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001

The Use of Ultrasound in Assessing Tonsillar Size in Children

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Introduction and Aims

Ultrasound is a readily available, safe, quick, repeatable technique which allows dynamic assessments in vascular access and regional anaesthesia. Ultrasound has been used to assess the hyomental mobility and tongue size in which may predict difficult tracheal intubation in morbidly obese patients.[1] It has also been used in the assessment of the tongue base width which correlates with sleep apnoea severity.[2] Adenotonsillar hypertrophy in children is the most common anatomical abnormality associated with obstructive sleep apnoea. Perioperative complications associated with adenotonsillectomy are more common in children with severe obstructive sleep apnoea.[3] Our aim was to assess the assess the validity of ultrasound as a tool for measuring tonsillar size in children.

Methods

26 healthy children aged 2-6 years underwent transcervical ultrasound assessment of their tonsils prior to their tonsillectomy operation at a tertiary referral paediatric hospital over a 6-month period. Following induction of anaesthesia a 13-6 MHz ultrasound probe was used to visualize and measure the tonsil in three planes. Volume was calculated using a standard sonographic formula height x length x width x 0.523. Tonsillectomy was performed by a consultant or senior trainee otolaryngologist. The excised tonsils were measured in three planes and volumes determined using the water displacement technique. The two tailed Mann-Whitney test was used to compare the sonographic and the actual tonsillar size.

Results

The mean tonsillar size (±SD) using ultrasound was 3.64mls (±2.53mls) which was not significantly different when compared to a mean actual tonsillar size of 3.99mls (±2.13mls) (p-value = 0.24, Z-score = -1.18, U-value = 1170.5).

Discussion and Conclusion

This is the first study to show that ultrasound is a reliable method for assessing tonsillar size in paediatric patients. Adenotonsillar hypertrophy is one of the anatomical parameters in predicting obstructive sleep apnoea in children which has been associated with periopertive complications. Using ultrasound to assess tonsillar anatomy preoperatively could potentially be part of a risk stratification system in children with obstructive sleep apnoea undergoing tonsillar surgery.

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002

Anaesthetic Perioperative Management of Vein of Galen Malformation: A Review of 192 Anaesthetics

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Introduction and Aims

Vein of Galen malformations (VGAM) are rare arteriovenous malformations which often present neonatally with high-output cardiac failure. Limited published information exists regarding appropriate anaesthetic management for such cases. We have reviewed the perioperative management of VGAM in a single centre.

Methods

A retrospective case note review of 77 patients, undergoing 192 VGAM embolisation procedures in our institution over an 18-year period (April 1997 to April 2015) was undertaken.

Results

Demographics:

The number of embolisations per patient ranged from 1 to 7. At first embolisation, the median (IQR) age was 1.5 (0.3 - 25.5) weeks, with median weight of 3.7 (3.2 - 6.7) kg. 13% of patients were born prematurely and in 23% the diagnosis of VGAM had been made antenatally. We looked in most detail at neonates (≤ 4 weeks) undergoing first embolisation (NF).

Pre-embolisation status:

In the NF group (44 patients), 90% of the available echocardiograms (2 not available) showed features of either high-output cardiac failure or pulmonary hypertension, with 52% of these patients supported by inotropes and 46% on diuretic therapy. 81% of NF patients required assisted ventilation preoperatively. Evidence of pre-existing neurological ischaemic changes on CT or MRI were seen in 21% of the NF group.

Intraoperative management:

The NF group had central venous and arterial lines in situ for 76% and 71% of patients respectively. In this group 29% required one or more vasodilator and 56% required one or more inotrope intraoperatively. The majority of cases had a standard anaesthetic using sevoflurane, atracurium and supplemental fentanyl, median dose 2 (1 - 3) $mcg.kg^{-1}$. Severe cardiovascular or respiratory compromise occurred in 6% of cases.

Post-embolisation care:

Postoperatively 98% of NF patients were transferred to ICU. During the postoperative ICU stay of NF patients, 57% required one or more inotrope and 48% required one or more vasodilator. For the NF group the median days ventilated was 4 (2 – 8) and the median ICU length of stay was 5 (2 – 8) days. The outcome at latest follow-up for all patients was 23% mortality, 46% with current disability, and 31% alive without disability. Outcomes in the NF group were 34% mortality, 39% with current disability, and 27% alive without disability.

Discussion and Conclusion

Previously published mortality rates for VGAM case series vary from 10-23% overall, with a higher rate of 36-52% in neonates [1,2]. Our mortality rate of 23% is at the higher end, though this may reflect a high proportion of neonates in our series.

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003

A Pilot Randomised Open-Label Taste-Testing Study to Evaluate the Acceptability of Chocolate-Based Midazolam in Children

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Introduction and Aims

Children reject medicines mainly because of poor taste. Midazolam, a commonly used premedication agent in paediatric anaesthesia has a particularly bitter taste and is therefore often rejected by children. The generally limited availability of solid dosage forms small enough to be swallowed by young children has compelled the World Health Organization to launch a global "Make medicines child size" campaign in 2007, and to advocate flexible solid oral dosage forms for children (1). In order to provide safer and more palatable substitutes for a midazolam premedication, we have developed prototype dark chocolate mini tablets. The aims of this project are to evaluate the acceptance of the midazolam chocolate tablets and the pharmacokinetic parameters and relative bioavailability.

Methods

Following Ethics committee approval, 150 children (3-16 years) who have been prescribed a premedication with midazolam by their treating anaesthetist, are invited to participate in this ongoing trial. The patients are randomized to receive either the chocolate-based midazolam or the currently used IV midazolam solution orally at 0.5 mg/kg. Children were asked how much they like the sample using a five point facial scale (1 very much dislike to 5 very much like). Anxiolysis was scored with a 4 point scale behavior scale (1 unafraid, calm, playing, relaxed to 4 crying, clinging, combative). The time to clinical onset of anxiolysis was recorded. Up to four blood samples were collected for population pharmacokinetic analysis of midazolam and its active metabolite.

Results

These are the results of a pre-planned interim analysis following the administration of chocolate tablets to 20 children. The time to onset of sedation was similar between both groups (IV (mean±SD) n=18, 11.3±5.0, choc 12.4±6.4 minutes). All children in the chocolate group had adequate anxiolysis at the induction of anaesthesia, while 4 children in the standard group had insufficient anxiolysis. The children preferred the midazolam chocolate formulation (IV 1.5±0.6, choc 3.4±1.0). Parents and administering clinical nurses also scored the chocolate tablet superior in observed taste compared with the IV solution as 2.1±1.2 vs. 3.5±1.1, 2.2±1 vs. 3.2 ± 1.2, respectively. The final results of the pharmacokinetic modelling are outstanding.

Discussion and Conclusion

All children receiving chocolate midazolam achieved clinical effect within 30 min and the midazolam chocolate appears to be the preferred formulation compared with the orally ingested IV solution.

Funding

This study is funded by the Princess Margaret Hospital Foundation, Perth, Australia and the Australian and New Zealand College of Anaesthetists, Melbourne, Australia.

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004

Stating the 'Bleeding Obvious': Association Between Increased Transfusion and Mortality During Paediatric Heart Surgery at Alder Hey Children's Hospital

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Introduction and Aims

Blood transfusions are common during paediatric cardiac surgery. Transfusions are required due to haemodilution during cardiac bypass, critical illness associated anaemia and haemorrhage (1). Very large transfusions will be a consequence of severe haemorrhage. The aim of this study is to examine the association between transfusion and outcome in patients undergoing surgery for congenital heart disease over the past 13 years.

Methods

Retrospective analysis of transfusion data in patients undergoing paediatric cardiac surgery with cardiac bypass, excluding those whose surgeries overlapped a period of extracorporeal membrane oxygenation (ECMO), between 2002-2015. The primary outcome measures were 10-day perioperative blood donor exposures and 30-day mortality. Other variables were considered for risk adjustment. The PRAISE model (risk estimation during heart surgery (2)) was used for further risk adjustment on those operated after April 2009. Multivariate logistical regression analysis was conducted on factors which were significantly ($p<0.05$) associated with mortality in an initial univariate analysis.

Results

There were 3716 procedures in 3212 patients (16.4% neonates, 35.4% infants, 47.7% children, 0.4% adults). Overall 30-day mortality occurred in 63 (1.7%) patients. Age group, body weight, RACHS-1 score (3), 30-day reoperation, post-operative ECMO, exposure to cryoprecipitate, platelets or fresh frozen plasma as well as donor exposure were associated with increased mortality (univariate analysis). Odds ratios (95% confidence intervals) for mortality with increasing donor exposure (relative to those receiving less than 3 exposures) were: 4.6 (1.7-13) for 3-5 exposures, 9.1 (3.4-25) for 6-10, and 43 (20-114) for greater than 10 exposures. There was considerable co-variance between age group, body weight, and surgical complexity. Only a single variable (body weight) was required in the final multivariate analysis with donor exposure. The association between increasing donor exposure remained strong. For those receiving greater than 10 exposures the risk of dying was 37 times higher (14-100). After adjustment for both weight and PRAISE risk (1817 surgical episode of whom 34 died) this association remained strong: 24 (6.7-97) for greater than 10 donor exposures.

Discussion and Conclusion

Large transfusion is strongly associated with worse outcomes during paediatric cardiac surgery. There are very clear limitations to this type of analysis and specific limitations to our study. Specifically, the absolute number of patient deaths (events) was small and confidence limits in risk estimates were wide. Despite this the size of the association is of note. Those receiving the largest transfusions had a risk of dying which was 43 times higher than those receiving small transfusions and remains strong after risk adjustment. It is likely that if effective interventions can be developed to reduce bleeding and transfusion then it will also reduce mortality.

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005

Paediatric Emergency Laparotomy Audit (PELA)

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Introduction and Aims

Since 2011 there has been increasing attention on the management of patients undergoing emergency laparotomy. This lead to the commissioning of the National Emergency Laparotomy Audit (NELA). NELA's aim is to compare outcomes following emergency laparotomy and promote quality improvement[1]. Children were excluded as the NELA working group felt emergency laparotomy was rare in children and that data would be difficult to collect and compare. We felt this may not be the case. Many of the NELA standards represented universal good practice and could readily be applied to children undergoing emergency laparotomy. We undertook a prospective audit of children undergoing emergency laparotomy. The aim was to ascertain whether practice in our Trust was in keeping with NELA standards of care and subsequently to develop a pathway for paediatric emergency laparotomy.

Methods

We conducted a prospective audit between July 2014 and February 2016, using a data collection tool based on key elements of the NELA form. Where possible, data was collected at time of surgery, followed by a detailed examination of case notes. A subsequent review was conducted 30 days post operation. Neonates were excluded. Key NELA standards included; time to review by consultant surgeon and anaesthetist, formal documentation of perioperative risk, administration of antibiotics, promptness of arrival in theatre, provision of intra-operative care by consultant surgeon and anaesthetist, admission to critical care and 30 day mortality.

Results

Fifty eight patients have been investigated to date. Average time to consultant surgical review was 6 hours, with 86% seen by a consultant surgeon and 34% by a consultant anaesthetist. Only one patient had a formal documentation of perioperative risk. Documentation was poor as to whether antibiotics were indicated or their timings. There are several examples of late antibiotic administration. Time from decision to operate was 3.5 hours on average (1.05 hours for NCEPOD category 1 cases). All patients received intraoperative care by a consultant surgeon and 90% by a consultant anaesthetist. 43% of patients were admitted to critical care post-operatively. There were no deaths within 30 days in this audit sample.

Discussion and Conclusion

Overall, care compared well with national standards, particularly in time from decision to operating, consultant surgical review, consultant led intra-operative care and overall mortality. Several areas were highlighted in which performance could be improved, including formal perioperative risk assessment, documentation of the perioperative journey, integration between surgical, anaesthetic and critical care teams and administration of antibiotics. We believe that an approach based on NELA standards is possible in children and that whilst we are performing well against some standards, others require improvement. To this end, we have developed a Paediatric Emergency Laparotomy Pathway aiming to improve adherence to NELA-based standards.

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006

Post Operative Analgesia in Tonsillectomy and Adenotonsillectomy: In the Wake of Withdrawal of Codeine from Paediatric Practice, How Effectively is this Being Managed?

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Introduction and Aims

A number of infant and child fatalities linked to codeine consumption have been reported, including some children with suspected obstructive sleep apnoea after adenotonsillectomy[1]. This led to national guidance being issued on the limitations of codeine use, with specific reference to tonsillectomy[2,3]. Simple analgesia and codeine were the mainstay of discharge analgesia after tonsillectomy in our paediatric ENT unit. In the wake of its withdrawal, we reviewed our analgesic regime. In this project we aimed to improve patient analgesia and therefore satisfaction, whilst ensuring patient safety.

Methods

Our review comprised of two cycles. An initial 2014 survey undertaken when patients were discharged on regular simple analgesia. It was then repeated after the introduction of 100mcg/kg Oramorph in 2015. The children were ASA 1 and 2 individuals, three to sixteen years old attending for daycase tonsillectomy or adenotonsillectomy. A questionnaire was distributed to caregivers for completion over the two week post operative course, which collected data on pain scores, analgesic administration, sleep disturbance, oral intake and unplanned GP or hospital attendances. A follow up phone call on day 7 and 14 served to collect similar information in the anticipation that questionnaire return would be less than fifty percent.

Results

Sixty six patients were enrolled over three months in 2014. Twenty nine questionnaires were returned. Highest pain scores were, as anticipated, within the first week post operatively with a mean pain score of 7. Twenty one of these children had documented sleep disturbance and reduced oral intake due to pain. Sixty nine percent of patients were successfully followed up with a telephone call. Over 34% of these children reported severe pain within the first week and 15 sought medical attention for infection and pain related issues. Similar methodology was utilised in the 2015 data collection after the introduction of Oramorph. On this occasion, more emphasis was placed on the follow up phone calls due to the modest questionnaire return rate in our initial cycle. Eighty patients were identified. Children experiencing severe pain had fallen to 22%. Nearly all the patients complied with the prescribed simple analgesia; however Oramorph was used less widely with only 46.7% of children receiving it. There were no reported side effects or obvious complications in the new analgesic regime.

Discussion and Conclusion

The results of this quality improvement project have been of benefit to our practice in managing paediatric post tonsillectomy analgesia. We have demonstrated a reduction in pain scores with no major complications with the addition of oral morphine. However there are still children experiencing severe pain, perhaps due to underdosing of Oramorph and parental reluctance to administer a lesser recognised medication. Moving forward we plan to increase the Oramorph dose to 150mcg/kg and improve parental education.

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007

RELAX Anaesthetics: the Effect of a Bespoke Distraction App on Anxiety Levels in Children Undergoing Anaesthesia

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Introduction and Aims

The process of administering anaesthesia in children can be distressing for both children and parents. Pre-operative anxiety is associated with post-operative behavioural changes [1]. Computer games and videos are effective at reducing anxiety [2], and have advantages over sedative premedication. We developed a tablet-based app, *RELAX Anaesthetics* for use as a distraction tool. The aim of this study was to measure and compare anxiety levels in children undergoing general anaesthesia using either the *RELAX app*, or traditional toys and books.

Methods

Ethics approval was obtained. Seventy children aged 2-16 years requiring general anaesthesia were consented and randomised to receive either *RELAX Anaesthetics* or traditional distraction methods during the anaesthetic procedure. Anxiety levels before entry to anaesthetic room, at initial entry, and during administration of anaesthesia were measured using the modified Yale Preoperative Anxiety Scale (mYPAS). Secondary measurements included intravenous vs. inhalational induction rate, previous exposure to tablets, and time to cannulation.

Results

Baseline comparisons between the two groups revealed no difference in previous hospital and surgical exposure, type of surgery, age and tablet usage. There was a slight difference in gender and 80% had weekly or daily exposure to tablet computers. Anaesthetic induction method was inhalational in 15 (21%) (mean (SD) age 4.9 (2.7)) and intravenous in 55 (79%) (mean (SD) age 7.5 (3.8)) with equal proportions in each group. Anxiety scores did not differ between the groups before and on entry to the anaesthetic room, although they both increased at that point to a similar level. There was a significant difference in anxiety scores during induction of anaesthesia with 65% of the *Relax app* group having a low mYPAS score vs 27% in the control group ($U = 409$, $Z = -2.064$, $p = .039$). Mean (SD) time from start to successful cannulation was 49.0 (19.4) seconds with *Relax Anaesthetics* compared with 82.6 (87.9) seconds without ($F=3.6251,50$ $p=.06$). There was also greater success at first attempt cannulation (90% vs. 77%) and fewer attempts at cannulation (1.1 (0.4) vs.1.3 (0.6)), ($F=3.3261,60$ $p=.07$) using *Relax*.

Discussion and Conclusion

Tablet computers are a simple gateway allowing access to a wide range of child-friendly content, that may be tailored depending on the developmental ability of the child, leading to engagement and distraction [3]. They can also modify the behaviour of healthcare providers to promote children's coping [4]. Our study showed a reduction in anxiety levels during administration of anaesthesia whilst using the *Relax app* compared with traditional methods, despite similar baseline anxiety scores. Interactive distraction may improve cooperation with procedures such as intravenous access or mask induction. Reduced anxiety improves behavioural compliance, and may improve efficiency, as well as quality of patient-centred care.

Chelsea and Westminster Health Charity (CWplus) provided funding for the development of the *RELAX Anaesthetics App.*

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POSTER PRIZE

008

A Quality Improvement Project in Can Tho, Vietnam: 'S.A.F.E SBAR'- Designing and Introducing a Checklist to Improve Anaesthetic Handover from Theatre to Recovery

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Introduction and Aims

In June 2015, the Anaesthesia and Perioperative Care Priority Setting partnership published its top-10 priorities for future research[1]. One priority was: how can we improve communication between the teams looking after patients throughout their surgical journey? This question was amenable to a local quality improvement project that we conducted on a recent paediatric charity trip to Vietnam, providing cleft palate and hypospadias corrective surgery to children from the Mekong Delta. Checklists have been shown to reduce preventable error and improve teamwork and communication[2]. Handovers are essential for continuity, patient safety and quality of care. In recovery, this takes place in a time-pressured/high-turnover environment with multiple distractions, leading to possible omissions or misunderstanding over relevant information. We developed a new checklist designed to improve anaesthetic handover from theatre to recovery.

SMART Aim

'We aim to improve the quality of anaesthetic handover from theatre to recovery by 20% on our charity trip, by designing and introducing a handover checklist.'

Methods

Using the model for improvement methodology, baseline data (ten-cases) were collected on day one of our trip on our outcome measure: 'percentage of handover complete in accordance to our checklist S.A.F.E SBAR'. S.A.F.E aims to ensure **s**upplying oxygen, **a**ttaching monitoring, **f**irst assessing immediate patient medical needs, before **e**ffectively communicating handover via an anaesthetic developed SBAR handover checklist. The checklist included patient name/age, weight, allergies, medical/drug history, operation performed, type of anaesthetic, lines/flushed, intraoperative management and complications, and a specific recommendation for care in recovery (such as airway, monitoring, analgesia, fluids, and antiemetics). We then introduced our checklist via a PDSA cycle, by educating and motivating the anaesthetists and recovery staff in its use, and by having a checklist champion. Laminated copies of the checklist were placed on the wall over each recovery bed space. Twelve random data samples were then recollected on our outcome measure throughout the rest of the charity trip.

Results

A run-chart created demonstrated that the median baseline percentage of handover complete was 71%(IQR 68-74%). Introducing a specific handover checklist led to a 24% improvement. The median percentage of handover complete increased to 95%(IQR 89-100).

Discussion and Conclusion

We have demonstrated that having a handover checklist has reduced omissions of relevant data, achieving our SMART aim. The recovery nurses felt empowered to prompt the anaesthetists to use the checklist. They liked 'S.A.F.E'- which allowed essential tasks to be performed before any information was relayed, ensuring the child was safe, especially working in a low resource environment. The design of an anaesthetic specific 'SBAR' was also happily received as it is a recognized tool in the UK hospital setting[3]. Having a champion driving the change is an invaluable resource. This will ensure sustainability and continued improvement.

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A Quality Improvement Project: Improving Theatre Recovery Throughput in Elective Craniofacial Paediatric Surgical Patients

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Introduction and Aims

Times of financial austerity need high-quality care whilst being efficient. 'Crossing the quality chasm[1]' demonstrated six-facets that define quality, of which being efficient and timely are specific to this project. Great Ormond Street is a world-class children's hospital, performing many complex surgeries. Discharge delays from recovery to HDU in major craniofacial surgical patients have been observed. Our aim of this project was to evaluate the efficiency of recovery throughput and implement changes in the craniofacial perioperative journey to improve flow, eventually developing an enhanced recovery(ER) pathway. Specifically we aimed to decrease the time spent in recovery by 30-45minutes, by December 2015.

Methods

Using improvement methodology, baseline data was collected on our outcome measure: time spent in recovery, on a random sample of twelve patients undergoing fronto-orbital remodeling and posterior-vault expansion during March-April 2015. Data was also collected on intraoperative anaesthetic management, reasons for recovery delays, and postoperative management- including removal of lines, return of functional recovery (eating, drinking, mobilising), and length of stay(LOS). Highlighted areas for improvement were explored via a key-driver diagram. Our first change-concept implemented through a plan-do-study-act(PDSA) cycle was an 'anaesthetic care-bundle,' consisting of five steps: active warming during induction/transfer/surgical preparation/surgery, dual anti-emetics, prompt sending of coagulation screen and full blood count towards the end of surgery, Haemoglobin >80-90g/L, and contacting HDU upon arrival in recovery as a prompt for imminent transfer. Data was re-collected in ten patients after presentation to the anaesthetic department and discussion with recovery nurses to gain enthusiasm and momentum in implementing the care-bundle.

Results

A run-chart created demonstrated the baseline median time spent in recovery was 130minutes (IQR 102.5-165minutes). Delays included drowsiness, transfusion, awaiting and checking laboratory results, nausea/vommiting, hypothermia and HDU transfer delays. After care-bundle implementation, the median time reduced to 100minutes (IQR 90-120minutes). Postoperatively, arterial and central lines were removed the same day, and peripheral cannulae removed day 1-to-4. Only 64% of patients achieved full functional recovery on day one, and hospital LOS was 2-to-7 days (mean3.5).

Discussion and Conclusion

Our care-bundle/change led to an improvement in outcome by 30minutes, achieving our aim. Local leadership/having a champion was key. After care-bundle implementation, the main recovery delay to discharge was HDU collection delays. We suggest our next PDSA-cycle should involve a streamlined, standardised care pathway(ER), to reduce variations in patient care, improve flow/reduce LOS, and increase productivity to improve the efficiency of HDU[2]. To encourage early removal of peripheral cannulae by establishing early oral intake (functional recovery), carbohydrate drinks pre-operatively and post-operatively (first 24hours) may be beneficial, preserving normal endogenous release of insulin and preventing the catabolic response to fasting[3].

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POSTER PRIZE

010

A Service Review of Baxter and Primal Sevoflurane

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Introduction and Aims

Inhalational induction with sevoflurane is widely used in paediatric anaesthesia. Our pharmacy switched sevoflurane brand from Baxter to Piramal as a cost saving initiative. We conducted a service review of the two sevoflurane brands to evaluate clinical effect due to concerns that there may be a difference.

Methods

Data was collected comparing the induction characteristics of a "snatch" induction during the transition time between brands. This was achieved using a maximal initial inspired concentration of 8% of the different brands of sevoflurane from a drager vaporizer. Ninety ASA I - III children were included where the anaesthetist was planning a "snatch" induction. Patients were excluded if they had significant cardiac comorbidities, required premedication, or if an incremental induction was planned.

A parent was present at each induction. Anaesthesia was administered by one of four anaesthetists using a standard technique. The anaesthetic was administered via a Mapleson F circuit with a tight fitting facemask. Each brand of sevoflurane was administered unblinded at 8% with 66% nitrous alongside oxygen with total flows of 9 litres. The time taken to loss of consciousness (loss of eyelash reflex), loss of purposeful movement and movement at cannulation, were recorded by a trained observer. The inspiratory and end tidal concentrations of sevoflurane were recorded at multiple time points throughout the anaesthetic. When induction was complete anaesthesia was maintained with 2.5% sevoflurane.

Results

Of the 90 patients studied, 44 received Baxter and 46 received Piramal sevoflurane at induction. The distribution of age (3.5 yrs [1 month – 7 yrs] vs 2.7 yrs [1 month – 10 yrs]), weight (12.7kg [SD 7.5] vs 12.4kg [SD 4.6]) and ASA score was similar in both groups. There were more boys than girls due to the inclusion of urological patients. Mean time to loss of purposeful movement was slightly shorter with Baxter (45.3s, SD17.1, range:34-90s) than with Piramal (51.1, SD 17.1, range: 45-89s) however this was not statistically significant ($p=0.06$). Mean time to loss of consciousness was 55.7s (SD19.1s range: 44-118s) for Baxter and 57.2s (SD 19.9s range: 51-122s) for Piramal. This was not statistically significant ($p=0.33$). More children appeared to move on cannulation with Piramal 6/46 versus Baxter 4/44 however this small difference was not statistically significant ($p=0.53$). No child coughed, vomited, had excessive secretions or bronchospasm during this review.

Discussion and Conclusion

Our study demonstrated no significant differences between induction times for the two brands of sevoflurane at maximal initial inspired concentrations. During the period, August 2014 – August 2015, the department made a cost saving of £68,931 by changing sevoflurane brand whilst the caseload remained constant. In view of the cost reduction of sevoflurane, without significant clinical impact, we are continuing to use Piramal Sevoflurane to reduce costs.

What Do Trainees REALLY Think of Training in Paediatric Anaesthesia in a Tertiary Centre? A Novel Approach to Assessing the Training Experience

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Introduction and Aims

Significant changes have occurred within paediatric anaesthetic training in our region in recent years. Intermediate level trainees are rotating for two months as opposed to three and we have recently moved to an entirely new hospital site. Alongside this, there is increasing emphasis for those delivering training to engage in reflective practice and submit evidence for appraisal and revalidation. Combining these issues, we developed an innovative method for trainees to provide feedback by anonymously rating the consultants on key aspects of the training. As recommended by the Royal College of Anaesthetists1, consultants have provided performance feedback to trainees for years and the process is familiar.

Project aims:
To allow trainees to anonymously assess and comment on teaching, training and out of hours support provided by all consultants.
To provide individual feedback to consultants for personal development.
To identify the department's strengths and weaknesses and areas requiring improvement.

Methods

From October 2015, each trainee received an email link to participate in a secure survey. Trainees were asked to anonymously assess and rank all 22 consultants with regard to 8 questions on a 4 point ranking scale.
Questions:
Formal teaching
Informal teaching
Provides clinical supervision appropriate for stage of training
Out of hours support
Assistance with work place based assessments (WPBAs)
Assistance with audit/research/presentations
Assistance with exam/interview preparation
Have you ever felt undermined by this consultant?
Questions 1-7 were answered with the scale:
Consistently good (4), acceptable (3), sometimes inadequate (2), often inadequate (1).
Q8 scale: Never (4), rarely (3), occasionally (2) and often (1).
Comments were encouraged.

Results

Of 29 trainees surveyed, 14 responded (48%). Areas of strength were formal and informal teaching, with median scores of 4 (IQR 0.2 [Range 2-4]) and 3.8 (0.275 [3.4-4]) respectively. High median scores were also apparent in levels of clinical supervision, 3.8 (0.2 [3.4-4]) and out of hours support, 4 (0.1 [3.7-4]). Assistance with WPBAs and audit/research/presentations were lower scoring areas, medians of 3.5 (0.375 [3-4]) and 3 (0.6 [2.5-3.6]) respectively. Trainees did not report feeling undermined by consultants.

Discussion and Conclusion

Trainees receive a high level of teaching and appropriate levels of supervision. The survey identifies areas requiring development, particularly assistance with WPBAs and non-clinical activities. Consultants have since ensured they are accessible on e-portfolio. Our audit lead is developing rolling audits for trainees to participate in during their short rotation.
Individual performance feedback, made easy to submit for appraisal, was provided to each consultant confidentially, along with departmental scores, creating fiercely competitive discussions!
We feel this is a unique method for evaluating our department's performance and are committed to continuing this project to further improve the quality of training provided.

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POSTER PRIZE

012

Reducing Error in Paediatric Anaesthetic Emergencies

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HENE

Introduction and Aims

Medication errors are a huge problem in the NHS. Recent studies report that up to 6.5% of patients admitted to hospital experience medication-related harm[1]. Approximately a third of these errors are due to wrong dose, strength or frequency of medications. Drug errors in the paediatric population are potentially more serious due to the need to calculate drug doses on a patient weight basis. A miscalculation or dosing error has the potential to cause significant morbidity and mortality to a child. The aim of this project was to reduce the cognitive load of calculating the doses in an emergency situation, to reduce the number of drug errors during emergency situations in Paediatric Anaesthesia.

Methods

The whole process was mapped to identify why drug errors occur in paediatric anaesthesia and to identify where improvements could potentially be made. The current situation was measured by recording the number of critical incidents and near misses in the hospital in the year prior to the project. Stakeholders' views were sought using a survey. A quick reference tool was created in consultation with the multi-disciplinary team. The aim of the tool was to make it easier to calculate the correct dose of emergency drugs in paediatric anaesthesia. The first draft of the tool was drafted and presented to the stakeholders for them to give feedback and suggest improvements. The final draft was piloted in one theatre, for one week and feedback was sought from the teams involved. The tool was advertised to the multi-disciplinary team before rolling out its use across the paediatric theatre suite.

Results

The results of the pilot showed that the quick-reference tool is simple and easy to use. The teams that used the tool gave positive feedback. The location of the tool within the anaesthetic room was changed following the pilot. It has been shown to reduce the time taken to calculate emergency drug doses compared with using memory or the British National Formulary (BNF). The tool also allows the correct dose to be clearly displayed in the anaesthetic room and theatres so that the whole team can see what dose needs to be given.

Discussion and Conclusion

The quick reference tool is a quick, effective and cheap method to help with calculating emergency drug doses in Paediatric Anaesthesia. It has been shown to reduce the time taken to calculate the necessary drug dose. It has been more difficult to demonstrate a significant change in the number of critical incidents due to drug errors as these incidents are very rare.

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The Usefulness of the Modified Yale Preoperative Anxiety Scale and Other Qualitative Markers for Induction of Anaesthesia in Paediatric Patients

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Introduction and Aims

Induction of a child for anaesthesia for day case surgery, is often a challenge.
Little is written about the communication skills of the anaesthetist for this process. Obtaining compliance of the child depends on a number of factors, adapting to the child's level of communication, using appropriate and goal focused imaginative play where appropriate in an acceptable time scale. Anecdotally it is believed compliance is smooth when the child makes eye contact, communication is clear and non threatening, parental insight is high and can be facilitated by persons accompanying the child which can be the parent or a member of staff.

Methods

The short version of the modified Yale preoperative anxiety scale was used by the anaesthetist on the day ward and the anaesthetist in theatre to assess the child's level of anxiety. The child's score on the day ward was blinded from the anaesthetist in theatre. Two separate scoring records were developed. The anaesthetist in theatre also answered a number of other questions about the process of induction and interpersonal communication skills between the anaesthetist and child and the general theatre environment. All data was recorded on paper forms with collected afterwards by an independent research assistant. This was conducted as part of a larger study evaluating parental perceptions of anaesthesia for day case surgery.

Results

Over 100 children were assessed preoperatively and at induction by two separate anaesthetists. Children who scored as anxious on the day ward did not always score anxious in theatre even without a premed being given. Children although anxious in theatre were reported to have had a smooth induction. Eye contact was a good predictor of ease of induction. Fasting times were prolonged in a number of these cases, and should be consideration in evaluation of the anxious child.

Discussion and Conclusion

The short version of the modified yale preoperative anxiety scale could not always predict the child's level of anxiety in theatre. Other questions asked about eye contact, the role of the person accompanying the child yielded useful information. Coaxing was not felt to have been conducted by the anaesthetist in theatre but this may reflect anaesthetists level of insight into their own level of interpersonal communication skills with the child or that of others around the child. The change in the child from anxious on the day ward to non anxious in theatre suggest other positive attributes occur when the child and parent come to theatre. The short version of the modified Yale preoperative anxiety scale and questions asked of the anaesthetist in theatre regarding the interpersonal components of communication behaviour may help to increase ours and that of trainees insight into this domain of psychological overalay which occurs at induction.

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014

Pharmacoeconomics of Sevoflurane

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Introduction and Aims

Sevoflurane is the preferred volatile in paediatric anaesthesia and represents a significant expenditure. It was identified as a source of cost reduction through brand change and judicious use.
The aims of this project were to investigate:
(1) volatile use compared to 2011; choice of volatiles and fresh gas flow (FGF) rates
(2) the impact of sevoflurane brand change from Baxter to Piramal in terms of cost consumption

Methods

(1) The choice of volatile and FGF rates were recorded for 50 randomly selected cases. Measures were taken 15 minutes or more following transfer from the anaesthetic room. The airway device and breathing circuit in use was also noted.

(2) Consumption of sevoflurane (bottles/month) was monitored for a 12 month period before and after brand change (August 2014). The price of sevoflurane in the respective periods was obtained, allowing calculation of cost per month. The influence and trend of annual caseload was sought using the number of cases conducted in the relevant periods.

Results

Sevoflurane use increased from 56% (28/50) in 2011 to 72% (36/50) in 2015. Isoflurane (24% to 20%) and Desflurane (20% to 8%) use had reduced. Mean FGF reduced from 2.78L/min to 1.75L/m. All analysed cases used circle breathing systems and endotracheal tubes.

Consumption and cost:
The cost for 12 months before and after brand change was £234,133 (2934 bottles x £79.9/bottle) and £165,742 (2889 x 57.37) respectively, a saving of £68,391. There were 20,040 cases in 2013-14 and 19,800 in 2014-15. This compares with 18,766 and 18,919 cases in 2011-12 and 2012-13 respectively.

Discussion and Conclusion

Sevoflurane remains the volatile of choice, and indeed the data suggests increasing use. Desflurane use has seen the greatest decline, whilst use of isoflurane has remained constant. Our 2011 recommendations to consider alternative agents have not been observed, although the sample size is limited.

Mean FGF rates have reduced by 1.03L/m, which has potential to substantially reduce cost and pollution over the approximate twenty thousand annual cases. Whilst encouraging, and in line with 2011 audit recommendations to consider flow rates, the limitations of small sample size and mean as a statistical method is acknowledged.

Brand change has resulted in a significant cost reduction, without a significant change in consumption of sevoflurane and case load. This assumes similar rates of non-volatile anaesthetic techniques.

Brand change is a viable cost-saving exercise without compromising clinical care. Efforts to reduce FGF rates through audit and dissemination may further reduce cost and pollution.

Prevalence of Preoperative Anaemia in the Paediatric Population

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Introduction and Aims

Preoperative anaemia is an independent risk factor for adverse perioperative outcomes in patients undergoing surgery [1]. As well as an increased risk of 30-day mortality and cardiac events [2], it is also associated with respiratory, urinary, wound, septic and thromboembolic complications [3], and a negative effect on functional recovery, length of stay and quality of life outcomes. The prevalence of anaemia varies within different populations [4], occurring across all age groups and remains significant after adjustments for associated disease. The aim of this audit was to determine the prevalence of anaemia within the paediatric population presenting for surgery at our institution.

Methods

Following registration with the hospital audit department, all patients presenting for elective and emergency non-cardiac surgery at our institution over a 14-day period were prospectively audited. Data was collected on the haemoglobin concentrations of all patients who had a full blood count within 28 days of their surgery. Anaemia was defined by the normal value ranges according to age, as used by the hospital's haematology laboratory, in accordance with international values.

Results

A total of 723 patients underwent elective or emergency non-cardiac surgery during the14-day audit period, of which 46 % (331 patients) had a full blood count within 28 days of surgery. Forty nine percent of these patients were found to be anaemic, having a haemoglobin level below their age specific normal range. Using the WHO assessment of severity for paediatric anaemia, 20% of cases were classified as mild, 76% moderate and 4% severely anaemic.

Discussion and Conclusion

Oxygen delivery is determined by cardiac output and oxygen content of blood [(1.34 x Hb x SaO2) + (0.003 x PaO2)]. Oxygen bound to haemoglobin therefore accounts for a significant proportion of oxygen content. During the perioperative period there is an increase in oxygen requirements with reduced oxygen delivery. In the presence of anaemia the normal compensatory mechanisms are overwhelmed favouring anaerobic metabolism and cellular hypoxia leading to suboptimal organ function. As a modifiable risk factor for adverse perioperative events, the detection and management of anemia prior to surgery in the adult population has been the focus of much attention.

This prospective audit has shown that the paediatric population is also at risk of presenting for non-cardiac surgery with a haemoglobin concentration below the age specific normal range and therefore may be at increased risk of adverse outcomes associated with anaemia as demonstrated in the adult population.

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POSTER PRIZE

058

Paediatric Cardiac Arrest...Who Should Make the Call? A Survey of Multi-Disciplinary Opinions Regarding Decision-Making in Termination of Paediatric Cardiac Arrest

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Introduction and Aims

Paediatric cardiac arrest (CA) is a relatively uncommon event and generally secondary to a prolonged period of hypoxia and/or hypovolaemia/shock[1]. Despite the known poor outcomes for out-of-hospital arrest the decision to stop resuscitation may be challenging for clinical staff. Recently published consensus guidelines relating to termination of traumatic CA empower a clinician to make such a decision[2]. No single variable has been shown to reliably predict outcome. Therefore decision-making is likely to be based more on experience. Revised ERC guidelines advocate a "tailored code" where high quality resuscitation is performed but clear limits are defined[3]. The fact that paediatric CA is uncommon when compared to adults inevitably means that trainees' inexperience may lead them to await consultant support prolonging the resuscitation, sometimes with return of circulation. Ultimately treatment may then be discontinued some hours or days later. There were concerns within our Trust that on occasion delayed decision-making during paediatric CA had prolonged resuscitation despite futility.
To determine:
1) If the subject of termination of paediatric CPR is adequately covered in advanced resuscitation courses?
2) What grade of doctor can lead decisions on termination of the attempt to resuscitate?

Methods

A survey was conducted within our Trust. Consultants, trainees and nurses from 3 specialties (Emergency medicine, Anaesthesia/Critical Care and Paediatrics) were surveyed.

Results

145 responses; 72 doctors (39 consultants/33 trainees) and 73 nurses.

Aim 1) Of the 145 who responded 55% (n=80) had either APLS/EPLS or NILS qualifications.
76% (n=51) felt the topic of termination of CPR was not well covered. Of those who were instructors (n=13) 54% felt the same.
Aim 2) All groups supported senior trainees (within 2 years of CCT) as well as consultants in all 3 specialties to make the decision to terminate resuscitation.
45% of consultants and 57% of nurses felt that a senior trainee could make the decision to terminate, however only 12.5% (n=1/8) of senior trainees surveyed *would* terminate without seeking a consultant opinion.
92% of ST3-ST8 wanted consultant input before terminating.
60% of consultants wanted to consult a colleague before terminating.

Discussion and Conclusion

Our survey suggests that respondents felt training could be improved. We would advocate the addition of scenarios in resuscitation courses that promote discussions on withdrawing CPR. It appears that all clinicians feel that senior trainees in each specialty should be able to make the decision to terminate resuscitation, however few trainees themselves are comfortable to do so. In addition, given that most consultants would seek colleague consensus, it would seem unreasonable to expect trainees not to do the same. Formation of locally agreed guidelines detailing who should be involved in this decision may reduce the prolongation of futile resuscitation attempts. It would also set clear standards and roles.

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Factors Predicting Impact of 711 Pediatric Anesthesia Case Reports

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Introduction and Aims

Case reports in pediatric anesthesia provide an opportunity to drive hypothesis generation and testing for future clinical applications and research. However, their quality and impact on anesthesia scientific literature is largely unknown. The goal of our study was to assess the quality of published pediatric anesthesia case reporting using the Case Report (CARE) guidelines and the bibliometric impact of published pediatric anesthesia case reports and identify factors associated with high citation rates.

Methods

This systematic review was exempt from local ethics board approval. Pediatric anesthesia case reports published over a ten year period from 2005 to 2014 were identified on Medline and Embase and evaluated according to predefined criteria. Quality of case reports was assessed using the CARE guidelines Score. Untoward events were evaluated using the **Anesthesia Quality** Institute (AQI) anesthesia adverse events and near-misses framework. Bibliometric impact (citations) of case reports published prior to 2011 was assessed using Scopus.

Each report was categorized into low quality (scores 0 to 10), lower medium quality (scores 11 to 18), upper medium quality (scores 18 to 23), and high quality (scores 24 to 30). Quantitative data was analyzed using descriptive statistics and non-parametric tests as appropriate. Factors associated with high citation rates were identified using multivariate analysis.

Results

711 case reports published across 156 journals originating from 56 countries were included for analysis. The number of case reports published each year decreased from 87 in 2005 to 37 in 2014. The mean age of patients was 6.5 years old, and weight was 22 kg. Only forty percent of cases reported untoward events. The most commonly reported untoward events were death (5%), cardiac arrest (3.8%) and re-intubation (3.5%). Overall, cases scored low on quality of reporting with a mean CARE checklist score of 18.5 (median 19; range 0-26).

Only 2% of case reports were of high quality with the majority being lower medium quality (67%). The mean number of citations was 5.6 (median = 3; range= 0-129). Seventy-nine percent of case reports were cited.

Factors predicting a high citation rate (>10) were low birth weight, cardiac surgery and the occurrence of cardiac arrhythmias requiring management. The CARE guideline score did not correlate with the number of citations.

Discussion and Conclusion

The number of case reports published in pediatric anesthesia have decreased over a decade, are of moderate reporting quality and are frequently cited. We have identified factors that are associated with citation. Efforts are needed in improving the overall quality of case reports in pediatric anesthesia.

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080

Use of Simulated Scenarios to Assess Effectiveness of Emergency Paediatric Tracheostomy Emergency Algorithms and Training

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Introduction and Aims

Clinical incidents involving tracheostomies are well documented[1,2] and various patient safety initiatives have been aimed at targeting this in adults[3]. We wished to assess the effectiveness of a new paediatric tracheostomy emergency algorithm in improving safety. Simulation is a rapidly developing area of medical education used for training skills and scenarios, to practice uncommon or potentially life-threatening events in a safe environment, including training for cardiac arrest situations[4]. We utilised a simulated scenario in a novel way to assess the efficacy of our training package and emergency algorithm.

Methods

141 volunteer healthcare professionals (52 ENT consultants, 37 anaesthetic trainees, 32 nurses and 19 ENT trainees) each managed a simulated scenario of a child with a blocked tracheostomy. Three performance metrics were measured and analyzed: time with oxygen saturations less than 88% (SpO_2<88%), time to call for help, and total scenario time. Participants were then given a targeted training package using a new paediatric tracheostomy emergency algorithm. Following this, participants managed a second subtly different scenario with emergency algorithms available, and the same performance metrics measured.

Results

Average time for the scenario decreased from 541 to 402 seconds, (mean difference 139 seconds, $p<0.005$). Mean time to call for help decreased to 227 from 342 seconds, (mean difference 116 seconds, $p<0.005$). However the largest improvement came in the time with SpO_2<88%, with a pre-training mean time of 474 seconds, dropping to 270 seconds (mean decrease 204 seconds, $p<0.005$). Dividing results for subspeciality, post-training times for total scenario time and time with SpO_2<88% improved most for the ENT trainees (means of 164 and 246 seconds respectively), although this group had been slowest pre-training. Time to call for help improved most in the anaesthetic trainee group (mean 129 seconds), however results for this data set were very similar for all subspecialties.

Discussion and Conclusion

We have demonstrated statistically significant improvements in the three time metrics measured: on average participants called for help 2 minutes sooner, simulated patients had SpO_2<88% for 3.5 minutes less, and the entire scenario was completed 2.5 minutes faster. However there are a number of factors that could cause this improvement: the training package, having an emergency algorithm available for the participants to use in the second scenario, having already performed a similar scenario (i.e. they have practiced), or a combination of all of these factors. However we would argue that it does not necessarily matter which is the cause, as the most important point is improvement in oxygenation of patients in these emergency situations, plus getting appropriate help swiftly. These are the factors that could improve patient safety and importantly, may reduce the severity of clinical incidents related to tracheostomies when they occur.

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A Needs-Based Assessment of Paediatric Pain Management Teaching for UK Anaesthetic Trainees

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Introduction and Aims

Acute paediatric pain management is a key core competency of the Royal College of Anaesthetists' curriculum[1]. A recent survey of anaesthetic trainees in our deanery revealed that most found out-of-hours paediatric pain management challenging or even overwhelming. The perceived need for increased formal teaching emerged as a common theme. This prompted us to investigate if this issue is pervasive nationally. The aim of our study was to determine UK trainees' perceived confidence in their management of paediatric acute pain, along with their experience of training in this area. We compared local with national practice, to ascertain whether there may be a requirement for a more, formal, standardized training approach.

Methods

An online survey specific to our study aim was created and distributed nationally to Anaesthetic Specialty Trainees years 3 to 7. Results were analyzed descriptively.

Results

We received responses from 241 anaesthetic trainees, 30% of whom had completed higher paediatric training. Responses pertaining to differing experiences and confidence in the management of acute paediatric pain are categorized below:

Experience in paediatric anaesthesia – Over half of respondents had completed an 8-12 week module and 54% had anaesthetised >100 cases.

Confidence in providing paediatric acute pain management – Less than 20% of respondents felt very confident, but the majority (86%) had a point of reference for out-of-hours advice - often (39%) the on-call paediatric anaesthetist.

Involvement in paediatric acute pain management – Forty-one percent of respondents had managed acute pain on 1-5 occasions, while 10% attended >20 pain calls.

Training/teaching at induction – Forty-one percent of respondents had received no formal training. Of those who had, 44% felt the teaching to be very beneficial despite, only 27% having had multiple sessions. 69% of respondents stated that pain teaching sessions incorporated into their paediatric module would be of benefit.

Analgesic modalities – Trainees most commonly encountered Morphine PCA (66%), followed by NCA Morphine NCA (58%) and epidural (52%). Less commonly, Ketamine infusion (36%), PCA Fentanyl (29%) and NCA Fentanyl (26%). 79% reported low confidence when adjusting doses for these infusions.

Acute pain ward round – Sixty-eight percent of respondents had never participated in acute pain ward rounds. 45% of those who had, found them to be very beneficial.

Discussion and Conclusion

The survey has demonstrated that UK anaesthetic trainees perceive paediatric acute pain management teaching to be absent or sporadic, or if present, of variable structure and quality. It is therefore not surprising that trainees report a lack of confidence in clinical scenarios, as this may be considered a proxy measure of their training need. We believe that the high response rate to the survey supports the introduction of a more robust national training programme, tailored to individual institutional policies and practices.

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090

Comparison of Invasive and Non-Invasive Blood Pressure Measurement in Children Undergoing Cardiac Catheterisation

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Introduction and Aims

In the last two years, we have had three critical incidents in the paediatric cardiac catheterisation laboratory in which hypotension may have been a contributing factor. In all three cases there was a significant disparity between the invasive pressure (IBP) and non-invasive blood pressure (NIBP) readings. With the exception of neonatal intensive care studies 1,2,3, there is little published data on the correlation between invasive and NIBP in children. Cath. Lab. is one of the few areas in which invasive and non-invasive blood pressure is routinely measured simultaneously during a procedure under general anaesthesia. The aim of this prospective observational study is to assess how invasive and non-invasive blood pressure readings correlate for children undergoing cardiac catheterisation under general anaesthesia. The study also aims to address whether age plays a factor in the relationship between NIBP and IBP.

Methods

A prospective observational study collected three paired simultaneous NIBP and IBP readings for each study subject during a stable, balanced phase of maintenance anaesthesia in ninety patients undergoing cardiac catheterisation across the neonatal to adolescent age range. Research Ethics Committee approval in the form of proportionate review was successfully applied for and a favourable opinion provided for the study. Each invasive systolic, diastolic and mean blood pressure value was subtracted from the simultaneous non-invasive value. The three differences were then mean averaged and compared against age.

Results

The results of the study demonstrate that NIBP can read up to 39mmHg above the corresponding IBP and as much as 34mmHg below the same IBP. The results also demonstrate an inverse correlation relationship between the agreement of NIBP and IBP with the age of the child. In the neonatal and infant age group, systolic, diastolic and mean arterial NIBP tends to over-read when compared to the IBP. At the adolescent age range, the relationship reverses where NIBP tends to under-read compared to the IBP.

Discussion and Conclusion

There is a paucity of data examining the agreement of blood pressure measurement when measured invasively and non-invasively across the full paediatric age range. Current evidence is limited to neonatal studies performed in a NICU population and is not necessarily transferable to general anaesthesia. This novel prospective observational study examines the relationship between simultaneously measured IBP and NIBP and finds the difference can be extremely large. The study also demonstrates a relationship with the age of the child where our study demonstrated NIBP over-reads in neonates and infants and under-reads in older children and adolescents. The initial study will be expanded to three other UK tertiary paediatric cardiac centres to increase the study sample size.

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016

Great Ormond Street Preoperative Assessment Clinic: a Patient's Perspective

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Introduction and Aims

The anaesthetic preassessment clinic at Great Ormond Street Hospital opened in February 2015. The aim of the clinic is to reduce the need for on-the-day cancellations due to unforeseen clinical problems. With the introduction of a new service we wanted to assess patients' experience of attending the clinic and how it affected the ongoing patient journey.

Methods

We prepared a patient feedback questionnaire regarding the experience of being assessed at the pre-assessment clinic prior to theatre. 100 patients who had attended the preassessment clinic gave telephone feedback at least 2 weeks following surgery.

A total of 268 patients were telephoned. The response rate was 77% for those that answered the telephone and 33% for all telephone calls made.

Results

The average age of patients attending the clinic was 5.49 years. 65% of respondents were waiting for less than 30 mins. 77% of those respondents waiting more than 30minutes were offered a pager to allow them to leave the clinic area and return when necessary. 61% of respondents remembered receiving written information or leaflets. 100% of respondents felt very prepared or quite prepared for the anaesthetic following preassessment clinic. 67% of respondents thought attending the pre-assessment clinic was very useful.

Following are a selection of comments received:

- Consultant was very patient, explained things directly to patient. Was very reassuring and helped make the decision to go ahead with the operation because they had been putting it off for 7 years due to being nervous about the anaesthetic. Able to ask as many questions as we wanted. Very calming experience.
- Very good. Checked with colleague. Very thorough.
- Took good care of us. Gave a lot of information.

A number of areas for improvement were identified by respondents:

- Would be good to be seen even quicker but 30 mins is not a long time to wait considering the number of people that have to be seen.
- A long day. Disjointed - departments don't talk to each other. I was waiting in between appointments during the day so could have come earlier if they'd realised. A lot of hanging around on the day of surgery. Could have done it all on the day anyway, especially as had an anaesthetic before.

However, the majority of respondents had no improvements to suggest.

Discussion and Conclusion

We have conducted a patient satisfaction survey of a newly opened pre-assessment service. The method of obtaining feedback by telephone questionnaire was successful and facilitated a lot of open comments. Some areas for improvement have been identified by conducting this process. These include streamlining who the patient sees on the day of clinic and introducing possible telephone and video conferencing consultations in the future.

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017

Observational Analysis of the Use of Fibrinogen Concentrate (RiaSTAP) in Paediatric Cardiac Surgery

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Introduction and Aims

Acute acquired hypofibrinogenemia in children undergoing cardiac surgery can result in increased perioperative bleeding and large allogeneic blood transfusions which are associated with increased mortality. In the UK, cryoprecipitate, is usually used to supplement fibrinogen. As one paediatric unit of cryoprecipitate, sourced outside the UK (reduced vCJD risk) and methylene blue treated, is required for every 5 kilograms' body weight, transfusions can be expensive and result in multiple donor exposure. An alternative is human fibrinogen concentrate (RiaSTAP), a pooled, highly purified, viral inactivated, human plasma which delivers a standardised concentration of fibrinogen with no other clotting factors or plasma proteins. The product comes as a powder (1g vial) which can be easily reconstituted into a liquid. Although derived from human blood due to its preparation it is considered safer than cryoprecipitate and doesn't require the standard allogenic blood products cross-matching, processing or storage. Currently it is only licenced in the UK for the treatment of congenital fibrinogen deficiency but it is licenced and widely used in Europe. Initial evidence indicates that it is a safe and effective alternative to cryoprecipitate in bleeding children undergoing cardiac surgery.

Methods

RiaSTAP is available for the use of life threatening bleeding and severe acquired coagulopathy at our hospital. Observational analysis of its intraoperative use in cardiac surgery from May 2013 to June 2015.

Results

Eighteen patients received RiaSTAP. All patients had medium / high risk complex congenital cardiac disease and were undergoing complex surgery requiring cardiopulmonary bypass. Ten neonates (< 14 days old and <5Kgs); four infants (<2 years and <15kg) and four children (4 - 13 years and >15kgs) all received protamine, tranexamic acid, red cells, platelets and one dose 70mg/kg RiaSTAP intraoperatively. Three received subsequent intraoperative RiaSTAP doses. Mean pre-operative/intraoperative fibrinogen was 1.2g/l (range 0.3-1.9). Mean post-operative fibrinogen was 1.9g/l (range 1.4-2.8). Three required a further episode of cardiopulmonary bypass due to bleeding. In the next 30 days: none required re-operating; four required ECMO and one died. Excluding those children requiring ECMO total intraoperative mean donor exposure was 7.4 (range 3-21). All consultant anaesthetists thought the time to RiaSTAP administration was acceptable and 61% thought the product was helpful in the particular case. There were no reported cases of anaphylaxis, thrombotic events or other complications.

Discussion and Conclusion

Improvement in the management of intraoperative coagulopathy may play a role in improving the outcome in paediatric cardiac surgery. Fibrinogen concentrate provides a safe, non-allogenic blood product alternative to cryoprecipitate. It has a number of advantages at a similar cost. (One vial costs £400. Dose equivalent to three units cryoprecipitate £390.) Further trials are required to assess its effectiveness and to validate its use in the management of acute acquired hypofibrinogenemia in paediatric cardiac surgery.

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Patient Satisfaction Improvement After Post-Operative Standardized Video in Adenoidectomy Patients

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Nationwide Childrens

Introduction and Aims

Adenoidectomies are common procedures performed in private, academic and community surgical settings in the United States. However wide variability exists amongst institutions regarding age, weight, medical, psychosocial, and other requirements for same day discharge status. In addition many adenoidectomy patients do not get prior sleep studies for the primary surgical diagnosis of sleep disordered breathing due to time and expense. Risk stratification as to same day discharge is at the otolaryngologist discretion and therefore subjective. Although we have guidelines defining criteria for postoperative admission status at our institution for adenoidectomies, it is general and may over admit patients. It is also unclear how many of these children who are discharged the same day are seen in urgent care centers or the Emergency rooms after and why. Parental education, comfort, and satisfaction may play a role in increasing same day discharges.

We aimed to decrease the percentage of post-operative admission of healthy patients aged 18-24 months with SDB undergoing adenoidectomy following implementation of a standardized post-operative teaching video. Parental satisfaction and comfort with discharge were measured for enrolled patients in addition to the institutional cost savings associated with same day discharge

Methods

26 subjects aged 18-24 with SDB undergoing adenoidectomy were enrolled. All parents watched a standard teaching video prior to discharge. (“What to expect after your child has adenoid surgery at NCH”). 17 patients were discharged on the same day of surgery while 9 patients were admitted due to parental reluctance or initial criteria not being met. All discharged patients were followed up with phone call to measure satisfaction scores and to answer any concerns by an Anesthesiologist. Fisher exact test was used to compare patient comfort, pain medication administration and feelings about being discharged.

Results

There was no statistical significant difference in age at discharge or perception of video helpfulness. However, there was a marginally significant difference in respondent comfort with discharge, with more respondents feeling completely comfortable among those who found the video helpful. Cost analysis comparing same day discharged vs admitted patients demonstrated a 32% decrease in pharmacy costs and 53% decrease in procedure cost with an overall savings of $50,000.

Discussion and Conclusion

Anticipatory parental education for ambulatory adenoidectomies in selected healthy young children increases patient satisfaction, decreases unnecessary hospital stay and prevents use of excessive hospital resources. More research has to be done with effect of standardized readily available teaching on improved parental understanding and leading to better outcomes and satisfaction.

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019

Analgesia for Tibia-Fibula External Fixation in Children

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Introduction and Aims

Ilizaroth frames are increasingly used for fracture stabilisation and limb lengthening procedures. A review showed pain may result in negative psychological behaviour in adolescents[1]. Children should meet a clinical nurse specialist/psychologist, occupational therapist and play specialist pre-operatively. Wide variations of analgesic techniques, with variable pain control were noted in our trust.

The aims were threefold:
1) Review satisfaction with pre-operative information.
2) Audit analgesia against national standards (RCoA[2], APAGBI[3]).
3) Analyse analgesic techniques and pain scores.

Methods

Prospective anaesthetic, surgical and pain data was collected between September 2014–January 2015. Parents and children were questioned about satisfaction of pre-operative information. Retrospective data was collected for cases between March 2013–August 2014. Data was extracted from MedICUs database and casenotes.

Results

Nineteen patients underwent surgery. Twelve cases were performed in 18 months (retrospective), followed by seven cases in 5 months (prospective). Median age was 12 years. Most patients were male, ASA1, trauma cases. Except two patients, all were anaesthetised by consultants (three non-paediatric). Eleven different combinations of anaesthetic and analgesic techniques were used. Pain scores were poorly documented (74%) in the post-anaesthetic care unit (PACU) but excellently on the ward (98%) (95% standard[2]). Five episodes (8.6%) of unacceptable pain occurred (<5% standard[2]), which were all managed appropriately. 89% received both paracetamol and NSAID (100% standard[3]). Five patients had a peripheral nerve block, five had an epidural and nine had intravenous opiates. Three out of five epidurals failed due to disconnection or catheter migration. Patients receiving opiates had higher pain scores in PACU, compared to no pain in the documented epidural and nerve block groups. Average pain scores were taken for each group; pain scores peaked on day 1, greatest in the nerve block group. Pain was minimal at 72 hours. Pre-operatively, six out of seven received an information leaflet. Post-operatively, clinical nurse specialists reviewed all patients.

Discussion and Conclusion

Feedback was given to PACU regarding documentation. The recommendation for lower-limb orthopaedic surgery is "peripheral nerve block or epidural should be used"[3]. These two groups woke up pain free; beneficial psychologically and physically. Trainees and non-paediatric anaesthetists may be reluctant to perform epidurals and nerve blocks in children. 11% did not receive NSAID despite lacking contraindication. The APAGBI state there is no evidence that NSAIDS have a deleterious effect on bone fusion[3]. Small numbers limits analysis, but it appears focus on the first 24 hours is required. Locally, it was suggested that PCA/NCA is used alongside nerve blocks, and epidurals should be used for bilateral procedures. We are planning, with the orthopods, to produce management guidelines for this group of children, after re-auditing.

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Introducing Paediatric TIVA in a District General Hospital. Quality Improvement or Not?

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Introduction and Aims

The Royal Derby Hospital is a large DGH with 1100 beds, 33 theatres and over 3600 paediatric anaesthetics are given each year.

After the introduction of TIVA into the paediatric theatres in November 2014, we evaluated after a year whether there was a difference in the quality of care to the children attending for operations.

TIVA is reported to have several benefits over volatile anaesthesia, mainly a reduced incidence of PONV (1). Generally, this may lead to quicker recovery and shorter hospital stay times.

Methods

We wanted to look at the patient experience as a whole, through induction, maintenance, recovery and to the ward. We decided the most pragmatic approach was to ask the staff in theatres and on the ward for their opinion on TIVA.

We chose a semi-structured interview format. The questions were open worded and asked about whether staff like using TIVA, whether they think there is a difference to volatile anaesthetics and the practicality of using it at the different stages of the operating process, i.e. induction, maintenance, recovery and on the ward. The data then was collected over a two week period. Data collection was opportunistic, and was continued until a sample size of 28 out of 37 potential members of staff (75%) was achieved.

Results

The 28/37 staff, comprised of 6/9 Consultant anaesthetists, 14/18 ODPs and recovery nurses and 8/10 ward staff.

Induction Staff reported a smoother, calmer induction and less propofol pain. The induction dose of propofol was reduced due to the co-administration of remifentanil. Airway problems were not reported throughout the anaesthetic.

Maintenance Anaesthetists mentioned a specific positive during shared airway cases where surgeons can displace or obstruct the airway. Previously this had caused the patients depth of anaesthesia to lighten, but was no longer a problem with TIVA. A disadvantage was children don't breath and need to be ventilated.

Recovery Some staff initially didn't like children being apnoeic in recovery and requiring hand ventilation. However all staff reported a smoother, calmer and cleaner wake up, with Less disorientation and quicker discharge from recovery after removal of the LMA.

Ward Staff consistently reported that children seemed to be more awake, quicker to eat and drink and mobilise.

Discussions and Conclusion

We believe that changing from volatile to the use of TIVA in paediatric patients improves their quality of stay in Royal Derby Hospital. They are less disorientated, more awake, quicker to mobilize, eat and drink and discharge home. We have not scientifically proven any clinical or statistically significant differences. However this study does show that our beliefs are shared by the majority of staff working in our unit.

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021

An Audit into the Perioperative Care of Paediatric Type One Diabetic Patients Presenting for Elective and Emergency Surgery at a District General Hospital

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Introduction and Aims

Type one diabetes mellitus is an autoimmune disease resulting in the destruction of beta-cells in the pancreatic islets of Langerhans. Subsequent loss of endogenous insulin necessitates life-long dependence on an exogenous supply(1), and the disease itself predisposes to a plethora of pathophysiological consequences. Diabetes impacts on the provision of anaesthesia and surgery. Notable complications have been derived from studies in the adult population – and are reiterated in the recently produced Adult Perioperative Guidelines(2). Poor glycaemic control in the paediatric patient also affects wound healing, increases the risk of infection, and places the child at risk of diabetic ketoacidosis and its complications. There are no nationally agreed perioperative guidelines for the care of paediatric type-one diabetics so health regions produce their own, reflecting local practices. The East of England (EoE) produced a version in May 2013(3). Audit aim: to ascertain the guideline compliance at the Queen Elizabeth Hospital between May 2013 and September 2015. The standards being measured are:

1. Documented evidence of individualised care plans produced by the specialist diabetic team
2. That the patient is prioritised for surgery
3. That the frequency of perioperative blood glucose measurements are in keeping with those stipulated in the guidelines
4. Whether patients perioperative blood glucose levels remain within the recommended range, and where they do not, whether there is documented evidence of treatment in line with the protocol
5. Whether patients were correctly weaned off their perioperative VRIII

This audit also looked at surrogate markers of anaesthetic care that do not constitute guideline protocol but are considered good clinical practice.

Methods

This was a single-centre, retrospective audit. A standardised proforma based on the 2013 East of England guidelines3 was produced, reviewed by a senior paediatric consultant, and modified after a pilot trial. Inclusion criteria: paediatric patient (aged between 6 months and 16 years 11 months on date of operation); type-one diabetic on insulin; elective or emergency surgery after May 2013. Cases were identified via: (1) the paediatric diabetic team, and (2) the trust clinical audit department.

Results

Twelve cases were identified, eight male and four female. Age range 5 years to 16 years. Seven procedures were elective, two were emergencies, and two were urgent; documentation was missing in one case.
Standard 1: Compliance 100%
Standard 2: Compliance 60%
Standard 3: VRIII Compliance 28% (intraoperative)
Standard 3: VRIII Compliance 57% (recovery)
Standard 4: Compliance 54% (intraoperative)
Standard 4: Compliance 100% (recovery)
Standard 5: Compliance 50%
Standard 6: Compliance 0%

Discussion and Conclusion

Adherence to the EoE guidelines is variable. Reasons include substandard documentation and a lack of regular exposure to this cohort. Recommendations include in-house education and the introduction of a concise anaesthetic protocol.

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022

Improving Quality and Safety for Cardiac Children Presenting for Non Cardiac Surgery

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Introduction and Aims

Mortality is a basic measure of quality and safety. However, few data are available for paediatric anaesthetic practice. Studies have shown mortality under anaesthesia to be higher in children with coexisting cardiac disease(1). With improvements in the surgical and medical management of cardiac disease in childhood, increasing numbers of children with cardiac disease are presenting for anaesthesia. This can be for surgery for associated non-cardiac conditions, complications of heart disease and incidental elective and emergency surgical problems. Therefore, we decided to identify the number of children with cardiac disease presenting for non-cardiac surgery in our institution and examine their perioperative care to outline areas for improvement.

Methods

Data was collected over a 6-week period from March-April 2015. All elective and emergency cases in general theatres and MRI where anaesthetic involvement was requested were included. Data comprised demographics, cardiac history, preoperative assessment, preparation and active management, intraoperative management including problems or critical incidents and post-operative management including post-operative destination. All forms were completed by the Anaesthetist looking after the child.

Results

Thirty-seven children with a cardiac history presented for non-cardiac surgery during the 6-week period (3.4% caseload). Twelve remained uncorrected, 15 were corrected and 11 had been palliated. Eight children had cyanotic heart disease. Twenty-two (59.5%) cases were elective. Twenty-two were on no cardiac medications preoperatively, 8 were on diuretics, 4 aspirin, 2 ACE inhibitors and 2 on inotropes. Seven were neonates, 10 1 month-1 year, 13 1-4 years, 5 5-11 years and 2 12-15. All cases were managed by a consultant anaesthetist, in 28 (75.7%) this was a non-cardiac anaesthetist. On 16 occasions the anaesthetist altered their preoperative management. The most common additions were discussion with a cardiac anaesthetist, preoperative echo, cardiology review and fluids. Intraoperative management was also altered on 16 occasions because of the cardiac condition. The most common changes were IV fluids, close control of end-tidal carbon dioxide and invasive monitoring. Intraoperative problems occurred on 10 occasions. 22 children went to the ward postoperatively, 12 to ICU and 2 to HDU.

Discussion and Conclusion

Anaesthesia for children with cardiac disease presents a significant and likely increasing proportion of workload. In our institution this was a consultant-delivered service, 75% by non-cardiac anaesthetists. The majority of cases were for general surgery and ENT. Thirty-eight percent of cases were emergencies. Intra-operative problems were usually transient and rectified. The majority of cases going to ICU were intubated preoperatively. Team working and discussion with cardiac anaesthetists and PICU consultants was common and beneficial. Areas for improvement in the preoperative preparation of this high-risk group of patients were identified along with a need to allow time for frequent refresher days for non-cardiac paediatric anaesthetists undertaking these cases.

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023

Determining Relative INtaKes before Surgery (DRINKS) Audit

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Introduction and Aims

Recently a case was presented at the departmental Anaesthesia Risk Management meeting of a child who drank 26ml/kg of clear fluid two hours preoperatively. This child's anaesthesia was postponed as the anaesthetist was concerned about the risk of pulmonary aspiration. There is little evidence of what volume of clear fluids is appropriate up to two hours preoperatively. A recent study comparing two and one hour fasting times, allowed children 5ml/kg to a maximum of 150ml[1] and another study investigating the effects of the 6-4-0 rule, while not specifying a volume, encouraged children not to drink excessively[2]. Following discussion at the meeting, we decided to audit our current practice with the aim to ensure that patients are appropriately fasted prior to induction of anaesthesia. To prevent excessive drinking, we decided the criterion should be that no more than 5ml/kg of clear fluids should be consumed up to two hours before induction of anaesthesia.

Methods

Over one week, the nursing staff in main theatres were asked to record the child's weight, hours since clear fluids and volume drank on a data collection sheet.

Results

There were 173 anaesthetics given in main theatres during the audit period. We have complete data for 93 (53.8%) patients. Of these 93, 11.8% had clear fluids between 2 and 3 hours of anaesthesia induction and had consumed less than 5ml/kg. Five percent had consumed more than 5ml/kg within 3 hours of anaesthesia induction. One of these patients was having an emergency procedure. Within 2 to 4 hours of induction, 25.8% of patients had consumed less than 5ml/kg of clear fluids and 14.7% had consumed more than 5ml/kg (including 2 children having emergency procedures). About a third (34.4%) of patients had fasted more than 6 hours for clear fluids, with 26.9% fasting more than 8 hours and 20.4% fasting more than 12 hours.

Discussion and Conclusion

Although it was not the aim of the audit, a striking finding was the excessive fasting times for clear fluids in about a third (34.4% fasted more than 6 hours) of elective patients. This may be due to parents/carers not giving an early morning drink. Frequent list order changes may also be a contributing factor. It is uncertain when children will be called to theatre so drinks may not be given on the ward. Only a quarter of patients have had appropriate clear fluids within 2 to 4 hours of anaesthesia induction. Following this audit we will undertake an education programme regarding the information that parents are given about clear fluids and the importance of an early morning drink. We will also discuss with our surgical colleagues how list order changes can be minimised.

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024

An Audit of the Distribution of the Paediatric Anaesthesia Workload at the University Hospital Coventry

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Introduction and Aims

University Hospital Coventry is a large teaching hospital with approximately 3000 children anaesthetised annually for elective and emergency procedures. Separate on-call rota is in place for anaesthetic consultants with specific paediatric skills who assist with the management of more complex cases. Nevertheless, anaesthetic consultants on the general on-call rota also need to maintain their skills in paediatric anaesthesia, as children appear regularly on both emergency and elective theatre lists. The existing departmental guideline recommended that every consultant should anaesthetise at least 38 children per year to maintain their skills in paediatric anaesthesia. It was based on a paper by Tomlison recommending regular exposure to routine paediatric anaesthetic practice of one to two lists per month for anaesthetists with paediatric commitments. A number of anaesthetists in the department felt that this target was difficult to achieve. The aim of this project was, therefore, to review the distribution of the paediatric anaesthesia workload and achieve a consensus on the best way to demonstrate competence in paediatric anaesthesia during annual job plan reviews.

Methods

We collected data on the number and ages of children anaesthetised by each permanent member of staff over a period of a year. The data was analysed and presented to the department at the Quality Improvement meeting. The presentation was followed by a debate and voting using the electronic Turning Point System.

Results

The mean number of children anaesthetised by consultants on the paediatric on-call rota, consultants on the general on-call rota without regular paediatric lists and non-consultant career grade anaesthetists was 103, 27 and 56 respectively. Respective numbers for children under 5 year old were 38, 8 and 14.Sixty three per cent of consultants in the department felt that the target of 38 paediatric cases per year was unrealistic. Ninety per cent of consultants thought that there was no need for a specific recommended number of cases that should be anaesthetised annually. Eighty three per cent of consultants felt confident to manage children younger than five for uncomplicated procedures.

Discussion and Conclusion

As a result of this audit the anaesthetic department decided to abandon the existing guideline on the recommended number of paediatric cases. The vast majority of consultants felt that recommending a specific number of cases is unnecessary and misleading. The consensus was that the 'RCoA Guidance on the provision of paediatric anaesthesia services 2015' should be followed during annual job plan reviews. This guidance states that anaesthetists should ensure that their competency in anaesthesia and resuscitation is adequate for the management of the children they serve and does not advocate a specific number in relation to the workload.

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025

Cochlear Implants as Day Case Surgery: Implementation, A Retrospective Study of Techniques Employed and Production of a Day Case Surgery Protocol

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Introduction and Aims

There are numerous benefits and pitfalls to providing surgery on a day case basis. After surveying the post-operative period of our cochlear implantations, and ascertaining that day case surgery was appropriate, patients meeting certain criteria underwent day case implantation. After 9 months, a retrospective study of the cases was conducted, looking at whether the techniques employed had a bearing on success rate and complications associated with the procedure.

Methods

A retrospective review of all 20 planned day case cochlear implant procedures from 24/04/15 to 08/01/16 was performed. Due to the misplacement of one set of notes, 19 notes were reviewed in total. Information on demographic data, intra-operative anaesthetic technique, LA block, post-operative complications, analgesic and anti-emetic requirements and reasons for failure of day case surgery was collected and analysed.

Results

Eight out of 19 patients stayed in overnight. Three (37.5%) were due to vomiting and poor oral intake. One (12.5%) was due to poor intake. One was due to a nose bleed and poor intake. One was due to a nose bleed, poor vision and low respiratory rate. One was due to evidence of chest infection. One was fit for discharge but the mother was not happy to take child home. After consultation with the ENT surgeon it is believed that the nose bleed was in fact blood from the Eustachian Tube following surgery. After analysis, a number of factors were found to significantly affect the outcome and the post-operative recovery. The use of intra-operative Diclofenac significantly improved day case success rate ($p=0.020$). The use of intra-operative morphine significantly reduced success rate ($p=0.00080$). Morphine use did not significantly affect post-operative analgesic requirements but significantly increased post-operative anti-emetic requirements ($p=0.0092$). The use of TIVA significantly reduced post-operative anti-emetic requirements ($p=0.047$).

Discussion and Conclusion

After finding strong evidence for and against various techniques, a ‘Day Case Cochlear Implant Protocol’ has been produced. There were no major post-operative complications that would preclude day-case anaesthesia. Minor post-operative complications were chest infection (which was evident immediately and probably present before surgery), parent refusing to take child home (possibly a result of sub-optimal pre-operative counselling), a head bandage slipping off at home and child presenting to ED (potentially avoided with improved counselling) and parental misplacement of paperwork. In the literature there was one major complication of sub-dural haematoma that was diagnosed within one hour of surgery and therefore not a delayed complication. All of this re-enforces that conducting day case cochlear implantation is acceptable, manageable and above all is safe with appropriate post-operative care and assessment. Our patients are reviewed at day 1 and day 3 post surgery.

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Comparison of Tablets to Other Conventional Distraction Methods During Anaesthetic Induction in Children

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Introduction and Aims

Since their launch, tablets have become increasingly popular as entertainment tools in children. With the introduction of various interactive apps, the use of the tablets has become more prevalent among the younger population. High pre-operative anxiety level in children is known to have adverse effect on recovery and overall hospital stay (1). The use of tablets as distraction methods has shown to improve the effectiveness in relaxing and distracting children in anaesthetic room (2).

iPads™ have recently been introduced into our trust to be used as means of distraction and entertainment for children in the anaesthetic room. The APAGBI has published on their website a list of apps that might be of use for this purpose. A prospective study was undertaken to compare the level of satisfaction between iPads™ and other conventional techniques, as judged by anaesthetists involved in the perioperative care of the children.

Methods

A total of 50 un-premedicated children aged between 1 and 15 years having elective surgery were enrolled in the study. They were split in to two equal groups; one group had iPads™ as distraction method and the other conventional techniques including toys, books, talking to the child etc. Assessment of satisfaction level was based on child's co-operation, any anxiety/distress caused to child, parental satisfaction and general ease of inducing the child. Both intravenous and inhalational techniques were used, although majority (80%) of the children in both the groups had intravenous route of induction.

Results

Satisfaction level in the iPad™ group was higher compared to the conventional group during intravenous induction. Children who had inhalational induction generally scored less in the satisfaction levels. It was difficult to interpret the difference in satisfaction levels between the groups when gas induction was used, because of the nature and complexity of the process and by the limited number of children induced by inhalational technique.

Discussion and Conclusion

Satisfaction levels were higher in the iPad™ group probably because of the familiarity and the acquaintance with the gadgets at home. Inhalational induction group expressed more annoyance with the interruption possibly caused by the facemask or by the hand of the anaesthetist whilst the tablet been in use.
We recommend the usage of tablets with age appropriate apps as a method of distraction for intravenous induction in order to reduce anxiety in children and thereby improving positive experience during

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027

Introduction of Buccal Midazolam for Pre-Medication and Procedural Sedation in Children at Oxford University Hospital NHS Foundation Trust: a Quality Improvement Initiative

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Introduction and Aims

Many procedures are demanding and stressful for children[1]. NICE recommends the use of midazolam for conscious sedation in paediatrics as it is an effective anxiolytic with a strong safety profile[2]. However, administration of the oral preparation requires co-operation and assent in itself[1]. Currently, buccal midazolam is licensed to treat status epilepsy and published data reports it is well tolerated with no significant adverse events[3]. It is already in use in some UK centres as pre-medication. When comparing buccal midazolam with oral and intra-nasal formulations it is considered superior in taste, comfort of administration, onset of action and bioavailability[4]. We wanted to ascertain whether buccal midazolam can improve the quality of care provided for children in our institution when sedation for pre-medication or stressful procedures is indicated. If favourable, we aim to extend our pharmacy indications for this formulation.

Methods

Preliminary surveys were conducted to determine the frequency and nature of sedatives currently in use for pre-medication and stressful procedures in the Children's Hospital of Oxford (CHOX). A feasibility study was presented to the Medicines Advisory Committee and permission obtained for a 6 month trial of buccal midazolam. Patients are included if they are >6 months old, >8kg and have baseline SpO_2 ≥94% in air. Exclusion criteria are raised intra-cranial pressure, history of apnoea or allergy to benzodiazepines. A simplified regime for prescribing was incorporated into our electronic prescribing record system and nurses on the day care ward were trained on the correct administration, to minimise drug errors. Patients receive pre-filled syringes based on weight range, at a dose of 200-300mcg/kg. Outcome measures are patient tolerability, ease of administration, speed of onset, adequacy of sedation, adverse events, impact on theatre scheduling and cost per treatment; compared with oral midazolam.

Results

Our initial survey showed that oral midazolam is the commonest pre-med and used for 50% of procedural sedations. We are in the process of collecting data to analyse the effectiveness and safety profile of buccal midazolam compared to oral, when used as a pre-med for theatre and procedural sedation. Preliminary results look favourable. We anticipate reporting on 40 patients by the time the APA meeting convenes.

Discussion and Conclusion

Based on NICE recommendations on midazolam use for sedation in paediatrics, coupled with the favourable pharmacokinetics, limited adverse events and ease of administration in the context of assent and agitation, buccal midazolam's profile seems to outweigh the clinical effectiveness and safety of oral midazolam. Although oral midazolam is currently cheaper than buccal, the wasted vials per patient allow for overall cost-neutrality. Our comparison results will be published in May/ June 2016 and if favourable, buccal midazolam will replace oral midazolam at CHOX for pre-med and procedural sedation in children.

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028

PATRN – Setting Up a Trainee Research Network

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Introduction and Aims

In the UK there are multiple regional trainee research networks that have been making remarkable progress in advancing knowledge in anaesthesia. These networks operate under the umbrella of RAFT (The Research and Audit Federation of Trainees), which is endorsed by the NIAA and the RCoA1. In 2015, PATRN, a new paediatric anaesthesia trainee research and audit network was established, and remains the only UK wide sub-specialist trainee network that we are aware of.

Methods

PATRN was founded by two senior anaesthetic trainees with experience of participating in pre-existing research networks, both intent on pursuing a career in paediatric anaesthesia. It is currently run by a committee of three trainees. We approached the APA, who kindly agreed to support our initiative and help us quality control any putative projects. Invitations to join were sent out via email to the entire APA trainee membership, with subsequent advertisement on the APA website and social media. The original aim was to limit PATRN to representatives in tertiary paediatric centres for collaboration, but an enthusiastic response from many trainees in district general hospitals prompted a rapid re-think to include all those wishing to participate. The committee subsequently contacted local audit leads and APA linkmen with an outline of the network, both to ensure there were no local objections and to seek out further trainees who may wish to become involved.

Results

PATRN currently have forty-four trainees in the network, with most tertiary centers represented and a wide spread geographically of district general hospitals. A simple pilot project on day-case tonsillectomy analgesia has been put through the network with a good response, and allowed us an insight into how to maximize the data that the network could collect. Our second project has since successfully gone out to the network, with a third very nearly ready to go.

Discussion and Conclusion

PATRN currently invites any of its members to submit an idea. Projects may be designed by consultants or trainees, but are carried out by trainees. We encourage trainees with ideas to plan their projects extremely carefully and liaise with their local audit lead. Once an idea is submitted, the committee endeavour to seek an expert in that particular field to ensure relevance and quality. No confidential data is exchanged at any point. We aim to credit every trainee that contributes to a project with evidence of involvement for their portfolio, and would encourage trainees whose projects lead to publication to acknowledge the contribution of individuals

We hope that PATRN represents an opportunity for trainees in paediatric anaesthesia to gain experience in research and to participate in multi-centre projects that will impact positively on patient care.

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029

A Pilot of Excellence Reporting in Theatres in the Royal Manchester Children's Hospital

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Introduction and Aims

In a National Health Service (NHS) that is becoming more and more stretched, by finances and targets, morale in staff members can be a big issue. Subjectively we have noted poor recruitment and staff retention at various hospitals, and yearly NHS staff surveys show low rates for staff feeling recognised or valued for good work[1]. As morale is strongly linked with staff engagement, and therefore with patient outcomes, this is a worrying statistic for many healthcare managers[2]. Excellence reporting is an initiative pioneered at Birmingham Children's Hospital (BCH)[3], in which examples of excellence at work amongst the multidisciplinary team are reported, analysed and lessons learned in how they can be repeated as often as possible. We thought this was a valuable idea to introduce in our workplace to consolidate excellent practice and improve staff morale.

Methods

We introduced a paper-based reporting system to the theatres at RMCH for 11 weeks. We publicised it via posters in the department and by speaking a number of times at the daily morning meeting. We enlisted the support of a consultant to oversee the project and three "excellence champions" amongst the staff. In analysing the forms, staff named in them were given individual feedback via "excellence certificates" and themes were looked for to provide information on service improvement.

Results

20 forms were completed. These were analysed using the methodology described by the BCH team[3]. A wide range of themes were reported with the commonest areas being teamwork (in 13 forms), communication with colleagues (in 11 forms), general theatre working/staffing (in 9 forms) and "going the extra mile" (in 7 forms). Specific measures suggested to enable excellence to be repeated included anticipating and thoroughly planning difficult cases, staff always remembering safeguarding role for patients and families, training staff to achieve potential, including dual-role training to allow flexibility in theatre teams, and not overbooking lists.

Discussion and Conclusion

Informal feedback to us directly and through the excellence champions was overwhelmingly positive, with people enjoying the experience of their good work being formally acknowledged. We had positive feedback from other practice areas (Paediatric Intensive Care and our regional transport service) asking for further information so that they could look at setting up a similar system. We believe that excellence reporting is valuable both for staff morale and for improving systems. We will use the feedback from the pilot to develop the forms and procedures, and are currently extending the project to the whole of our hospital via a web portal on the trust intranet. The data from the pilot was discussed and compared at the first UK excellence meeting in Birmingham, January 2016, and we aim to contribute to this emerging area of healthcare.

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030

A Snapshot of Induction Practice in the Paediatric Theatre, Ninewells Teaching Hospital

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Introduction and Aims

Our aim was to observe the premedication practice at Ninewells hospital and overall quality of Anaesthesia induction with or without premedication use.

Pharmacological premedication is used in to facilitate management of the uncooperative child and reduce anxiety. Agents commonly used include Midazolam, Clonidine and Ketamine.

Methods

The project ran for 2 months from September 2015 and included all elective cases. An audit pro-forma was designed to collect information on the child's age and operation. The pro-forma included three parts: pre-operative, induction and post-operative/recovery.

Pre-operatively, we documented the child's state on arrival to the Paediatric ward using the following score: calm/ cooperative, calm/ anxious, crying/consolable and crying/unconsolable. If the child received premedication, drug and dose were recorded and the sedation score prior to induction.

For induction, the Anaesthetist documented the planned (Intravenous vs. Inhalational) and the actual outcome of induction.

In recovery and post-operatively on ward, the WATCHA Score was used as a tool to detect post-operative agitation and delirium[(3)].

Results

Data was collected for 88 children, age range from 8 weeks to 15 years. 55 children received a successful Intravenous induction (62.5%). 30 children received a successful Inhalational Induction (34%). 8 children had a failed attempt intravenous induction, failure to obtain I.V access and had a subsequent inhalational induction (9%). 8 children received pharmacological premedication (9%) age rage 4-12 years. 4 received Midazolam and 4 received Midazolam/Clonidine. 2 out of 8 children were anxious despite premedication on arrival at theatre. Both children deemed anxious had failed IV Inductions and required Inhalational induction despite premedication. One child had received Midazolam and the other Midazolam/ Clonidine. In recovery, all patients that had received combination Midazolam/ Clonidine were asleep or calm according to the WATCHA Score.

Discussion and Conclusion

The predominant Anaesthetic technique used in our hospital is Intravenous Induction. 1 in 9 children receive a premedication on our unit. The use of an anxiety scoring system on arrival to the ward helps us identify the children who may benefit from premedication. Our choice of premedication agent is still divided between Midazolam and Midazolam combined with Clonidine. However, from our small numbers we can say that there was no delayed discharge with Midazolam/ Clonidine and that the children's WATCHA score demonstrated less anxiety and distress during recovery phase.

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031

Quality Improvement Through Reverse Innovation: Re-Assessing NCA Use for Post-Operative Pain Following Cranial Surgery

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Introduction and Aims

Reverse or "trickle up" innovation focusses on needs and requirements in resource-limited environments[1], removing any unnecessary and expensive features to fully meet patients' needs in the most cost effective way. In the ever-tightening financial climate of NHS healthcare, reassessing and "stepping down" unnecessary treatments has potential benefits both for patients and for budgets.

The Alder Hey pain team work closely with ward nursing staff and became aware that after cranial surgery patient- and nurse- controlled analgesia (PCA/NCA) systems seemed to be under-used and taken down within 24 hours of surgery. We used the Model for Improvement[2] to optimise our patient's pain relief with minimal side-effects and utilizing no more resources than necessary.

Methods

The PCA/NCA use of 50 patients undergoing elective cranial surgery from June 2015-February 2016 were analysed. Our current NCA regime uses a background infusion and boluses with 15 minute lock-out. A change would be considered an improvement if the incidence of pain scores >3 in the first 24 hours was reduced[3] or the pain scores remained at similar levels with reduced overall use of morphine, reduced use of anti-emetics or improved time to first oral intake.

We looked at

- demographic details
- boluses and demands counts
- time between leaving theatre and first oral intake
- time before the PCA/NCA was taken down
- use of adjuncts and anti-emetics
- pain scores over the first three days

This allowed us to identify areas where change was possible.

Results

75% of patients received an NCA (25% received PCA). Documentation was poor for several patients. Therefore the first Plan-Do-Study-Act (PDSA) cycle focused on working with ward nurses to improve compliance with documentation regimes for PCA/NCA use and pain scoring.

It was noted that for NCA patients except posterior fossa procedures, the NCA was administered for less than 24 hours and over that time both boluses and demand totals were less than 10. Most patients also had oral intake within a few hours of surgery. For the second PDSA cycle we therefore are working with the neuro-anaesthetists to change the standard NCA regime to a bolus-only preparation unless the patient undergoes posterior fossa surgery.

Discussion and Conclusion

The NHS model for improvement allows a step-wise approach to successfully changing practice. This can be applied not only for the introduction of novel techniques but also for the "reverse innovation" of removing unnecessary treatment and consequent side-effects. In time we aim to perform further PDSA cycles to assess the possibility of removing the NCA and substituting oral morphine as first-line opioid analgesia. This would be with appropriate piloting and re-audit of practice to monitor effectiveness.

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032

Audit on Unplanned Hospital Admissions Following Day Case Surgery in Pediatric Patients

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Introduction and Aims

Delayed discharges of the patients from the hospital can cause significant impact on the costs and on the bed occupancy and can in turn disrupt the elective care prolonging the waiting lists. Unplanned admissions of children are undesirable and can cause significant inconvenience to children and the parents. A retrospective audit was conducted to identify the number of unplanned admissions after day surgery over a period of one year in paediatric patients at Leicester Royal Infirmary.

Methods

Data was collected from the Clinical Audit Support team and subsequent review of the patient notes was done to confirm reasons for unplanned day case admission. 36% of the total paediatric cases (n=3344) admitted to the hospital were day case patients for various surgeries. Community dentals and medical patients were excluded from the list.

Results

The rate of unplanned admissions identified by the audit team was 5% as opposed to the national target of 2% (1).The anaesthetic causes identified for unplanned day case admissions were: Postoperative nausea and vomiting (71%), drowsiness (9.6%), pain (11%) and airway complications (1%). Postoperative nausea and vomiting was identified as the major cause contributing to delayed discharges as opposed to the proposed standard of 0% in children (2).

Discussion and Conclusion

It is commonly accepted that many unplanned admissions can be prevented if the optimal care is in place. The figures from the audit team has shown that careful selection of patients and pre-operative assessment is necessary when allocating them to fast track surgery. Appropriate education of the surgical, anaesthetic and nursing staff, adherence to guidelines and care pathways implementation of enhanced recovery would decrease the number of delayed discharges and the cost to NHS (3, 4). Postoperative nausea and vomiting and pain should be treated effectively by identifying high risk patients and using multimodal regimes. Enhanced recovery after surgery entails a multidisciplinary approach to the peri-operative care of the patient to permit earlier discharge from hospital.

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033

The Changing Face of Operating at Sheffield Children's Hospital 1947 – 2015

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Introduction and Aims

In January 2016, two new operating theatres, including an intraoperative MRI facility, were opened at our hospital, bringing the number of locations in which general anaesthesia is routinely administered to 12. This expansion of our services prompted us to look back at the hospital's provision of anaesthesia over the years, to investigate the changing pattern and demand for surgery for children since the inception of the NHS.

Methods

The archived Operating Theatre record books were consulted, which held records of all operations performed in the hospital since 1947. As a representation of surgical activity, data was collected for all operations performed during the first full week of October in each year, including the number of theatres active, the age of the patient, the surgica specialty and the actual operation performed. Data from 2008 onwards were obtained by interrogating the electronic theatre data system. National Census records were also consulted to establish any changes in the local population during that time.

Results

In 1947, there was one theatre active with only 12 operations carried out – 9 during the week and 3 over the weekend. They included 7 general surgery, 2 ENT and 3 plastic surgery cases. By 2015, there were 7 theatres, and a procedure room and nearly 300 operations were being performed per week. In the early years, there were many operations for infection, including tuberculosis, and for myelomeningocoele and cleft palate. As the decades progressed, increasingly complex trauma and orthopaedic surgery, endoscopy and laparoscopic procedures were all introduced. Early neurosurgery was limited to ventriculo-peritoneal shunt operations, but now includes prolonged tumour excisions involving neuronavigation and insertion of vagal nerve stimulators.

Discussion and Conclusion

Although the city's population has remained relatively static since 1941, the demand for children's surgery has risen almost exponentially. On analysis, this seems likely due to the expanding range of procedures available for conditions which may have had non-surgical management in the past, rather than a generally sicker population. Our review of the records has caused us to reflect on the impact of medical innovations, such as the introduction of effective antibiotic treatments, the reduction of cases of spina bifida after the importance of folate was recognised and the greater throughput of cases possible after the introduction of newer anaesthetic agents and equipment.

Reviewing the complexity of some of the earliest operations, however, causes us to have an even greater respect for the colleagues who pioneered paediatric anaesthesia in the middle of the 20th Century, and the skill they applied to their work without the benefit of the sophisticated drugs and equipment we enjoy today.

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034

Tracheo-Bronchial Topicalisation in Paediatric Medical Bronchoscopies - A Unique Anaesthetic Technique at Oxford University Hospital NHS Foundation Trust

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Introduction and Aims

Paediatric bronchoscopies are performed mainly as a diagnostic aid in children with chronic respiratory diseases. Anaesthetising these children is demanding as they have fragile and irritable airways with limited physiological reserve. During bronchoscopy it is essential that spontaneous ventilation is maintained to allow dynamic assessment of the airway[1]. Adequate topicalisation of the vocal cords and carina is vital to prevent coughing and laryngospasm. The usual approach to this is by spraying the vocal cords with local anaesthetic (LA) under direct vision during laryngoscopy[2]. This can prove challenging in a patient who is not paralysed and breathing spontaneously. At the Children's Hospital of Oxford (CHOX) we have developed a technique that does not require additional pharmacological agents or equipment, is easy to perform and minimally invasive. Our technique involves injection of LA via the LMA, on the inspiratory phase of spontaneous ventilation. A further 3 injections are administered on entering the trachea and down each main bronchus. Our aims were to determine whether our technique is safe and effective at tracheo-bronchial topicalisation in children having medical bronchoscopies.

Methods

After liaising with colleagues at other tertiary centres, we concluded that our technique is not being used elsewhere. Data was collected between June 2015 and February 2016 and we included all children <18 years undergoing day-case medical bronchoscopy. All patients received our standardised anaesthetic technique with injection of LA as described above. Our outcome measures were any adverse events; divided into major (laryngospasm, aspiration, bradycardia, apnoea and/ or coughing with SpO2 <90%) and minor (coughing and/ or apnoea with SpO2 >90%≤94%).

Results

To date 18 cases have been analysed and we anticipate a total of 25 by the time the APA meeting convenes. The median age is 6 years with a male/ female spilt of 89% and 11% respectively. A third of patients had cystic fibrosis and underwent bronchoscopy for reduced lung function. Investigation of ‘chronic wet cough’ accounted for 40% of cases. There were no significant adverse events and minor events occurred in only 8 cases (44%).

Discussion and Conclusion

Our case mix reliably represents the type of children undergoing medical bronchoscopy nationally. No major adverse events occurred. Of the minor events, only coughing and apnoea were reported, with half occurring during injection of LA down the LMA and half when passing the scope beyond the carina. The most common cause of the latter was omission of the 3rd dose of LA by the physician. All of the minor events were self-limiting with no interventions required. As such, we conclude that our anaesthetic technique of tracheo-bronchial topicalisation in children undergoing medical bronchoscopies is safe and effective. In addition, the technique is easy to perform and minimally invasive for patients.

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035

Post-Thoracotomy Analgesia - an Audit of Clinical Practice

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Introduction and Aims

Considerable pain can be anticipated following thoracotomy. Effective post-operative analgesia is essential in the prevention of complications such as atelectasis. We aim to ensure that analgesia provision within our institution follows recommended best practice. A secondary aim was to compare the efficacy of the regional analgesia techniques used, with a view to standardising practice.

Methods

A retrospective analysis of postoperative pain records of children undergoing thoracotomy in Royal Manchester Children's Hospital between June 2009 and November 2013 was conducted. The Association of Paediatric Anaesthetists guideline[1] recommending a multimodal analgesic approach including a local anaesthetic technique and/or opioid with NSAIDs and paracetamol was the primary audit standard. Collected data included: analgesia provided, pain scores, complications related to analgesia. Patient mean pain scores between analgesic groups were compared for statistical significance using a Mann Whitney U test - performed using StatsDirect3, Stats Direct Ltd, (Cheshire UK).

Results

Sixty-eight patients were included - 67 of these patients underwent thoracotomy with one patient (in the epidural group) undergoing a VATS procedure. Of these patients, 42 (61.8%) had an interpleural catheter, 21 (30.9%) had epidural analgesia and 5 (7.5%) had paravertebral analgesia. In all patients this was part of a multi-modal analgesic strategy. The epidural analgesia cohort had lower mean total pain scores on days 1-4 post-operatively in comparison to both the interpleural and paravertebral groups. This difference, in relation to the paravertebral group, was statistically significant ($p<0.05$) on all 4 days. In contrast, the difference between the epidural and interpleural groups was statistically significant on day 1 only. However, the interpleural group received more additional opioid analgesia. Epidural group patients suffered a higher incidence of complications (such as nausea and vomiting) than the paravertebral group. Patients who received interpleural analgesia experienced the most side effects.

Discussion and Conclusion

All patients undergoing thoracotomy received a multi-modal analgesic strategy, conferring 100% compliance with the audit standard. Epidural analgesia appears to be more effective than both paravertebral and interpleural analgesia but confers a slightly elevated risk of side-effects. The increased incidence of side effects in the interpleural group may reflect the greater administration of morphine infusions. As all three regional analgesia modalities continue to be used we recommend a focus on ensuring staff familiarity with managing these patients and potential complications, with a clear escalation policy in place should these occur.

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036

Anaesthesia Exposure of Children Under 12 Months of Age at Temple Street Children's University Hospital, Dublin, Characteristics and Complexities

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Introduction and Aims

A prospective audit of anaesthesia exposure in children under 12 months of age at Temple Street Children's University hospital from September 2015 to March 2016 was conducted. TSCUH is a tertiary referral centre, and is the specialist centre for neurosurgical referrals in children under 12 months of age. Elective, urgent and emergency surgery for all specialisms other than cardiac are carried out in TSCUH.The goals were to audit

1. the numbers of children who receive general anaesthesia and are under 12 months of age, and to breakdown this number further into neonatal exposure and non neonatal exposure, and highlight the numbers of children who receive muliptle exposures to general anaesthesia as neonates/ or with a history of prematurity.

2 the airway device used intraoperatively, the Cormack and Lehane grade of intubation, and who performed the intubation.

Methods

A data collection form was designed to collect a number of data, and Non consultant hospital doctors and Consultants in Anaesthesia were asked prospectively to fill in the the infomation including patient identity stickers and hospital numbers. Colleagues were reminded at the begining of the day to complete the form when it was identified that an under 12 month old child was present on an operating list. A retrospective componnent of the audit included daily, and weekly examinaitions of patient details on emergency lists, recovery, high dependency and intensive care to ensure that no patients were missed particularly when out of hours emergency and or urgent surgery was conducted. When missing patients were identified details were obtained from the anaesthetic chart, medical notes and nursing notes.

Results

Over 200 children who were under 12 months of age received general anaesthesia during this 6 month period, and over 25 % of these were neonates with 5 to 7% of these neonates having muliple exposures to anaethesia. Chilren who required neurosurgery as neonates generally required multiple anaesthetics and had other significant comorbidities. Trainees who were rotating through Temple st, as part of the Specialist Registrar Training, largely performed the intubations and graded the Cormack and Lehane status. Only 5 % were considered difficult intubations, and a videolaryngoscope device was used in a smaller number.

Discussion and Conclusion

There are a large number of children who are under 12 months of age and a large number are neonates. This audit has helped to capture this data from an anaesthesia planning perspective and hospital planning perspective also. The overall experience of trainees and their exposure to intubation for generally all cases at TSCUH may contribute to their ease with intubations in this age group although all trainees are highly supervised.

Acknowlegements and Conclusions

Limited audit information in this area is available nationally, or internationally.

037

The Preparation of Anaesthetic Emergency Drugs in Paediatric Theatres: a Survey of Practice

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Introduction and Aims

Many anaesthetists routinely draw up emergency anaesthetic drugs at the beginning of an operating list, which are mostly unused and discarded. The practice of pre-preparing drugs is to facilitate rapid response in emergencies. Prefilled syringes for emergency drugs are commercially available.

Aims:

- To gather opinion with regard to the use of emergency anaesthetic drugs in paediatric theatres.
- To assess the use and possible wastage of these drugs.
- To consider the cost implications of introducing "pre-filled" syringes.

Methods

A survey of anaesthetic practice was conducted in two paediatric centres, Great Ormond Street Hospital and the Royal Belfast Hospital for Sick Children. This was carried out in two phases:

1. A questionnaire distributed to the anaesthetists in the departments.
2. An observational audit carried out on separate occasions, of whether emergency drugs had been drawn up in each theatre.

Results

- We received 66 responses (40 consultant, 26 trainee).
- When asked about emergency drugs, 38% (25/66) of anaesthetists stated that they 'always' prepared emergency drugs prior to an elective list, 33% (22/66) stated that they 'sometimes' prepared emergency drugs and 29% (19/66) stated that they 'never' prepared emergency drugs.
- When asked if their practice changed when anaesthetising outside a main theatre block, 47% (31/66) of respondents stated that they 'always' prepared emergency drugs, 25% (17/66) stated they 'sometimes' did and 28% (18/66) stated that they 'never' pre-prepared emergency drugs.
- When asked if they would prefer pre-filled syringes to be available, 59% (39/66) of respondents stated that they would, 11% (7/66) stated that they wouldn't and 30% (20/66) didn't mind.
- Of the trainees, 75% (20/26) routinely draw up emergency drugs when on a solo list and 85% (22/26) when working 'out of hours'
- The observational audit showed that on an average day, 58% of operating theatres have pre-prepared emergency drugs.
- During a 3 month period, the cost of current practice compared with prefilled syringes:
    - Great Ormond Street - Current cost £571.09, prefilled syringes £584.25
    - Royal Belfast Hospital for Sick Children - Current cost £260.81, prefilled syringes £167.63

Discussion and Conclusion

This survey shows that a significant proportion of anaesthetists in paediatric theatres pre-prepare emergency drugs. The majority of anaesthetists would prefer pre-filled syringes. The advantages of pre-filled syringes include immediate availability, avoidance of the potential risks of contamination and drug deterioration, and also reduction in drug errors - as approximately 30% of drug errors involve incorrect checking and labelling[(1)]. As there is no increased cost in providing pre-filled syringes compared to current practice, we believe providing pre-filled syringes offers a quality improvement to the theatre environment. Based on these findings, Great Ormond Street Hospital have moved to prefilled syringes, and the Royal Belfast Hospital for Sick Children are in the process of changing.

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038

Improving the Safety of Post-Anaesthesia Paediatric Handover

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Introduction and Aims

One of the key recommendations by the Association of Anaesthetists in their Immediate Post-Anaesthesia Recovery Guideline is that "the anaesthetist must formally hand over care of a patient to a recovery room practitioner or other appropriately trained member of staff" (1). The National Patient Safety Agency has defined clinical handover as "the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis" (2). Clinical handover depends on accurate and complete communication between two healthcare professionals in an environment that can be busy and noisy with multiple distractions. For handover to be performed safely it depends on both individuals having a clear idea of what information needs to be shared and transferred, in order to minimise risk to the patient. At the Children's Hospital of Oxford (CHOX), handover within the recovery room has previously been structured at the discretion of the individuals directly involved, with little formal local guidance. Our aim was to audit the current practice for the handover of paediatric patients from anaesthetist to recovery practitioner within CHOX, prior to introduction of a visual aide memoir within each recovery bay that we hope will improve performance of this key task.

Methods

The Royal College of Anaesthetists have outlined standards for the appropriate content of post-anaesthesia handover, which formed the standard in our audit (3). With assistance from the theatre recovery staff we collected data on 103 handovers from December 2015 to January 2016. This was followed by the introduction of a Paediatric Recovery Handover Aide Memoir (PRHAM), and we will re-audit handover performance in March 2016.

Results

We collected data on 103 paediatric handovers, and found that overall communication was excellent with the majority of key areas of information being handed over. Three of the thirteen handover criteria (location of theatre, type of induction and airway management) were observed in fewer than 80% of patient handovers, identifying room for improvement. Eight of thirteen handover criteria were observed in more than 90% of patient handovers, identifying existing areas of good practice.

Discussion and Conclusion

Our audit has illustrated existing good practice in handover of post-anaesthesia paediatric patients, but has also identified some room for improvement in specific handover criteria. Safety of the handover process can be compromised in a busy working environment with distraction, high levels of ambient noise, assumptions regarding patient care and fatigue leading to ineffective communication of key information. This has been addressed with the introduction of a Paediatric Recovery Handover Aide Memoir, a visual prompt above each recovery bedspace to improve consistency, content and safety of handover in our workplace.

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039

A Completed Audit Cycle of Parental Satisfaction with the Paediatric Anaesthetic Service in our Hospital

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Introduction and Aims

Patient satisfaction is a useful tool for measuring the quality of healthcare and is an integral component of a high-quality service. Indeed, a survey of parental satisfaction is listed in the anaesthetics Audit Recipe Book[1]. We completed this survey-based audit cycle in our hospital with the aim of assessing and improving parental satisfaction with the anaesthetics team in general. Following the first survey we identified that parents wanted more information about post-operative pain relief, and consultants were encouraged to spend more time discussing this. We then repeated the survey.

Methods

The first survey was conducted over a two-week period in June 2015. Parents of children admitted for elective procedures requiring anaesthesia were surveyed. Ward staff gave questionnaires to all parents returning from theatre recovery, and collected all completed forms. No patient identifiable details were recorded. The results of the first survey were presented at the paediatric anaesthetics consultants meeting, and an action plan instituted for improving satisfaction. Specifically consultants were encouraged to spend more time discussing post-operative pain relief. The survey was repeated in October 2015 using the same questions.

Results

A total of 84 questionnaires were returned in June, and 61 in October. Overall parental satisfaction was high and all except one parent in each survey group was at least satisfied with the service. For questions relating to satisfaction with the anaesthetic team generally (7 questions), 69.5% of parents were “very satisfied” in June improving to 77.0% in October ($p=0.0106$). For plans for post-operative pain relief, 47.9% of parents in June reported being “very satisfied”, with one parent being “dissatisfied”. In October, the proportion of parents who were “very satisfied” improved to 56.0%, however one parent in the group still reported being “dissatisfied”.

Discussion and Conclusion

Overall, our two surveys demonstrate high levels of satisfaction amongst parents of children undergoing anaesthesia in our hospital. There was a small improvement in parental satisfaction between the June and October surveys. However, we would aspire to a target of 100% of parents being “very satisfied” with their child’s anaesthetic experience, and certainly no parents being “dissatisfied”, and therefore there is need for further intervention to try to improve the parental experience.

We will also consider surveying older children directly, since these patients may have a different view of the anaesthetic experience to that of their parents.

Our study is limited by the small sample size, with the methodology and potential for other sources of bias influencing survey answers. The survey must also be repeated frequently to maintain our current high standards.

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040

Peri-Operative Paracetamol Prescribing in a Tertiary Paediatric Teaching Hospital

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Introduction and Aims

Paracetamol is commonly administered in theatre to children. Optimal dosing of paracetamol requires the anaesthetist to take account of the child's weight, age and formulation. Experienced clinicians still have difficulty with the multiple dosing recommendations found in the British National Formulary for Children (BNFc)(1,2). This can lead to under or overdosing of patients providing inadequate analgesia or potential hepatotoxicity respectively. Our audit aims to evaluate the paracetamol prescribing by experienced anaesthetists in a children's hospital.

Methods

The anaesthetic charts and post-operative drug prescription charts for 110 patients attending the day surgery unit were examined retrospectively, doses of paracetamol and route of administration noted. The mg/kg dose for each patient was calculated. We decided on a dose of 15mg/kg of paracetamol as being our standard to compare our results. The patient's actual weight was compared with the Resus council's formulae calculated weight; (weight=2(age)+8 for 1-5 years and 3(age)+7 for 6-12 years). This allowed a "Weight for age" ratio (WFAR) to be calculated for each patient (actual weight/ estimated weight). A ratio >1 indicates a patient is heavier than the Resus Council's formula would estimate.

Results

Seventy nine patients had an intravenous dose of paracetamol intra-operatively. The median (IQR) dose given was 14.7mg/kg (15.0-14.3). Sixty nine patients then went on to be prescribed oral paracetamol post-operatively. The median (IQR) dose prescribed was 14.6mg/kg (15.0-13.7). The intra and post-operative median dose was compared to a hypothesized median of 15mg/kg using a one sample Wilcoxon test and this found both doses to be significantly lower than 15mg/kg ($p<0.001$). There was also found to be no evidence of a difference in the median dose in patients who received intra and post-operative doses (Wilcoxon $p=0.331$). The WFAR for our 1-5 years group was 1.14 and 6-12 years was 0.92. Using the previous Resus council equation for the latter group (2(age)+8) it would have been 1.2.

Discussion and Conclusion

Prescribing of paracetamol remains a problem. Despite the limitations of our small sample size it was apparent that patients were receiving too small a dose both intra and post-operatively. The WFAR for the 1-5 year olds would suggest that they were on average larger than the population and were perhaps given an age appropriate dose which would be an underdose for this group. It was also noted that the older age groups and those over 50kg were underdosed to a greater extent. Dosing guidance is available for safer prescribing of intravenous paracetamol(3). We still require a simple and effective method of calculating the dose of oral paracetamol.

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Acknowledgement

Dr David Young for statistical analysis of data

041

The Impact of a New Consultant Led Pre-Operative Assessment Service at Royal Manchester Children's Hospital

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Introduction and Aims

Pre-operative assessment is an essential aspect of the safe delivery of anaesthesia and perioperative care. (1) Anaesthetic pre-operative services have an important role in reducing cancellations and in improving patient experience. It can take several weeks to ensure appropriate assessment and investigation of comorbidities and to co-ordinate the optimisation process. (2) Prior to April 2014, pre-operative assessment at Royal Manchester Children's Hospital was carried out by nurse practitioners with ad-hoc input from anaesthetists. On-the-day cancellations and delays were causing much frustration among patients and staff.

The aim of this service improvement project was to reduce the number of on-the-day delays and cancellations with the introduction of a consultant led pre-operative assessment service that allows children with complex medical problems to be adequately assessed and prepared for elective procedures.

Method

From April 2014, nurse practitioners from the pre-admission service were able to refer patients to a consultant led anaesthetic clinic for a number of reasons documented in a newly developed set of guidelines. Consultants review the referrals and arrange to see those patients needing further assessment and optimisation. The relevant information with regards to optimisation, risk assessment and anaesthetic options along with any advice received from relevant specialties is documented in a structured document and made available to the anaesthetist who will be responsible for that patient.

During the pilot period (March 2014 – September 2014) we collected data detailing on-the-day cancellations and delays. We have recently undertaken a satisfaction survey of anaesthetists, pre-admission nurse practitioners and surgeons. We are in the process of repeating the initial audit in order to assess the impact of this service on theatre productivity and to identify any problems or areas for further improvement. We expect to have completed this by the end of February 2016.

Results

Data collected during the pilot period demonstrated a fall in on-the-day cancellations due to inadequate pre-operative assessment from 20% in March 2014 to less than 5% in September 2014 There was also a 30% reduction in the number of theatres commencing their first case late. Satisfaction surveys have demonstrated that both nurse practitioners and anaesthetists find the service extremely beneficial and are satisfied with the advice and support provided.

Discussion and Conclusion

We have demonstrated that introduction of a consultant led pre-operative assessment clinic at Royal Manchester Children's Hospital has resulted in the reduction in on-the-day cancellations and delays, at least in the short term. Anecdotal evidence implies that this benefit has persisted throughout the 18 months since the service began. Although we expect the current audit to highlight some residual areas for improvement, we are confident that the improvement in theatre productivity will have been sustained.

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Safety and Improvement in Allergy Documentation and Identification in the Royal Belfast Hospital for Sick Children

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RVH

Introduction and Aims

The incidence of anaphylaxis in children has been estimated at 10.5 per 100,000 population per year. Standards of practice for the diagnosis and management of drug allergy in both adults and children have been established by NICE 1. The recent launch of NAP 6 has further highlighted the issue of allergy in the perioperative period.
In the Royal Belfast Hospital for Sick Children (RBHSC) it became apparent that there was inadequate documentation of allergy status in children both in the Paediatric Intensive Care Unit (PICU) and attending theatres. A similar patient safety issue had previously been identified within the adult regional intensive care unit in the same trust, and successful interventions implemented to address the problem. We felt that the lessons learned from this experience could improve patient care in RBHSC, with a recent patient safety initiative within the hospital providing a platform upon which to do this.

Methods

This service improvement project took place over a number of months, with two initial branches of intervention: Firstly, the issue of effective allergy handover was highlighted in PICU and allergy status introduced as a key part in the morning and evening multidiscipinary handovers. Secondly, an audit of allergy documentation was undertaken over a two-week period to formally assess standards and areas of deficit, where a number of kardex reviews were undertaken (n=264) over a two-week period on two surgical wards and PICU.

Results

Of all kardexes reviewed, 11% (29/264) had a documented allergy to a medication or food. Of these, 28% (7/29) had an allergy to antibiotics, 41% (12/49) to other drugs such as antiepileptic medication and local anaesthetic topical creams. Out of 29 allergies, only 50% documented the type of reaction. In the majority of cases this was a rash (11/29). Anaphylaxis was noted in only 1/29 cases. In 40 out of 264 cards reviews, allergy documentation was incomplete, with completely absent documentation of allergy status in 16 reviews.

Discussion and Conclusion

Subsequent to this audit, we considered further ways to improve documentation of allergy status of paediatric inpatients. Staff education sessions were organised, including presentation of audit results to healthcare staff at various meetings. Promotion of allergy status as a central part of handover was extended to include the surgical wards. Lastly, there was introduction of allergy posters and wristbands to the surgical wards and PICU.
Allergy is not an insignificant problem in the paediatric population. While anaphylaxis tends to be rare, insufficient documentation leaves a potential risk of preventable critical incidents occurring. This project used a multimodal approach to introduce safer practices relating to patient allergy.

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043

Facilitating Timely Non-Elective Surgical Intervention in Children -- Full Cycle Clinical Audit and Recommendations

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Introduction and Aims

Reducing the waiting times for emergency surgery is crucial, particularly in vulnerable patient groups such as children. The Children's Surgical Forum (comprised of representatives from the RCS, RCoA, DoH and Patient Liason Group) suggest that children requiring emergency (but not immediate) surgery should be operated on within twelve hours of the decision to operate(1). A clinical audit was designed to investigate whether this target is being achieved, and subsequently reaudited the following year.

Methods

Fifty-two structured data collection forms were filled out contemporaneously by attending clinicians between May 2013 to July 2014 for any child (<18 years of age) undergoing emergency surgery. Thirteen forms were excluded due to not containing sufficient information for analysis. Following an extensive local educational campaign directed at the surgical specialties, a reaudit of twenty-six cases was completed between August 2015 to January 2016.

Results

Data for thirty-nine children aged 1 to 15 years of age revealed that 59% of children were operated on within twelve hours, with a modest improvement to 60% in the reaudit. However, we note that there is a marked increase in children who are asked to reattend the following day for surgery, instead of being admitted.

Discussion and Conclusion

Despite the majority of children being operated on within twelve hours, there is still room for improvement. The primary cause for delay appeared to be late booking time. Cases booked between 0730 – 1130 had a 92% chance of being operated on with twelve hours, but only 20% of cases booked between 1630 – 2030 met the target. After presenting these results to our surgical colleagues there is now a clear preference to send non-urgent cases home if booked after midday, to return the following morning for surgery. This avoids needless admission to hospital and a reduced risk of an overnight stay should a late cancellation occur. Furthermore, we have demonstratively reduced the likelihood of a protracted starvation period for the child.

Permission obtained from Clinical Audit Department YGC. No competing interests to declare.

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044

Peri-Operative Neonatal Temperature Control - a Quality Improvement Project

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Introduction and Aims

It is has long been recognised that inadvertent hypothermia may be associated with adverse outcomes, especially in neonates. Increased risk of post-operative infections, prolonged post-operative recovery, increasing coagulopathy and blood transfusion requirements [1], increased aspiration risk, alteration in immune function [2] and cardiac arrhythmias are just some of the consequences of hypothermia.

Having identified from two previous audits that some neonates were becoming hypothermic (temperature < 36^0) perioperatively, a series of changes and suggested guidelines were implemented. We wanted to evaluate whether these had made improvements to the numbers of neonates becoming hypothermic perioperatively.

Methods

Changes in practice that were implemented included the use of clear, plastic drapes intra-operatively, heat and moisture exchangers (HME) and the use of a transwarmer during transfer of the neonate back to the neonatal intensive care unit. These changes were well publicised amongst all staff involved in the perioperative care of neonates.

A subsequent prospective audit of all neonatal patients presenting for elective or emergency surgery or cardiac intervention was carried out between October 2015 and January 2016. Demographic data, temperature measurements along the patient pathway and methods of warming devices were collected. Comparison to previous audit results were made and data analysed.

Results

Data from a total of 29 patients over a 15 week period presenting for surgery were collected. The median age of the patients was 12 days, median corrected gestational age was 34.6 weeks (23-54 weeks) and median weight was 1.98 Kg (1.06-4.05 Kg). General surgery represented the majority of cases, with ENT and interventional radiology also contributing. The majority of cases were for emergency surgery rather than elective surgery. The median anaesthetic preparation time was 30 minutes (10-60 minutes) and median surgical time was 70 minutes (30-193 minutes). Our results showed that there was a 6% reduction in hypothermia rates of patients arriving in the anaesthetic room and a 3% reduction in hypothermia rates of patients arriving back to the neonatal intensive care unit in comparison to previous audits.

Discussion and Conclusion

With the introduction of alterations in surgical draping and warming methods, a clear reduction in neonatal hypothermia rates have been demonstrated. This is of clinical significance especially when considering the potential adverse effects of hypothermia on an already vulnerable group of patients. We have demonstrated a completion in audit cycle; instigated a change in practice, introduced reinforcement measures and seen sustained improvements as a consequence.

Acknowledgements

Nursing and medical staff on the neonatal intensive care unit, St Thomas' Hospital, anaesthetic and theatre staff at the Evelina Children's Hospital, London.

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045

Weighing Children, A Heavy Burden?

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Introduction and Aims

The weighing of children is an important marker of growth and development but perhaps more importantly for anesthetists it guides medication dosing. Anesthetists in our institution had noted a number of children coming to theatre with an incorrect weight documented. At the same time a number of medication related Datix incidents indicated that an incorrect weight was a common contributory factor. Our aims were to identify current practice, compare it with national guidelines, identify areas for improvement, communicate both good and bad practice, implement changes and re-audit.

Methods

We audited our weighing practice against the Royal College of Nursing (RCN) Standards for the weighing of infants, children and young people in the acute health care setting by using their snapshot audit tool in 9 clinical areas.(1) We also reviewed all weight related Datix incidents reported in the previous 3 years. Each incident was then reviewed by our Quality Coordinator. The results were presented at the hospital audit meeting. Following this a multidisciplinary group was set up to develop a weighing policy specific to our institution. When this policy is finalised it will be rolled out to all clinical areas. We will then perform a re-audit.

Results

The snapshot audit looked at many domains under the headings of; availability of weighing equipment, equipment maintenance, education and training, practice and record keeping.

Key findings; audit:

- All 9 clinical areas met national standards
- The process of weighing and documentation of weight in our institution requires improvement.
- There is a lack of consistency in methods used to weigh children.
- Current APLS formulae for weight estimation were not known in all areas and accurate documentation was not evident everywhere.

Key Findings & Incidents

In the three year period, 21 incidents found.

Key issues identified included:

- Incorrectly measured weight,
- Weight not measured,
- Weight incorrectly documented.

Many of these issues led to drug errors with children being over and under-dosed on pain medication as well as antibiotics. .

Discussion and Conclusion

The importance of a consistent and accurate method of weighing, calculating and recording weight in paediatrics cannot be underestimated. This is essential in order to deliver safe and effective anaesthesia and analgesia, which is fundamental to patient care and safety. In this audit, we identified current practice, compared it with national guidelines and identified areas for improvement. We have communicated good and bad practice and we are in the process of policy development and implementing changes. A re-audit is planned. This will help us to improve the quality of the care we provide.

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046

Audit of Paediatric Micro-Cuff Endotracheal Tube use – is the Pressure on?

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Introduction and Aims

New understanding of paediatric airway anatomy[1] and the introduction of new, cuffed endotracheal tubes (ETT) has resulted in more frequent use in paediatric anaesthesia.[2] However, it has been recommended that cuff pressures be maintained below 20cmH2O, to minimise airway complications related to tracheal mucosal hypo-perfusion.The widespread use of nitrous oxide (N2O) in paediatric anaesthesia complicates this issue. It is well-established that N2O can diffuse easily into the ETT cuffs, raising the pressure within them.[3] We audited practice related to use of micro-cuff ETT in children at our hospital and related intra-operative changes in cuff pressures.

Methods

The audit was conducted in all paediatric theatres over a two month period. Data collected included age, weight, ETT size and gas mixtures used intra-operatively. The volumes of air used to inflate the cuff on insertion was noted and the resulting pressure was measured with an analogue manometer. At the end of the case, the ETT cuff pressure was noted again as was the volume of air removed. The duration of intubation was also recorded.

Results

Data was collected from 94 cases, with 61 (65%) using nitrous oxide.Overall compliance with cuff pressure monitoring was 68% (64 patients).Thirty-six patients (56%) had increase in cuff pressures (5 in air group, 31 in nitrous group), while in 18 (28%) the pressure decreased. In 28 cases (44%), the pressures was >20cm H2O at some point (22 (78%) in nitrous group, 6 (21%) in air group). There was no consistent relationship between the duration of operation and increases in cuff pressures, with operations lasting anywhere between 20 minutes to 120.

Discussion and Conclusion

Cuff pressures can vary greatly duration anaesthesia, particularly when nitrous oxide is used. Both pressure increases, causing mucosal damage, and decreases, allowing tracheal soiling, can be harmful to the patient. Frequent monitoring is required to maintain pressures within safe limits and avoid potential morbidity associated with cuffed ETT use in children. Further research is needed to give definitive recommendations for the frequency of cuff pressure monitoring in children, especially in those receiving nitrous oxide as part of their anaesthetic.

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047

Analgesia Post Paediatric Pacemaker Insertion

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Introduction and Aims

Post procedural pain relief remains a challenge in the paediatric population undergoing interventions in the cardiac catheter laboratory (CCL). Permanent pacemaker insertion represents a procedure where a child would benefit from the use of a strong opioid as part of a multimodal analgesic regime to optimise pain relief. Our Trust guidelines reflect this, suggesting the use of opioid sparing analgesia (paracetamol and non-steroidal anti-inflammatory drugs) as well as a long acting opioid (morphine). The prescription of appropriate analgesia has been investigated over several audit cycles since 2002. On-going education encourages the prescription of opioid sparing analgesia and long acting opioids to optimise pain management in this population.

Methods

The latest cycle of audit analysis was undertaken over a two-year time period 2013 – 2015. The CCL anaesthetic database was used to identify appropriate cases. Adherence with hospital guidelines for intra-operative analgesia provision was assessed: opioid sparing analgesia (Paracetamol; 20mg/kg PR or 15mg/kg IV +/- Diclofenac 1mg/kg PR or IV) in addition to use of a long acting opioid, Morphine (0.1mg/kg).

Results

The results show 86 cases were undertaken over the audit period with an average of 3.6 cases per month. All cases had some form of analgesia prescribed. Eighty-one (94%) had paracetamol +/- non-steroidal analgesia prescribed (also 94% during previous audit period). Sixty-three (73%) of cases had long acting opioids prescribed (as compared to 64% during previous audit period). Sixty (70%) cases had opioid sparing and long acting opioids prescribed (61% during previous audit period).

Discussion and Conclusion

This quality improvement project reflects the results of the latest cycle of a continuous audit process aiming to ensure the provision of appropriate analgesia following insertion of permanent pacemaker.

There appears to be an on-going improvement in the proportion of patients receiving optimal analgesia as described by Trust guidelines. Seventy percent of patients now receive opioid sparing drugs along with long acting opioids compared with 61% in the previous audit cycle[1] and 18% at the start of the programme 12 years ago.

Furthermore, we now provide some form of analgesia (other than local anaesthesia) in all cases which was not the case previously[1].

With the continuation of presentation of results at regular clinical governance meetings, along with further staff education, we aim for further improvements over future audit cycles.

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Paediatric Emergency Surgery: Do we Time it Well? Paediatric Emergency Theatre List Efficiency at Great North Children's Hospital, Newcastle Upon Tyne

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Introduction and Aims

This audit was done due to Datix forms and patient complaints about paediatric emergency case management. The emergency list runs daily but for the afternoon only, and there is an elective list in the morning session beforehand which has the potential to overrun. With the general expansion of paediatric emergency list users, there is not enough space on the emergency list and sometimes there is interruption of an elective list for emergency work. The aims of the audit were to look at the efficiency and utilisation of the paediatric emergency list during weekdays and to determine the average wait for an emergency operation not requiring immediate intervention[1].

Methods

Prospective data collection took place over a two-week period in April 2015 and included: date/time operation booked, who booked it, method of booking, time patient sent for, operation start and completion date/time. A communication log was kept once the patient had been booked to see if there were any delays, and if so, the reason why and if the patient was then offered food/drink. Anonymus questionnaire asking for issues with current system and suggestions to improve was also sought from all stakeholders.

Results

Children requiring category 2 operations waited for an average of 7.2 hrs, category 3 for 11.34 hours (excluding one outlier of 67 hours wait due to PICU bed issues) while wait for category 4 operations was 35.07 hrs. The average waiting time against duration of operation was 8.99 hours for procedures lasting less than half an hour, 18.77 hours for half an hour to one hour procedure, 27.1 hours for one-two hour procedure and 24.6 hours for two-three hour procedure. If there was a delay in surgery, 59% of children recieved water while the remaining 41% had prolonged starvation.

Discussion and Conclusion

There is more than expected delay in children requiring emergency services irrespective of urgency of procedure or duration of surgery. Lack of theatre space and time is a primary contributing factor for this delay in addition to the expanding emergency workload. An obvious solution to this delay would be to have an all day emergency list, like in other centres with comparable paediatric emergency workload[2]. To optimise our current system we now have a trainee with emergency list consultant anaesthetist, pre-list team brief with all stakeholders to have an estimated start time for each case, utilise early finish elective lists for emergency procedures, dedicated theatre coordinator to improve communication with ward staff to avoid unnecessarily prolonged starvation. This seems to have had a positive impact on our emergency waiting times at Great North Children's Hospital.

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049

Fresh Frozen Plasma Repletion on Bypass as a Management for High Risk Paediatric and Congenital Cardiac Surgery

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Introduction and Aims

Children undergoing heart surgery are at risk of fluid overload and coagulopathy[1]. We routinely use filtration to combat oedema. Large volumes of clotting factors are required to correct coagulopathy[2]. We administer fresh frozen plasma (FFP) prior to separation from bypass and concentrate clotting factors by filteration of fluid. This project assessed if FFP repletion and filtration prior to bypass separation altered thromboelastography (TEG) values when compared to usual practice. We also investigated the effect on product administration in ICU.

Methods

We reviewed retrospectively patients who had surgery between April 2014 and January 2016. Post protamine TEG's were included. The patients were then divided; group A FFP repletion on bypass; group B usual practice. The R time and MA were compared. PICU blood and clotting factor administration in the twenty- four hours following surgery was assessed.

Results

Fourteen patients in group A, fifteen patients in group B. There was no statistical difference in R Time. Mean for group A 11.39 (S.D. 7.56), mean for group B 14.19 (S.D. 13.0).There was no statistical difference in MA. Mean for group A 57.12 (S.D. 12.06), mean for group B 44.84 (S.D. 21.28). During the first 24 hours in ICU there was no statistical difference in the amount of FFP, PRC's or cryoprecipitate given. Mean FFP in group A 4.58mls/kg (S.D. 8.95), mean in group B 5.23mls/kg (S.D. 11.8). Mean PRC's in group A 4.98mls/kg (S.D. 6.42), mean in group B 24.10mls/kg (S.D. 37.62). Mean cryoprecipitate in group A 0.73mls/kg (S.D. 2.27), mean in group B 1.82mls/kg (S.D. 7.06). There was a statistically significant difference (p value 0.03) between both groups with regards to platelet delivery. Group A received less platelets per kg than group B. Mean platelets in group A 1.43mls/kg (S.D. 2.98), mean for group B 8.45mls/kg (S.D. 11.05). There were no surgical re-explorations in group A and three in group B.

Discussion and Conclusion

During bypass there is depletion of platelets and fibrinogen[3]. This project assessed if FFP repletion was effective in high risk cases and an appropriate suggestion for our current coagulation guideline. The sample size was too small to show a difference. The MA was more affected by FFP repletion than the R time. There was a statistical difference in platelet use; group A receiving less than group B. Clot strength depends on fibrinogen and platelets. Deficiency in platelets may be partially compensated for by higher fibrinogen levels[3]. This may explain the lower use of platelets in group A.

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050

An Evaluation of the Pain Management of Patients Undergoing Major Craniofacial Surgery in a Tertiary Children's Hospital

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Introduction and Aims

To evaluate the efficacy of current analgesia provision for post craniofacial surgeries in children and to improve the quality of pain management we provide - Quality improvement study.

Methods

Retrospective audit looking at the analgesia requirements of children having major craniofacial surgeries i.e Fronto orbital remodelling, Posterior vault expansion & Total calvarial remodelling in the peri-operative period from January 2015 to December 2015. Notes were reviewed for demographics, analgesia prescribed, pain scores in recovery and 24 hours immediate post operative period, length and type of surgery.The project was registered with the Clinical Audit Department. Data was collected from the anaesthetic chart, post surgical plan and pain scoring sheets. Pain scoring was done using FLACC & Wong & Baker scales.

Results

During this period there were 89 cases of which we have been able to perform retrospective analysis on 56 case notes. Average length of surgery was 210 minutes . Mean weight of the patients was 16.16 kilograms. 100 % of patients received Paracetamol and Morphine intra operatively. Pain scores in recovery was 0 /10 in all the patients whose notes were reviewed. Mean pain scores in the ward was 3.4/10. 100 % of patients had pain score 0 in the recovery. 25% patients had no pain even 24 hours post operatively, 16 % had mild pain, 55 % had mild to moderate pain scores and only 2 patients had severe pain with pain score 8-10. 2 patients had NCA Morphine prescribed and both had pain score 0/10 throughout recovery and in ward. Not all the patients had pain scores documented throughout the post operative period.

Discussion and Conclusion

There was widespread use of multimodal analgesia including ibuprufen where it was not contraindicated. However there were few delays in starting ibuprufen in some cases. Management of pain with NCA Morphine was very good but the numbers are inadequate to quanitfy significant difference.Education needed to prescribe all possible modes of analgesia and trial use of NCA Morphine postoperatively. There needs to be more education on using the pain scoring charts regularly in the immediate post operative period until discharge of the patient.

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051

Handovers to a Paediatric Post Anaesthesia Care Unit: a Pilot Audit

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Introduction and Aims

It is recognised that handovers to the adult post anaesthesia care unit (PACU) lack standardisation and are frequently incomplete (1). The combination of performing both technical and verbal tasks whilst working in a busy environment can make handovers especially challenging. Recently, handovers to the paediatric PACU were reported to omit vital information and poor communication is known to be associated with precipitating adverse events (2). Few studies have investigated handovers to the paediatric PACU therefore this audit aimed to assess the quality and consistency of information communicated in the paediatric PACU.

Methods

This prospective observational pilot audit assessed handovers to the PACU at a tertiary paediatric hospital. Handovers were evaluated for patients admitted to the PACU following elective surgery. The quality of handovers was assessed using an established checklist which covered 45 items across 3 domains including pre-operative, intra-operative and post-operative information. Each handover was observed by a single researcher. Information which was verbally communicated during the handover was marked on the standardised checklist. If documented in the anaesthetic record, this was also marked on the checklist. The primary outcome was the proportion of information verbally communicated compared to the documented information.

Results

A total of 20 (n=20) handovers were observed which included 13 male and 7 female patients with a median age of 7 years, 6 months [range: 8 months to 15 years]. Post-operative information such as name was frequently communicated (80%) whereas items such as age (40%) and any pre-existing disease (20%) were frequently omitted. Intra-operative regional anaesthesia was often verbally communicated (85%) yet type of surgery was only handed over in 65% of cases. The destination of patients following surgery was often not communicated (32%) and the plan for monitoring patients post-operatively was only verbally communicated in 15% of cases.

Discussion and Conclusion

The results of this current pilot study suggest that important information is omitted during handovers which could potentially affect patient safety. At present, no standardised checklist exists and handovers rely on the clinical judgement of healthcare professionals. Although extensive checklists with 45 items would be impractical to implement in practice, there are vital items which should be verbally communicated to maintain patient safety. While this pilot audit only observed a limited number of handovers, the results highlight possible areas for improvement and should prompt other departments to consider evaluating the quality of handovers to the PACU.

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052

Analgesia Given to Patients Under 12 Months of Age who Require General Anaesthesia and Turnaround Time in Recovery with a Nurse Led Extubation Policy

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Introduction and Aims

Temple Street Children's university hospital(TSCUH), is a tertiary referral centre for children and operates a busy day case surgery schedulling, with approximately 7000 day case surgery performed per year. With up to four busy operating theatres and daily emergency surgery this number is acheived through a nurse led extubation policy which has facilitated efficiency but also training for non consultant hosptial doctors in anaesthesia as as they rotate through TSCUH. Recovery nurses are highly trained and skilled in the area of extubation. When the child reaches recovery intubated, connected to an Ayre's T piece and oxygen, time is spent ensuring that a full return to normal ventilation, and readiness for extubation is acheived before extubation is performed. Consultant anaesthetists introduced this practice to TSCUH after providing teaching to specialist recovery nurses as it was felt safer, and promoting efficiency and team working.

Methods

As part of a prospective and retrospective audit carried out between September 2015 and March 2016 detailing the exposure of children who were under 12 months of age to general anaesthesia the nature of surgey, the types of analgesia given, time to extubation and duration in recovery were audited.

Results

Over 200 chilren received general anaesthesia. Local Anaesthesthic infiltration by the surgeon and or regional blockade was performed in up to 45% of cases and Paracetamol was given to 40% of cases. For neonates intravenous paracetamol and local anaesthethic infiltration with 0.8mls/kg of 0.25% Levobupivicaine was the mainstay of analgesia given. 25% of extubations were carried out in less than 5 minutes, almost 25% less 10 minutes, 20% between 20 and 50 minutes, and the remainder were prolonged or transferred to ICU for as expected for ventilatory support. 80% of patients were in recovery 10 minutes minimum after extubation, when concerns about pallor, desaturations, or jerky movements patients were kept up to one hour and reviewed by the anaesthetist.

Fentanyl or Morphine given intravenously to a neonate seem to prolong the recovery time to more than 6 times that when it was not. Intravenous pethidine and local anaesthethic were the main analgesics given to children undergoing cleft lip and palate surgery and no adverse events occured in recovery when this was given, neither was recovery prolonged as compared with other opiates. 90% of extubations were carried out by nurses whereas out of hours and at night extubations were carried out by nurses and anaesthetists.

Discussion and Conclusions

Local anaesthethic and simple analgesia can form the mainstay of analgesia given to children under 12 months. It would be interesting to ask trainees about what they have learnt about the art of extubation in TSCUH and whether this skill needs to be emphasized more formally for children.

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053

An Audit of Preoperative Pain Management in Paediatric Appendicitis

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Introduction and Aims

Acute appendicitis is the most common general surgical emergency in children. Delayed diagnosis or treatment can be associated with serious morbidity and even mortality. Clinical diagnosis of appendicitis is guided by examination findings, for example, guarding. There can be some reluctance to prescribe adequate analgesia to children in order to prevent any 'masking' of these positive examination signs, however there is no evidence to support this practice[1].

While there is guidance available on the management of post-operative pain, to date there has not been a full guideline on the management of pre-operative pain in suspected appendicitis or other abdominal pathology[2,3].

This audit aims to review the documentation of pain scores in the accident and emergency department (A+E), pre-operative analgesia prescribed and assess the correlation between analgesia received, physical examination and intraoperative findings.

Methods

We reviewed the medical charts of all children who had an open or laparoscopic appendicectomy in a 12 month period at The Royal Belfast Hospital for Sick Children, a regional paediatric hospital.

Results

81 children had an appendicectomy in a 12 month assessment period. Charts were obtained for 77 children. The age range was from two to 13 years old.

Only three (5.7%) children admitted directly to the regional paediatric hospital A+E had a pain score documented.

66 (85.7%) children had confirmed appendicitis and 49 (63.6%) children had a perforated appendix.

Seven (9.2%) children received no analgesia either in A+E or in the 4 hours preceding A+E attendance; six of these children had confirmed appendicitis. 12 (15.6%) children in total received opioid analgesia in A+E, four of which had a rigid abdomen and a perforated appendix with free pus in the abdomen.

Discussion and Conclusion

This audit shows that the majority of children who had an appendicectomy actually had a perforated appendix. Half of those children presenting to hospital with peritonism did not receive opioid analgesia, highlighting its under-prescribing for children with an acute abdomen. The poor documentation of pain scores in A+E may have contributed to this inadequate assessment of analgesia requirement, and subsequent re-evaluation post-analgesia.

By creating a guideline for pain assessment, analgesia and anti-emesis in children presenting with abdominal pain, we aim to provide guidance for medical and nursing staff and to standardise their pain management.

This audit highlights the need for education for medical and nursing staff in the emergency department, surgical and anaesthetic teams in the prescribing of opioid analgesia for children.

We appreciate that this audit specifically assessed children who had an appendicectomy, and therefore excluded other presentations of abdominal pain.

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054

Paediatric Recovery Times: A Tale of Two Tertiary Referral Centres

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Introduction and Aims

Recovery space in every hospital is a scarce resource and efficiency in theatre is heavily reliant on optimal flow through it. Minimising the time spent in recovery can be affected by many variables and we compare the difference in recovery times in two centres.

Methods

Prospective collection of patient recovery times was performed over 5 days using a proforma given to the recovery staff. 126 patients were audited in total (Birmingham Children's Hospital (BCH) n=73; King's College Hospital (KCH) n=53). They were divided into specialties and any reason for delay were detailed by the recovery nurse caring for the patient.

Results

The mean recovery time independent of specialty was 88.0(+/- SD) mins vs 34.9(+/- SD) mins, ($p<0.0001$) for KCH and BCH respectively. When delays are accounted for the average recovery times are reduced to 56 vs 33 mins. For specialty specific cases, general surgery – 90 vs 40 mins (n=27 vs 20), orthopaedics 82 vs 33 mins (n= 4 vs 9).

Fifthteen vs forty per cent of recovery times are delayed due to preventable factors at BCH vs KCH respectively such as waiting for staff, staff shortages, bed shortages and communication errors. This amounts to approximately 178mins per month of avoidable wasted recovery time.

Discussion and Conclusion

There is a marked difference in the recovery times in these two centres even when organisational and specialty specific factors are taken into consideration. Whilst KCH is a tertiary referral centre for certain paediatric specialties, it does not have the same management and staffing (on the wards and in recovery) of an exclusive paediatric hospital. For example, at KCH, recovery nurses will be expected to manage both adult and paediatric patients. This may account for the discrepancy in results. Adapted from the BCH model, KCH are improving education of recovery staff less familiar with paediatrics and new guidelines for paediatric recovery and hope to show an improvement in results.

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Anaesthetic Implications of Robotic Urology Surgery in Children

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Introduction and Aims

In recent years, paediatric urology surgery has increasingly been performed laparoscopically, and more recently using robot assisted techniques. Robotic surgery has gained popularity for complex procedures requiring delicate dissection in hard to access areas. It is believed to offer the precision and dexterity of open surgery with lower post-operative pain and faster recovery.[1] Changing surgical technique has implications on anaesthetic management, hence modification of anaesthetic practice is required to improve the benefits of advanced surgical methods. We report a case series of paediatric patients undergoing robotic urology procedures at a tertiary centre.

Methods

The study was a retrospective case note review of 53 children undergoing robotic urology surgery over a 3 year period, under the care of a single consultant surgeon. The majority of patients (83%) underwent either pyeloplasty or nephrectomy. Other surgeries included ureteric stricture repair, Mitrafanoff and excision of ureteric horn. Patients were anaesthetised by one of four consultant paediatric anaesthetists, using the method of their choice. Data was collected on anaesthetic and surgical time, intra-operative fluid requirements, post-operative analgesic requirements, post-operative blood transfusion and length of hospital stay.

Results

The study population had a median age of 5 years (range 9 months - 16 years) and a median weight of 20kg (range 9-78kg). 79% patients were ASA1, 15% ASA2 and 6% ASA3. Anaesthetic management consisted of general anaesthesia plus epidural with or without continuous morphine infusion (22%), caudal (8%) or local infiltration (56%). 75% patients received intra-operative remifentanil infusions. 4 patients (8%) required oral morphine solution post-operatively, 75% required ≤2 doses. Continuous morphine infusions (CMI) were continued for a median of 16 hours post-operatively (range 2-24 hours).

Median anaesthetic plus surgical time was 170 minutes (range 78-300 minutes) and median intra-operative fluid requirements was 29.1ml/kg. No patients required a blood transfusion in the first 24 hours. 10% of patients were discharged the day of surgery and 67% on day one post-operatively.

Discussion and Conclusion

Robotic urology surgery is thought to combine the technical benefits of open surgery with the post-operative benefits of laparoscopic surgery. This less invasive technique boast benefits of reduced blood loss, scarring and post-operative pain, shorter hospital stay and earlier return to normal activities. Many of the patients in this series were successfully managed without epidural analgesia and required minimal post-operative analgesia when local infiltration was performed by the surgeons. Anecdotal evidence shows epidural or CMI could delay discharge due to side effects and delayed mobilisation.

This study presents a group of patients that demonstrate many robotic urology procedures can be managed successfully with less invasive anaesthetic techniques. In fact, a move away from epidural analgesia traditionally used for open procedures is both achievable and likely advantageous. Modified anaesthetic practice is hoped to further reduce hospital stay and increase patient and family satisfaction.

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056

Transversus Abdominis Plane Catheters: The New Epidural. A Comparison on Analgesic Techniques for Paediatric Laparotomies in our Centre

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Introduction and Aims

The use of epidural anaesthesia is considered the gold standard of analgesia for open abdominal surgery[1], however NAP3 has placed its use and complications under scrutiny[2]. Transversus abdominis plane (TAP) blocks can be used as an alternative to epidural analgesia in children and adults[3]. The use of TAP catheters has been advocated to prolong analgesic effects and reduce opioid requirements[4]. We aimed to compare the use of epidurals, intra-operative intravenous morphine +/- Rectus Sheath or TAP blocks (AbdoBl) and TAP catheters via elastomeric pump (TAPCath) at our centre with regards to post-operative opioid requirement and pain scores.

Methods

We retrospectively reviewed case notes of patients who had undergone intra-abdominal surgery (identified by the paediatric pain database) between June 2014 and January 2016 identifying analgesic technique, 48hour post-operative analgesia and pain scores. We excluded cases that required post-operative ventilation or relook abdominal surgery in the study period.

Results

Fifty-five notes were reviewed: Epidural (12), TAPCath (20), AbdoBl (20), three patients received no block (NoBlock). Post-operative opioid utilisation was higher in the NoBlock and AbdoBl groups (100% and 70% respectively), compared to TAPCath and Epidural groups (40% and 33%). In the AbdoBl group, three required PCA morphine (average dose 427mcg/kg), 11 required intravenous morphine infusions (average 584mcg/kg). In the Epidural group one required oramorph (293mcg/kg), one required PCA morphine (682mcg/kg) and two required morphine infusions (average 1077mcg/kg). In the TAPCath group three required oramorph (average 298mcg/kg), three required PCA morphine (average 850mcg/kg) and two required morphine infusion (average 387mcg/kg). In the NoBlock group all required post-operative morphine: two used PCA morphine (average 664mcg/kg) and one patient required a morphine infusion (972mcg/kg). Post-operative pain scores in recovery (FLACC, FACES or NRS) were zero in 92% of Epidurals, 80% TAPCath, 80% NoBlock and 70% AbdoBl. At 24 hours, pain scores were zero in 83% of Epidurals, 80% TAPCath, 75% AbdoBl and 50% NoBlock. All children were documented pain free at 48 hours.

Discussion and Conclusion

The high number of pain-free episodes in epidural and TAPCath groups may represent equivalence between these methods making TAPCath an important technique. Fewer children required post-operative opioids in the epidural and TAPCath groups; reducing exposure to opioid side effects and complications. At our centre the use of TAP catheters places a lower workload upon nursing staff with significant implications for service provision. Lower frequency of observations, requirement for pump training, enhanced patient mobility due to good analgesia and unrestricted movement are some of the advantages. We believe elastomeric pump delivered local anaesthetic via TAPCath is a good analgesic technique for paediatric laparotomies, avoids neuroaxial complications, reduces post-operative opiate requirement, reduces nursing burden, encourages mobilisation and is inexpensive to advocate.

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057

Pain Management for Appendicectomy in Children: Does Use of Morphine Nurse or Patient Controlled Analgesia Increase Morbidity?

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Introduction and Aims

Appendicectomy is a common surgical procedure of childhood1. A relatively recent move to a laparoscopic approach has demonstrated a reduction in post-operative complications and reduced length of hospital stay2. Our aim was to audit whether nurse or patient controlled analgesia (N/PCA) following Appendicectomy resulted in increased nausea delaying enteral feeding and ultimately hospital discharge.

Methods

Data was collected from Appendicectomies occurring within our trust in children between 1st May and 31st August 2015. Our outcome measures included time to discharge, incidence of nausea, time to enteral feed tolerance and pain scores. Data was collected on a proforma from anaesthetic charts, operation records, medical and nursing notes and N/PCA charts.

Results

Thirty four patients, ranging from 2 -15 years old, were included, 19 male and 15 female. Twenty eight patients underwent laparoscopic surgery and 6 had an open procedure. A perforated appendix was demonstrated in 24 cases, a normal appendix in 5 cases and the remaining 5 cases lay in between. In 26 of 34 cases an N/PCAwas given post-operatively. Pain scores were reviewed on the first three days post-operatively. These ranged from 0-10 on days 1 and 2 and 0-8 on day 3 in the N/PCA group compared with 0-4 on day 1, 0-6 on day 2 and 0 on day 3 in the non-N/PCA group. Data was unrecorded on 21 occasions. Nausea scores were reviewed similarly ranging from 0-1 on all 3 days in the N/PCA group compared with 0 on all 3 days in the non-N/PCA group. Data was unrecorded on 31 occasions. Discontinuation of N/PCA was recorded on 25 of 26 occasions and ranged from 1-4 days, mean 2.1 days. Tolerance to diet was consistently recorded and ranged from 0-5 days, mean 1.5 days in the N/PCA group and 1-3 days, mean 1.75 days in the non N/PCA group. Days to discharge were recorded on all but one occasion and ranged from 1-9 days, mean 5 days in the N/PCA group and 1-16 days, mean 6.5 days in the non N/PCA group.

Discussion and Conclusion

The results demonstrate a higher range in pain scores in the N/PCA group but little difference in range of nausea scores between the two groups. Both tolerance to oral diet and days to discharge demonstrated differences in range but little difference in mean between the two groups. In order to highlight any clinical significance between these two groups, and account for skewing of results due to outliers, a larger number of cases would need to be considered before further conclusions could be drawn. Continued education with regard to importance of recording such information within the patient notes would assist in reducing unavailable data prior to a larger re-audit.

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059

Use of Additives in Paediatric Epidurals: A Nationwide Survey of Practice Guiding Development of a Local Service

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Introduction and Aims

Continuous epidural infusions are commonly used to provide post-operative pain relief for certain paediatric orthopaedic procedures. A wide variety of practice exists across the country, with variable use of additives (including clonidine, fentanyl and ketamine), and local anaesthetic concentrations. Historically, at the Royal Victoria Infirmary (RVI) in Newcastle-upon-Tyne, no additives have been used in continuous epidural infusions for paediatric patients. To help guide our service development, and to improve the quality of our service, we used a "survey monkey" email survey to rapidly report on differing practices across the country.

Methods

A simple five question survey-monkey survey was created to assess the frequency of use of additives and differing strengths of epidural local anaesthetic infusions. This was sent to the "Travelling pain group", a specialist paediatric pain management group comprising of consultants and specialist nurses.

Results

36 completed surveys (**46%** consultants, **54%** nursing pain specialists) reported that **100%** of services utilised epidurals for paediatric orthopaedics.

67% reported that both "plain" epidurals and epidurals "with additives" were available, and **22%** reported that all epidurals contained additives. Only **6%** reported that the service was limited to "plain" bupivicaine.

Additives described as "frequently used" included fentanyl 2mcg/ml in **85%**, fentanyl 4mcg/ml in **3%**, and clonidine in **35%**. There was no ketamine use reported. 0.125% bupivicaine was used in **63%**, and 0.1% bupivicaine in **20%**.

25% of respondents considered that there were contraindications to epidural additives, which guided their practice. The two most frequent reported contraindications to the use of additives were cerebral palsy with opiate sensitivity, and neonatal age.

Discussion and Conclusion

The results of this survey demonstrated that our local practice ("plain 0.1% bupivicaine" only) was an outlier relative to practice across the UK. In most institutions, both plain and "with additives" are available for use. The most frequently used additive is fentanyl 2mcg/ml. Following this, fentanyl 2mcg/ml has been made available as an epidural additive, and is now used in the majority of our epidural infusions. A rolling prospective audit to assess use patterns, efficacy and safety with this change to practice is in place.

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060

A National APAGBI Survey of Time-Critical Paediatric Transfers

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QEH

Introduction and Aims

A time-critical paediatric transfer eg an acute neurosurgical emergency requires an appropriate senior anaesthetist from the referring hospital to accompany the child. The on call consultant is advised to deploy staff appropriately and a designated consultant should provide a written policy for emergency transfers of intubated children[1]. Our aim was to review current practice of time-critical paediatric transfers, the adequacy of the available senior anaesthetists, how one determines and maintains sufficient competency and if local written policies exist regarding these types of transfer.

Methods

All APAGBI Consultant anaesthetist members were invited to complete an online 10 part questionnaire via 'surveymonkey' in January-February 2016.

Results

86 responders. 50% non-specialist (DGHs, non-specialist paediatric teaching hospitals) and 50% from specialist centres.

A separate paediatric rota exists in 7% of non-specialist-responder centres and 93% specialist centres. Consultant competency is maintained (at least annually) preferentially by in house training (38%)particularly by non-specialist responders(27% v 12%) followed by APLS instructing(35%). 7% (non-specialist) and 18% (specialist) maintain competences less than annually. 13% responders (7% non-specialist, 6% specialist) noted inadequate out of hours senior cover with 6% recommending a dedicated PICU transfer resident or routine ICU assistance at tertiary centres. 6% had transfers weekly-quarterly. 21% have written policies where 10% only accept consultants and 11% also accept competent trainees.

Assessing a trainee's suitability to transfer depends on their clinical experience/competence and the patient's age/complexity (>90% responders). The presence of at least APLS was considered most important (64%)followed by (in descending order) a completed higher paediatric module (44%), transfer course(35%), intermediate module (31%) and basic module(9%).

For transfers of children aged under 3, 28% state that only consultants would be appropriate and 57% state either the completion of a higher/advanced paediatric module or a consultant would be suitable. If intubated/ventilated 14% accept consultants and 48% accept a completed higher/advanced module or consultant(37% non-tertiary v 60% tertiary).

Discussion and Conclusion

Senior paediatric cover is mostly present with a need for increased (P)ICU staff and written rotas with ad hoc availability of consultants(with paediatric interest) particularly as the sites where at least half of the inadequate cover was thought to occur had frequent (<3 month) transfers.

Senior clinical experience and competence were viewed as the most important followed by an in-date APLS and a completed higher module. RCOA[2] states that a completed higher paediatric module is required whilst GPAS[1] requires an appropriately senior anaesthetist which could include experienced non-trainee grades.

Anaesthetists are advised to maintain their skills in a team approach for resuscitation and stabilisation of the sick child[3]. Maintaining less than annual competency, particularly at non-specialist centres if the caseload and paediatric exposure is less than specialist centres, may reduce overall confidence in managing a critically ill child. This coupled with a reduced threshold of trainee level (intermediate v higher) deemed acceptable to transfer intubated/ventilated children may require increased vigilance.

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061

Post-Operative Tonsillectomy Analgesia After Discharge: A UK Practice Survey

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Introduction and Aims

Adeno-tonsillectomy is renowned to cause significant post-operative pain, which will often have a secondary peak at days 3 to 5 once discharged home. Use of codeine has been discouraged in children under 12 years since 2013, as advised by the MHRA, and is contraindicated in children undergoing adeno-tonsillectomy for obstructive sleep apnoea (OSA)1. In a series of fatalities or life-threatening cases following codeine use, the majority were post adeno-tonsillectomy in children with OSA2. Previous work has shown that oral morphine may be a reasonable substitute for codeine after discharge home3. We aimed to provide a comprehensive review of current UK practice.

Methods

The survey was initiated and performed via PATRN (Paediatric Anaesthesia Trainees Research and audit Network). All UK tertiary paediatric centres were invited to participate. Any district generals (DGHs) volunteering were included. The survey and instructions were distributed via email. Trainees applied for local audit approval as necessary. Data was uploaded onto an online database. No confidential data was collected. The PATRN committee collated the results.

Results

Twenty hospitals participated, fourteen tertiary and six DGHs. The annual tonsillectomy rates for tertiary centres was 197-1015, and for DGHs 71-580. Eleven centres have a formal protocol for discharge analgesia. All centres prescribe regular paracetamol and a non-steroidal anti-inflammatory(NSAID). Nineteen centres use ibuprofen, one uses diclofenac. Ibuprofen dosing varies from 5mg/kg to 10mg/kg eight hourly. Seven centres discharge patients with oral morphine, dose range 0.1-0.2mg/kg. Two centres modify doses for OSA cases. One centre uses tramadol for children aged over 14 years in place of oral morphine. Following the MHRA drug safety update, fourteen participating centres have changed their protocols, six to include and eight to remove opiate analgesia. Seven have subsequently audited their practice; five achieving satisfactory analgesia. Of these, one centre does not provide morphine but does prescribe higher dose ibuprofen (10mg/kg). The two centres finding inadequate analgesia provide paracetamol and NSAID only.

Discussion and Conclusion

PATRN is a national collaborative network of anaesthetic trainees with an interest in paediatric anaesthesia. This pilot project launched our network and aimed to identify ways of refining our processes. Our survey is the largest UK survey following the MHRA drug safety update. The data shows that many hospitals have consequently changed their practice, but there is a lack of consistency regarding NSAID doses and use of oral morphine at home. Those auditing their practice have predominantly achieved adequate analgesia, and correspondingly prescribe oral morphine at home.

There remains considerable variation in practice for analgesia post tonsillectomy. Oral morphine appears to provide adequate analgesia in those centres using it on discharge. PATRN provides a powerful method of collecting national paediatric anaesthesia data whilst additionally involving trainees in multi-centre projects.

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062

Parental Survey of Paediatric Day Surgery

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Introduction and Aims

A strong pillar of clinical success is based on patient-centred care. Assessment of services should involve patients and their parents. At this institution an average of 25 paediatric surgical day cases are performed per week, these involve general, urological, ophthalmic and ENT specialties. As there are no paediatric inpatient beds at this hospital it was especially important to assess satisfaction in day surgery services and support for families once they are back home.

Methods

This was a prospective parental survey that included a telephone follow-up by a clinician. The survey covered pre-assessment, the anaesthetic visit, management in the anaesthetic room and recovery. The telephone follow-up was performed the next day after surgery and included questions on symptoms overnight such as pain, nausea, vomiting or bleeding. All families received information leaflets prior to participating in the survey and gave consent to participation.

Results

A total of 43 patients aged between two months and 17 years were included. None required in-patient admission. Satisfaction in all areas was high [anaesthetic visit 100%, anaesthetic management 93%, recovery 98% and overall care 100%]. All were satisfied with the anaesthetic conversation and 81% felt the induction of anaesthesia was either smooth or manageable. It was noted that 40% of parents reported issues overnight [19 with pain, 1 with vomiting and 4 with bleeding]. None of the children required readmission but 14% contacted either their GP or the day surgery ward the following day. Almost 30% of parents did not know who to contact if they had concerns, this was despite 91% being given written information at the pre-assessment visit.

Discussion and Conclusion

Overall good satisfaction was reported in all areas, however parents mentioned concern with information for post-operative care and support from the clinical staff when contacting from home. Concerns with regard to after care were fed back to the surgical teams and changes to the patient information were made as a result.

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063

Monitoring Awareness in the Paediatric Cardiac Catheter Laboratories

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Introduction and Aims

Both the national audit project NAP5 [1] and NICE guidance DG6 [2] recommend the use of depth of anaesthesia monitoring in adults to reduce the incidence of accidental awareness during general anaesthesia (AAGA). NAP5 also suggests further studies should be undertaken to assess depth of anaesthesia (DoA) monitoring in children [1]. We therefore reviewed the current use of Bispectral Index (BIS) monitoring for the paediatric population in the cardiac catheter laboratories (CCL) of a tertiary referral cardiothoracic centre.

Methods

Prospectively collected data was retrospectively analysed for use of BIS during general anaesthesia in paediatric patients (0-16 years old) undergoing CCL procedures from January 2014 to December 2014 at our institution. Use of BIS was analysed in four categories: total intravenous anaesthesia (TIVA) with neuromuscular blockade (NMB), TIVA without NMB, inhalational anaesthesia with NMB and inhalational without NMB. We also considered the data set in six different age groups.

Results

A total of 424 patient records were analysed, with 11 excluded due to missing data, leaving 413. Of these, 10% (43) received BIS monitoring. BIS was most commonly used in the group at highest risk of AAGA: TIVA with NMB. In this group 42% (23 of 55 patients) had DoA monitored using BIS. As regards age, BIS was most commonly used in adolescents, with 34% (39 of 116) monitored, whilst only 7% (4 of 54) of primary school children were monitored in this way. BIS was never applied in younger children whatever the type of anaesthesia.

Discussion and Conclusion

In the adult population, national guidelines highlight the risk factors for AAGA; in particular where TIVA is used with NMB and cardiovascular function is impaired [1-2]. Because BIS value is based on adult EEG data, it may not apply to paediatric patients less then 6 months and probably up to 5 years of age. However, it seems to be useful in older children, whose EEG pattern is similar to that of adults [3].

In our survey (in a unit where 44% of all adults have DoA monitoring [4] and around 80% in high risk groups), the use of BIS was sporadic in every anaesthetic category. Even where the risk of AAGA is higher, monitoring rates were less than 50%. In primary school children and adolescents, BIS use was higher compared to younger children but it represents only the 25% (43 of 170). With an increasing range of procedures being undertaken in adolescents using TIVA, this will be of growing importance in the future.

This survey, from a unit with relatively high DoA monitoring rate in adults, suggests the need to promote the use of BIS in the paediatric population, especially in older children with risk factors for AAGA.

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064

A National Survey of Paediatric Pre-Operative Fluid Fasting

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Introduction and Aims

Prolonged pre-operative fluid fasting has been a leading cause of patient and parental dissatisfaction within our own institution for some time. Recently published evidence[1-2] and opinion[3], together with the work of our own 'Fasting Project Group' has lead to the introduction of a new 1-hour pre-operative fluid local operating procedure in our day admission unit at Great Ormond Street Hospital. As this is contrary to some previously published guidelines[4] a consensus of current UK practice and opinion was sought.

Methods

An online survey was distributed to all 150 APA linkmen enquiring about current local guidelines, personal practice and opinion.

Results

Fifty two responses were received. Of these, only 2 (4%) departments had a 1-hour minimum clear fluid fasting policy for paediatric patients, 1 department had a 90-minute policy with the remainder (94%) being 2 hours. However, 10/52 (19%) of respondents allowed just 1 hour of free fluid fasting in their own practice. Free text comments exposed further respondents who were happy to adopt a more liberal attitude to pre-operative fluid fasting and also those who felt constrained by the lack of national guidance 'allowing' more liberal fluids. One respondent cited medico-legal reasons as the only reason preventing him/her from adopting reduced fasting times. Some also reported recent changes to their local adult fasting policy, with some centres allowing free fluids up until being called for surgery.

Discussion and Conclusion

There is a growing body of recent evidence for reducing the minimum starvation time for pre-operative fluids in children. Great Ormond Street Hospital is just the third UK centre we are aware of to adopt a 1-hour fasting regime. As a profession we are naturally risk averse and this survey shows that at most centres a 2 hour policy is extant, despite many individuals questioning this dogma. A 'tipping point' of consensus will need to be reached before reduced fasting times becomes mainstream practice and/or national guidance is amended. Having introduced a 1-hour regimen we will be auditing and publishing our outcomes and details of our exclusion criteria. We also intend to 'track' national practice changes by repeating this survey.

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065

Patients with Cardiac Disease for Noncardiac Procedures

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Introduction and Aims

The survival rates for children with congenital heart disease (CHD) have improved and are continuing to improve[1]. Children with CHD are physiologically more complex and they may have a higher risk profile in the perioperative phase than noncardiac children presenting for similar procedures[1], resulting in more planned and unplanned admissions, including to critical care. We do not have data on the numbers of children with CHD who present for noncardiac procedures; what types of procedures they present for and what complications are encountered so we decided to undertake this survey.

Methods

We completed a survey for each child with CHD who presented for anaesthesia for a noncardiac procedure over a 4 week period. Data collected included: cardiac history; planned procedure; preoperative preparation; anaesthetic technique; complications and admission rates, planned and unplanned. The survey was submitted to and acknowledged by the hospital ethics committee and ethics approval was not required.

Results

Surveys were completed for 41 patients. Twenty (49%) of these patients were daycase admissions; 7 (17%) were already inpatients (including 3 in PICU) and 14 (34%) were overnight admissions or longer. Six (15%) were admitted due to their underlying cardiac condition. There were no unplanned admissions. Ten percent were emergency cases. The specialties were as follows: 32% radiology; 17% general/urology; 15% ENT; 15% dental; 5% ophthalmology; 5% oncology; 5% orthopaedic; 2% gastroenterology; 2% combined general/ENT and 2% miscellaneous. Seventeen of the children had fully repaired cardiac lesions or those not requiring intervention. Fifteen of these children had inhalational inductions and two had intravenous. Twenty four children had ongoing cardiac issues, including 7 with single ventricle physiology, 2 children with pulmonary hypertension and 3 children with arrhythmias. Fourteen of these children had inhalational inductions and 10 had intravenous inductions (7 with propofol). The procedures undertaken were of varying complexity. In the fully repaired/no intervention group, 7 (41%) of the patients required treatment for hypotension and/or bradycardia. Of the group with ongoing cardiac issues, 5 (26%) required treatment for hypotension and/or bradycardia. Neither of the children with pulmonary hypertension had complications. One child with an arrhythmia required treatment for hypotension.

Discussion and Conclusion

Over the four weeks, children with cardiac disease for noncardiac procedures represented 4.3% (28/644) of the noncardiac theatre population and 17.6% (13/74) of children having general anaesthesia in radiology (excluding the cardiac catheterisation suite). While there were no unplanned admissions, 3 patients were in PICU already and 15% were admitted overnight or longer as a consequence of their cardiac condition. This has significant resource implications. None of the children in our survey had significant complications that resulted in an alteration of their planned care, including those who were at particularly high risk. Therefore we can conclude that this complex group of patients can be safely anaesthetised, using different techniques, in a tertiary paediatric cardiac centre.

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066

"I Hate Treating a Sick Kid" - Confidence in Paediatric Anaesthesia Before and After Dedicated Paediatric Training

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Introduction and Aims

Confidence in safely anaesthetising paediatric patients in a non-paediatric centre may decline as time progresses from dedicated paediatric training. In the literature, the nature or extent of this diminishing confidence has not been assessed[1]. Clinical and procedural confidence contribute to leadership and decision making, and both are core non-technical skills positively associated with quality of care[2]. This survey aims to quantify trainees' confidence in paediatric anaesthesia following a dedicated training rotation and to assess any decline in confidence thereafter.

Methods

A structured questionnaire was submitted to two consecutive groups of trainees upon completion of 6 months of paediatric training and to trainees in three general anaesthesia departments over the same period. Respondents self-assessed their ability to manage specific aspects of five clinical scenarios on a scale from 1-5, 1 being "very unconfident" and 5 being "extremely confident." The clinical scenarios included: pyloromyotomy in a 6-week-old, uncomplicated tonsillectomy in a 3-year-old, forearm fracture fixation in a 6-year-old, a 21-year-old with previous Fontan repair presenting for cystoscopy, and a 2-year-old presenting with meningoencephalitis.

Respondents were categorised into three groups: those finished paediatric training in the past week (PT), those who completed paediatric training within the last five years (PPT), and non-paediatric trained anaesthetists (NPT). Figures below are mean values with "case management" referring to mean values to all questions for a scenario.

Results

Sixty questionnaires were completed: 25 PT, 19 PPT and 16 NP. Confidence in airway management skills generally persisted and showed the smallest decline of all variables (0.2, 0.1, and -0.2 for a neonate, 3-year-old, and 6-year-old respectively.) The largest decline in confidence for case management was seen in the neonatal pyloromyotomy patient (0.42), and resuscitation and transfer of a toddler with meningoencephalitis (0.60). There was a negligible difference between PT and PPT in confidence in management of a 6 year old for wrist fracture fixation (-0.02) and a 21-year-old Fontan for cystoscopy (0.06). Unsurprisingly, there was considerably higher reported confidence in PT versus NPT across all scenarios. The lowest overall confidence for NPT was reported in the meningoencephalitis (2.43) and pylomyotomy (1.83) scenarios. The smallest discrepancy between NPT and PT was seen in case management of the Fontan circulation patient (2.4 vs 2.8). In free text responses, 53% believed simulation would maintain their confidence.

Discussion and Conclusion

This is the first study to assess the evolution of confidence in paediatric anaesthesia, confirming that confidence significantly rises following dedicated training but declines to a lesser extent thereafter. Notably, confidence and competence are not necessarily causally related[3]. The small difference observed between NPA and PA regarding the Fontan patient might reflect a misunderstanding of the potentially precarious physiology of this patient.

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067

A Survey of Post Operative Analgesia for Day Case Orchidopexy

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Introduction and Aims

Orchidopexy is a routine day case surgery. Our standard technique consists of regional anaesthesia and simple analgesics. Since the removal of codeine due to patient safety concerns[1], parents and carers are relying on paracetamol and ibuprofen for analgesia post surgery. The aim of this survey was to assess if this current regime provides adequate analgesia for children.

Methods

Pain diaries were given to all parents of children undergoing day case orchidopexy. Over a five day period they were asked to complete the following daily; paracetamol and ibuprofen doses, any other analgesia prescriptions acquired, worst and best pain scores based on a visual analogue score out of ten, sleeping pattern, eating pattern and drinking pattern. Parents were then contacted by phone to inquire if at any point they felt stronger analgesia was needed.

Results

Diaries were collected from April to July 2015. Sixteen diaries were given to parents; twelve completed diaries were returned. Paracetamol dosing reduced over the five days. On day one only one child was given the maximum four doses in twenty-four hours. Similarly the dosing of ibuprofen reduced over the five day period. Pain scores improved over the five days. On day one there were five children with a pain score of five or higher, six children on day two, two children on days three and four and one child by day five. Six patients had a best pain score of zero for all five days. Within one day the drinking pattern was back to normal for all twelve children. Sleep and eating patterns were normal within two days. A closer look at children with pain scores of five or higher revealed with the exception of a single child on a single day; they could have all received further doses of paracetamol and or ibuprofen and still been within safe dosing guidance. Two of the parents contacted by phone felt that their child needed stronger analgesia than paracetamol and ibuprofen during the first two days. The other ten parents were happy with the analgesia they received. None of the parents acquired a prescription for stronger analgesia from their GP.

Discussion and Conclusion

Post-operative pain for orchidopexy can be as high as 30%-60%[2]. The alternative to codeine in our institution is low dose oramorph, patients are seldom prescribed this for home use. Similar work in this area supports our findings that regional anaesthesia and combination paracetamol and NSAIDs provides adequate analgesia for the majority of children at home[3]. Day case surgical procedures are increasing. It is essential that we provide accurate information to parents caring for children in the post discharge period; this is an integral part of the anaesthetic plan[4]. Further parental education would be of benefit to highlight the importance of regular dosing.

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068

HALT - Are We Putting the Theory into our Practice?

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Introduction and Aims

The WHO summary "Learning from error" includes the various factors affecting individuals that can contribute towards error.[1] These individual factors are enshrined in two acronyms:

HALT - Hungry, Angry, Late or Tired
IM SAFE - Illness, Medication, Stress, Alcohol, Fatigue, Emotion

These acronyms act as an aide memoire to allow healthcare professionals to identify their contributors to error and potentially mitigate the associated risk. Human factors training is yet to be truly embedded within either the undergraduate or postgraduate curriculum in contrast to the training of airline pilots, where it is deeply embedded. In healthcare it remains the subject or focus of stand-alone courses or training sessions.

Paediatric healthcare is an especially complex environment with an increased risk of errors separate to those in the adult population.[2] By being independently and collectively responsible for safety, and aware of our limitations we can improve teamwork and reduce harm.

Methods

We conducted a multidisciplinary survey of staff prior to their attendance at a Human Factors study day, with opening keynote by Martin Bromiley OBE. We assessed attitudes towards aspects of human factors using a subset of the Operating Department Human Factors Questionnaire.[3]

11 consultants, 44 trainees and 9 senior theatre staff completed the survey, all are involved in the care of paediatric patients.

Responders graded their agreement to the statements on five-level Likert items.

1. I let other team members know when my workload is becoming excessive.
2. Team members should monitor each other for signs of stress.
3. Personal problems can adversely affect my performance
4. Team members should feel obligated to mention their own psychological stress or physical problems.

Results

7 consultants, 29 trainees and 5 theatre staff had previously completed formal human factors training.
Trainees are more likely than consultants to let team members know when their workload is becoming excessive.
All respondents felt that team members should monitor each other for signs of stress, and that personal problems were more likely to affect performance. However, they were neutral as to whether team members should mention their own psychological or physical stresses.
There was a positive correlation with having had previous human factors training to give more emphatic responses.

Discussion and Conclusion

The Oxford Deanery's future human factors training will have more focus on personal resilience. There is room to improve the impact the HALT and IM SAFE criteria have on individuals within teams. The goals should be to empower all staff to vocalise any factors within HALT/IMSAFE that have the potential to affect their performance.

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Harlequin Ichthyosis: Costume of Arlecchino

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Description

We present the extremely rare case of a 4 year old child suffering from Harlequin Ichthyosis (HI), highlighting the anaesthetic implications and its management.

Our patient presented for general anaesthetic for dental extractions, stenting of lacrimal ducts and release of finger contractures. Pre operative assessment revealed an 18.7 kg child, with hepatic fibrosis secondary to drug treatments and poor dentition. Airway evaluation was unremarkable. He was induced with sevoflurane and nitrous oxide and intubated uneventfully with a 4.5mm size endotracheal tube. He was maintained on a remifentanil infusion, sevoflurane, oxygen and air. A prophylactic dose of antibiotics was given, as well as dexamethasone as an antiemetic. A 10ml/kg bolus of Hartmanns fluid was given during the 45 minute anaesthetic. Particular consideration was given to temperature control, fluid management, infection prevention and positioning.

The Harlequin name derives from the diamond like patches on the costume of Arlecchino, an Italian and French theatre jester. HI is a severe genetic skin disease resulting from a mutation in the ABCA12 gene on chromosome 2. This gene is responsible for effective lipid transfer and formation of the epidermis. The resulting dermis is ten times thicker and grows at a faster rate. Histological analysis shows abnormal lamellar granules and expression of epidermal keratin. Antenatal ultrasound assessment can aid diagnosis and is later confirmed by genetic testing after amniocentesis or scalp skin biopsy. HI patients are born with widespread diamond shaped thickened skin plaques separated by deep erythematous fissures. Other possible characteristics include retraction of the lips (eclabium), the absence/underdevelopment of ears and or nose, ectropions, reduced joint mobility and mental developmental delay.

Prognosis is variable with a study showing 56% survival of patients, ages ranging between 10 months and 25 yrs.[i] Deaths from the disease occurring within the first few weeks of life from sepsis, respiratory failure and dehydration.

Discussion

The anaesthetic implications are vast and the management can be daunting. Hyperthermia can be a problem as the hyperkeratosis disrupts the normal temperature homeostatic mechanisms. Awareness that external warmers may need to be adjusted to ‘cool’ is important. Irregular skin means that dehydration and electrolyte losses need to be managed appropriately. Regular venous gas assessment is suggested to ensure early detection and treatment of electrolyte abnormalities. The high risk of sepsis means that antibiotic prophylaxis should be considered as the fissures are highly pregnable by microorganisms. Skin moisture is imperative, to reduce the risk of skin damage and infection.

We advocate the regular assessment of exposed skin and possible use of emollients during long procedures. From our knowledge, this is the only published case highlighting the implications on anaesthetic management.

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070

Generating an Educational Tool and Guideline for an EXIT (Ex-utero, Intrapartum Treatment) Procedure

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Introduction and Aims

An EXIT procedure is performed part way through delivery of a baby (usually by caesarean section), enabling management or treatment of a condition prior to terminating placental oxygen delivery[1]. It can be used for assessment and management of foetal conditions that could be immediately life-threatening when placental blood flow ceases, or where the airway may not be easily manageable by direct laryngoscopy and intubation post-delivery[2]. It involves meticulous planning from surgical, obstetric, paediatric anaesthetic and neonatal specialities, plus theatre teams[3]. Our hospital has recently undertaken two of these rare procedures for conditions that could immediately compromise a difficult neonatal airway.

Methods

Because of the number of health professionals involved in these procedures a formal multidisciplinary team (MDT) meeting takes place as soon as an EXIT procedure is planned, to develop a patient-specific management plan. We used these preoperative MDT plans and our practical experience of these cases to develop a standard operating procedure (SOP) for use by the paediatric anaesthetic team (anaesthetists and anaesthetic practitioners). We have also used a simulated EXIT procedure together with the whole team involved to produce an educational video for use within our trust.

Results

This simulation video is currently undergoing final stages of editing so teams taking part in these procedures can use it to plan cases. This includes various potential airway scenarios:

1. Oral intubation by ENT surgeon during EXIT procedure
2. Tracheostomy formation by ENT surgeon during EXIT procedure
3. Delivery of baby for intubation by neonatal team or paediatric anaesthetists
4. Delivery of baby and transfer to neonatal theatre for emergency intubation or front of neck access by paediatric anaesthetists and ENT
5. Further procedure for definitive airway (eg. Tracheostomy by ENT) in neonatal theatre following one of the above

The videos also include a dedicated section for the team brief including the airway plans as appropriate, and the completed paediatric anaesthetic SOP includes a formal plan for both obstetric and neonatal surgery, and any of the above management options.

Discussion and Conclusion

One of the reasons our hospital has successfully performed these procedures is the presence of both tertiary paediatric and obstetric hospitals within the same site. We are able to perform the caesarean section in an adjoining theatre to the dedicated neonatal theatre. These EXIT procedures must be well-planned and coordinated surgeries. However there may be issues if the mother begins to labour before surgery, or if there is an undiagnosed airway issue. It is therefore useful to have SOPs and educational videos for staff to familiarise themselves with as needed. Human factors and clear communication are very important in these kinds of multi-professional procedures, as we have highlighted in these videos.

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The Case of the Chesty Child

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Description

We present a case of a 2y child who presented post operatively with a life threatening tension pneumothorax despite a relatively slow and insidious onset of symptoms. She presented for a diagnositic endoscopy and therapeutic balloon dilatation of oesophagus as a day case procedure. Her previous surgical history included a thorascopic oesophageal atresia and tracheal-oesophageal fistular repair, which was complicated by an anastomotic leak and Intensive care admission. Two years later she represented with difficulty swallowing and was scheduled for an elective balloon dilatation.

She had received a recent course of oral antibiotics for an upper respiratory tract infection. Although fractious in the assessment area, she was apyrexial and otherwise well so a decision was made to give oral midazolam premedication and proceed. The anesthetic and surgery proceeded without complication. A reflux stricture was identified in the distal oesophagus and dilatation was performed. A check endoscopy at the end of the procedure was normal.

Later on the ward, she required low flow oxygen to maintain saturations. Over the next few hours she remained minimally oxygen dependent and mildly tachyponeic. On auscultation breath sounds were heard bilaterally along with added upper respiratory transmitted sounds. She was subsequently sent for a CXR, where she was found to have a left sided tension pneumothorax. Clinical deterioration occurred quickly and she was immediately taken to theatre for resuscitation. An inhalational induction, intubation, and decompression of the pneumothorax was performed and a surgical chest drain and central venous access was obtained. Once stabilised, she was transferred to PICU intubated and ventilated, requiring vasopressor support and intravenous antibiotics.

Discussion

This case highlights that the symptoms and signs of pneumothrorax in children can be easily misinterpreted and easily missed. It is important not to assume that post operative ‘chestiness’ is merely an effect of sedation or an exacerbation of upper respiratory tract infection and may be masking a more severe complication.

Iatrogenic perforation of the oeseophagus is rare in children. A PubMed search finds minimal articles dealing with this problem. One study looked at children who had sustained transmural injury to the oesophagus during a dilatation procedure at their institution between 1967 and 1994, and found only 11 children affected. 1 Another reports 10 cases of perforation between 2006-2013.2 Due to the rarity of this condition, it may not be the first differential diagnosis when faced with a similar situation. Coupled with the numerous ways that an oesophageal perforation can present, depending on which part of the oesophagus is perforated, it makes the iatrogenic oesophageal perforation a difficult diagnostic challenge. This case demonstrates a potentially life threatening complication of a day case procedure that is important not to miss, as early recognition can dramatically effect outcome.

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072

Fulminant Rheumatic Fever Causing Severe Mitral and Aortic Regurgitation

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Description

A ten year old Tahitian girl presented to a Tahitian hospital with a week long history of cough and shortness of breath. She was admitted to the paediatric ward for observation pending further investigation. The following day she deteriorated with sudden pulmonary oedema requiring mechanical ventilation. An echocardiogram (ECHO) was performed which revealed severe mitral and aortic valve regurgitation with rupture of the mitral chordae. She was commenced on noradrenaline to maintain her blood pressure and transferred urgently to Starship Children's Hospital in New Zealand for further assessment. On arrival to the Paediatric Intensive Care Unit (PICU) at Starship Hospital a repeat ECHO confirmed severe aortic and mitral valve (MV) regurgitation with left ventricular (LV) dilatation and severe biventricular dysfunction. Blood tests revealed worsening liver and renal dysfunction prompting immediate surgical correction. She underwent an aortic valve replacement and MV repair with annuloplasty. Due to on-going biventricular dysfunction she returned to PICU with an open chest which was closed the following day. Extubation occurred on day two and she was discharged to the ward on day four with marked improvement in ventricular function.

Discussion

Rheumatic fever is now rarely encountered in the UK. However, it is prevalent amongst the Pacific Island and Maori populations in New Zealand with 40-100 cases per 100000 per year[1]. It is more common with over-crowding, poor hygiene and lack of access to medical services[2]. Fulminant rheumatic fever is at the most severe end of the acute spectrum and is only recognized in a few countries as most die before presentation to hospital[3]. The classical presentation is of sudden onset pulmonary oedema secondary to rupture or lengthening of the chordae tendinae of the MV without left atrial dilatation. There is a rapid rise in left atrial pressure and pulmonary venous pressure due to regurgitation through the MV into the relatively non-compliant left atrium, resulting in pulmonary oedema. Initially there is little or no atrial dilatation evident on electrocardiogram, chest x-ray or ECHO. These cases are often misdiagnosed as acute pneumonia and therefore, urgent life-saving cardiac surgery is often delayed. The presence of MV regurgitation is often an indicator to acute disease. The LV does dilate more quickly than the left atrium and can also be evident early. In New Zealand, current practice is not to operate early, provided symptoms are under control. The MV can be managed conservatively and with advances in surgical technique, MV repair, rather than replacement is often possible. The degree of annular dilatation is small in acute cases as compared to chronic disease but annuloplasty is still required in some cases. There are reports of the need for extracorporeal membrane oxygenation for respiratory support in the most severe cases[4].

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073

Tumour lysis Syndrome Triggered by Anaesthesia in a Child with B-Cell Non-Hodgkin's Lymphoma

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Description

A previously well 11-year-old girl presented for urgent investigation of a large intra-abdominal mass. She had no personal or family history of anaesthetic complications. Pre-operatively she was reasonably well though she had a raised creatinine, a metabolic acidosis with raised lactate, and elevated LDH of 2235U/L. Other laboratory investigations were normal.

Following routine IV induction, the patient was intubated and ventilated, and anaesthesia maintained with sevoflurane in oxygen/air mix. No corticosteroids were administered.

There were several unusual observations that we noticed shortly after commencing anaesthesia:

- Despite easy ventilation with PEEP, the patient required a very high inspired oxygen fraction (FiO2) (>0.7 throughout) to maintain the oxygen saturations (SpO2) above 90%.
- Twice during brief disconnection of the circuit for repositioning, the SpO2 dropped extremely rapidly, and several minutes of hyperventilation in very high FiO2 was required to restore the SpO2.
- The end-tidal CO2 (ETCO2) was higher than expected throughout the procedure (range 6.3-8.8kPa), despite very high minute ventilation.
- Core temperature rose to 39.6oC despite IV paracetamol, broad-spectrum antibiotics and active cooling.

Following surgery, the patient was transferred to our paediatric intensive care unit. Very rapidly the patient's condition began to improve. Three hours after surgery the SpO2 could be maintained easily, and there were no problems with hypercapnoea. The high fever and tachycardia resolved over the following few hours.

Biochemistry results immediately post-operatively suggested a diagnosis of tumour lysis syndrome. The patient was treated appropriately and extubated the following day. She went on to start chemotherapy and is now back at school.

We discussed the case with the national Malignant Hyperthermia centre in Leeds, but no further investigation for this was considered necessary.

Discussion

Tumour lysis syndrome occurring in association with anaesthesia has previously been described[1,2,3]. Signs include hypercapnoea, low SpO2 and fever[1] as well as classical biochemical abnormalities of hyperkalaemia, hyperphosphatemia, and high urate levels. Suspected triggers for development of the syndrome under anaesthesia include surgical manipulation of the tumour[2], corticosteroids[3], and anaesthesia itself[1]. In this case, signs developed rapidly after induction and began to resolve following cessation of sevoflurane. Sevoflurane may have contributed to development of the syndrome. The mechanism by which sevoflurane could cause tumour lysis syndrome is not clear. Patients with tumours with a high proliferative rate and with LDH >1000U/L, as in this case, are known to be at higher risk of tumour lysis syndrome.

Although rare, tumour lysis syndrome should be considered in cancer patients with unexplained fever, hypercarbia, and hypoxia during anaesthesia. It is an important differential because of the risks of life-threatening hyperkalaemia. Initiation of treatment in theatre through treatment of electrolyte abnormalities and induction of high urine output may improve outcomes.

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074

Hyper-Metabolic Response to Inhalational Anaesthetics: Case Series

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Description

Case 1: A 6 month old boy presented for repair of cleft palate. He was born at term (39+3/40) and was diagnosed with '49XXXXY syndrome' Soon after induction of anaesthesia, persistent hypercarbia was noticed which didn't respond to increases in ventilation. Oxygen extraction also increased. Temperature and haemodynamic parameters remained normal. Anaesthetic technique was changed to 'Total Intravenous Anaesthesia'. The hypercarbia & oxygen extraction settled to normal values after giving dantrolene, and surgery proceeded uneventfully.

Case 2: A 14 year old girl for posterior correction of scoliosis. Child had Ulrich congenital muscular dystrophy, was wheel chair bound and had abnormal lung function tests. During maintenance of anaesthesia, persistent hypercarbia and increased oxygen extraction was noticed that did not respond to increases in ventilation. ABG showed marked respiratory acidosis. Again, temperature and haemodynamic parameters remained within normal limits. Sevoflurane was discontinued and Total Intravenous Anaesthesia (TIVA) commenced. Dantrolene (1mg/kg) was administered. Subsequently, the hypercarbia improved. Surgery was postponed on that occasion and performed few months later, uneventfully under TIVA.

Case 3: An otherwise normal 19 month old baby with recurrent laryngeal papillomatosis presented on multiple occasions for excision of the lesions. He had volatile based general anaesthesia 2-3 times initially which were unremarkable. However, each of those times he developed unexplained hyperthermia (>>38^0C) 1-2 hours post-operatively which responded to anti-pyretics. No other abnormalities were present. ABG, LFT,and creatine kinase levels were normal. On subsequent presentations, TIVA was successfully used with no problems post operatively.

Discussion

Children displaying a hyper-metabolic response to general anaesthesia pose a challenge to anaesthetists. The differential diagnoses include malignant hyperthermia, neurolept malignant syndrome thyroid storm, phaeochromocytoma and sepsis[1]. A condition called Malignant Hypermetabolic Syndrome has made its way into the literature.The key to successful management of a hyper-metabolic response is early diagnosis. Volatile anaesthetics which are often the triggering agents should be discontinued and the anaesthetic machine & breathing circuit changed. Anaesthesia should be continued with intravenous agents. Dantrolene is the only drug currently available to treat the excess calcium accumulation within the muscles & should be administered without delay[2]. Further symptomatic management of hyperthermia with active cooling, acidosis & hyperkalemia with NaHCO3, insulin/dextrose infusions should be carried out. A medical alert should be created to warn future physicians in case the child presents again before a definitive diagnosis can be reached. It would be prudent to carefully monitor these patients and avoid volatile anaesthetic agents and depolarising muscle relaxants in future anaesthetic exposures.In the three cases described above, children presented with different elements of a hypermetabolic response. Discontinuation of volatile anaesthetics and changing to TIVA were effective. Single dose Dantrolene was needed in two of them.

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075

Anaesthetic Management of Laparoscopic Nissen Fundoplication in a Child with MEGDEL Syndrome

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Description

A 3-year-old boy with MEGDEL syndrome (3-methylglutaconic aciduria with sensori-neural deafness, encephalopathy, and Leigh-like syndrome) presented for an elective gastrostomy and laparoscopic Nissen fundoplication. An upper gastrointestinal contrast study performed 6 months prior to the operation had showed normal anatomy with no evidence of reflux. However, vomitting persisted resulting in aspiration and recurrent chest infections with significant feeding difficulties and weight loss.

The boy was born uneventfully at term via elective Caesarean section. Truncal hypotonia was first noted at 8 months of age followed by global developmental delay. He remained aphonic although hearing tests were normal. An older sibling had died at the age of 3 from hepatic complications of MEGDEL syndrome and a genetic test confirmed the same homozygous mutation in exon 15 of the SERAC1 gene.

Anaesthesia was induced with sevoflurane in nitrous oxide, oxygen and rocuronium 1 mg/kg uneventfully. The airway was secured with an uncuffed 5.0 tube (grade I view). Anaesthesia was maintained with sevoflurane in air and oxygen. Fentanyl 1 µg/kg boluses where given intraoperatively and morphine 0.1 mg/kg prior to emergence. Postoperatively, he was responsive only to pain and was therefore admitted to the intensive care unit where he was extubated and alert within 1 hour of admission. He was discharged 5 days postoperatively after achieving full volume feeds.

Discussion

Anaesthesia for MEGDEL syndrome has not been described in the literature. The syndrome is caused by mutations in the SERAC1 gene which result in remodelling of mitochondrial phospholipids and subsequent mitochondrial dysfunction. The presentation in the neonatal period is similar to sepsis, however, no infectious agent is identified. The first year of life is characterized by feeding problems, truncal hypotonia and, with some infants, hepatic involvement ranging from a transient rise in transaminases to fatal liver failure. By the age of 2, deafness, dystonia and spasticity impair development. The diagnosis is confirmed by 3-methylglutaconic aciduria and bilateral basal ganglia involvement on MRI. Treatment is supportive (1).

Perioperative complications of mitochondrial myopathies such as respiratory failure, myocardial depression, arrhythmias and aspiration can occur due to inhibition of metabolism by anaesthetic agents or by the catabolic response to fasting and surgery. It is therefore prudent to avoid circumstances that increase the metabolic burden such as pain, nausea, vomiting, prolonged fasting and hypoglycaemia, hypothermia and shivering, hypovolemia, prolonged tourniquets and acidosis. Furthermore, both intravenous and volatile anaesthetics have been shown to depress mitochondrial function. Propofol, in particular, does so by 4 different mechanisms.

Mitochondrial myopathies represent a wide variety of molecular defects with reports of patients tolerating a wide variety of anaesthetics. As the different types of disease become better defined, the most appropriate anaesthetic may become clear (2).

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076

Congenital Central Hypoventilation Syndrome (Ondine's Curse) and the Anaesthetist

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Description

Congenital central hypoventilation syndrome (CCHS) presents the anaesthetist with significant challenges. A 4-year old girl (15.8kg) with CCHS presented for second attempted closure of tracheostomy fistula in September 2015. Previous anaesthetics were far from uneventful. A bronchoscopy in 2014 resulted in severe hypertension (systolic blood pressure >220mmHg), atenolol was prescribed and a diagnosis of autonomic dysfunction made. In June 2015, fistula closure was abandoned following cardiac arrest at induction of anaesthesia. In preparation for her September surgery, atenolol was weaned and ceased under direct supervision of a paediatric cardiologist. The anaesthetic aims were to avoid sedatives, opioids and muscle relaxants with post-operative care provided by the paediatric intensive care (PICU). The anaesthetic was commenced using O2/N2O/Sevoflurane 8% via face mask. The vocal cords were sprayed with 2mls of 1% Lidocaine using a mucosal atomiser device (MAD) and intubation with a 5.0mm uncuffed endotracheal tube was uneventful. Maintenance of anaesthesia was provided with O2/N20/Sevoflurane (end tidal 2.4-2.8%). Intravenous paracetamol (15mg/Kg) was used for analgesia, along with local anaesthetic infiltration by the surgeons. The patient was extubated awake in recovery with non-invasive ventilation on standby. Her blood pressure was monitored on PICU but did not require treatment. There were no episodes of bradyarrhythmias or pauses.

Discussion

CCHS is a rare condition in which central ventilatory control is lost and results in long term overnight mechanical ventilation.1 As a child develops, so does their desire for independence and a normal life and successful decannulation is a wish for many patients and their families. With little published literature to assist the anaesthetist, providing informed care is challenging. Our patient had been decannulated and was comfortable with gas induction via a face mask. The majority of CCHS patients will present with a tracheostomy in situ and the anaesthetic circuit can be connected directly. Sevoflurane was used for induction and maintenance due to its non-irritant properties and rapid onset and recovery.2 To optimise intubating conditions, potentially reduce the incidence of bradyarrhythmias, post-operative apnoea and hypoventilation events, we sprayed the vocal cords with local anaesthetic. This avoided the use of opioids, muscle relaxants or higher end tidal volatile concentrations. Silvestri et al (2000) hypothesised CCHS subjects are more prone to bradyarrhythmias than healthy controls.1 With this in mind, we felt the risks outweighed the potential benefits and favoured the cessation of atenolol. Total intravenous anaesthesia was investigated as an alternative technique. A literature search failed to find any paediatric case reports of its use but did unearth a case report detailing heart block following a single administration of a propofol bolus.3 Providing anaesthesia for patients with CCHS is another example of the importance of a multidisciplinary team approach, which was pivotal to our successful outcome.

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Accuracy of a Formula to Predict Optimal Oesophageal Temperature Probe Position in Children

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Introduction and Aims

A temperature probe positioned in the lower oesophagus (LO) behind the heart is unaffected by the cooling effects of gases transmitted to the conducting airways, and provides an accurate estimate of core temperature in children [1,2]. Precise placement in children [3] without radiographic imaging is difficult due to the short (and variable) distances between the stomach, lower and middle oesophagus. In a recently published study comparing nasopharyngeal (NP) and LO temperature in intubated children, we tested the accuracy of a formula to guide placement of the LO probe using the child's height.

Methods

Following Research Ethics Committee and Research and Development approval, informed consent was obtained for 59 patients, aged 8 months to 7 years undergoing procedures in the Interventional Radiology department at Great Ormond Street Hospital [4]. Following intubation with a Microcuff® endotracheal tube, both NP and LO temperature probes were inserted, the latter through the mouth to a depth using the formula:

Length (cm) = (0.226 x height) + 5.

Chest radiography taken during the operating procedure was used to measure the distance between the tip of the LO probe and the border of T8/T9 vertebrae, prior to adjusting the LO probe. Temperatures of the NP and LO probes were simultaneously recorded before and after adjustment of the LO probe. Bland-Altman plots were utilised to compare the actual and formula-predicted distances to T8/T9, as well as to compare the temperatures at the LO and NP sites.

Results

Formula-predicted insertion distance for the LO probe and and actual distance to T8/T9 were compared for 58 patients with median age of 26 months and height of 90 cm. The mean difference between the formula-predicted and actual distance was 1.1 cm. The upper and lower levels of agreement (LOA) were 3.6 cm and -1.5 cm. In 47 patients, NP and LO temperatures were simultaneously recorded before and after adjustment of the LO probe. The mean difference between the formula-positioned LO temperature and NP temperature was -0.02 °C, (LOA of -0.24 °C and 0.19 °C). Comparing this to post-adjustment temperatures, the mean difference between the LO temperature and NP temperature was -0.03 °C (LOA of -0.22 °C and 0.15 °C.)

Discussion and Conclusion

We have previously shown that NP and LO temperatures are in agreement when a LO probe is sited at the level of the T8/T9 vertebral border using radiographic guidance. We have now shown that the temperature measured by a formula-positioned LO probe also correlates to NP temperature. These findings support the use of this simple formula to accurately predict insertion distance of a temperature probe without radiographic imaging to the LO, a safe and accurate site to estimate core temperature in children.

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078

Improving the Use of Paediatric Clinical Guidelines with a New Information Delivery Platform

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Introduction and Aims

When one of the authors was chair of the hospital risk committee there was a recurring issue with poor conformance to the robust hospital fluid guidelines in subspecialty paediatric patients. It highlighted that good guidelines on their own weren't working to ensure children were managed correctly. We initially surveyed the accessibility and accuracy of clinical guidelines used by junior doctors in a children's hospital. Following the analysis of these results a new information platform for the clinical guidelines was developed and a repeat of the data collection is planned.

Methods

In an effort to improve access to clinical guidelines we firstly analysed the accessibility and accuracy of the information used by junior doctors at a children's hospital. Twenty junior doctors were surveyed using three clinical scenarios requiring access to a clinical guideline to calculate a correct answer. The speed and accuracy of their answers were measured via a data collection form that was completed by two medical students.

Results

The initial analysis found that 72% of junior doctors were able to access appropriate guidance for a critical clinical situation in less than two minutes. Dismissing the time taken to find the correct guideline, they were only able to achieve a completely accurate answer 22% of the time. Worryingly only 5% were able to identify the correct management for the scenario of a child with severe hyponatraemia following seizures due to a blocked ventriculo-peritoneal shunt, despite clear guidance on its management on the hospital intranet. What was clear was that virtually all the surveyed junior doctors used a computer to look for a clinical guideline. Re-audit results will be presented following introduction of the new guideline app / internet platform. We will also be present data usage statistics for the conventional hospital guideline website and the new information platform. This will derive qualitative and quantitative measures relating to changes in guideline usage.

Discussion and Conclusion

A working group was established to develop a new information platform, which could be accessed via a mobile phone app, internet or intranet. The fundamental plan was for a system that was easy to upload data to, easy to access, easily link to other clinical guidlelines and had safeguards to ensure the information is up to date. Time from concept to launch was achieved in less than seven months and the group was unusual as it only had a core of four individuals – a software engineer, a knowledge services expert and two clinicians.

Acknowledgements

Tactuum provided software engineering skills for free as a pilot. There was no financial support.

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082

Clearing the Mist: Introduction of Paediatric Bronchospasm and Anaphylaxis Guideline Boxes at a University Teaching Hospital

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Introduction and Aims

Fortunately, the incidence of paediatric anaesthetic emergencies is rare: anaphylaxis under anaesthesia has been estimated at 1 per 7500 anaesthetics[1] and bronchospasm at 1.7 per 1000[2]. The management of such emergencies can be highly stressful making it difficult to recall drugs and dosing regimens. We aimed to identify gaps in knowledge surrounding the management of these events and explore the introduction of local guidelines and equipment boxes to simplify these stressful situations.

Methods

We distributed a questionnaire to attendees of our Paediatric Anaesthesia Morbidity and Mortality meeting, all of whom have regular exposure to anaesthetising children. We asked questions surrounding drug dosing in paediatric anaphylaxis and bronchospasm, concentrations available, post-event management and differential diagnosis.

Results

Twelve consultants, thirteen registrars and eight core trainees responded. For paediatric anaphylaxis, 88% correctly identified the concentration of 1:1000 adrenaline, 35% knew the IV dose of adrenaline, 38% identified the dose of hydrocortisone for a 3-year-old, none knew the timing of serum tryptase levels and 15% could identify three common causative agents. For paediatric bronchospasm, 53% could identify the nebulised salbutamol dose for a 4-year-old, 12% identified the correct dose of magnesium, 26% identified the correct infusion rate for Ketamine and 71% could list three differentials of wheeze.

Discussion and Conclusion

The management of emergencies requires prompt recognition, consideration of differential diagnoses and initiation of life-saving treatment[3,4]. Our questionnaire showed that there is a variable understanding of drug doses and potential differentials in paediatric anaphylaxis and bronchospasm. This may lead to delay in therapy and increased stress in emergency scenarios.

To facilitate the management of these situations, we implemented easy to follow management guidelines and equipment boxes: one for anaphylaxis and one for bronchospasm[3]. Guideline Sheet One, mounted on the outside of the box for ease of use, features a flow chart guiding initial management and first line and subsequent drugs. It also features differential diagnoses, other considerations (such as equipment failures), ongoing management priorities, and top tips (such as available adrenaline concentrations). The box contains all the equipment and drugs required to implement the guidelines. Sheet Two details all guideline drugs by type, route and child age group with tips for dilution regimes for complex medications. The boxes are of a type commonly used for emergency situations in our centre and are sealed with expiration dates detailed.

It is hoped that by locating these boxes in our dedicated Paediatric Recovery, the ease of access to the guidelines, appropriate drugs and ongoing management strategies will reduce stress and ensure an effective and safe response to potential catastrophes. We aim to simulate this to assess their implementation.

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083

Survey of Paediatric Difficult Airway Management Practice at a District General Hospital and Production of a Training Video Utilising Locally Available Equipment

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Introduction and Aims

Difficult airway management in younger children (< 1 year/ 10kg) can be problematic outside of a paediatric specialist centre. Paediatric fibre-optic scopes have no suction port, are more difficult to manoeuvre and are not available in many district general hospitals. The adult fibre-optic scope diameter is typically >3.7mm thus size 4 and below internal diameter (ID) endotracheal tubes (ETT) cannot be loaded onto the scope. The size 1 and 1.5 laryngeal mask airway (LMA) have an ID of 5.3mm and 6.1mm respectively. We conducted a survey of practice for difficult paediatric airway management at the Royal Berkshire Hospital (district general hospital). Following the results of this we produced a video detailing a previously described modified 'Seldinger' intubation technique with an adult fibre-optic scope and a guide-wire kit[1] both of which are likely to be available in non-specialist hospital.

Methods

We surveyed the practice of consultant anaesthetists and senior anaesthetic trainees based on the Difficult Airway Society paediatric algorithms(2) for unanticipated difficult intubation. Questions assessed both equipment and techniques used and confidence in their use. Results were analysed and compared to DAS guidelines. The method has been previously described and is summarised in the references[3]. We developed and produced a short video demonstrating wired guided fibre-optic intubation via a supraglottic airway device, using equipment commonly available outside of a tertiary paediatric centre.

Equipment required:

- Laryngeal Mask Airway(LMA)
- Adult fibre-optic scope with suction channel
- Angled connector with gas-tight seal
- Cook 0.038inch wire
- Intubating catheter or ureteric stent
- 2 cuffed or uncuffed endotracheal tubes
- 20ml syringe
- Lubricating jelly

Results

Of 22 respondents, 23%(5) were aware of the paediatric DAS guidelines. 59%(13) felt confident in the use of a paediatric LMA. 9%(2) were familiar with a intubation with a fibre-optic scope through an LMA technique but this technique was not identified as plan B for intubation in an unanticipated difficult intubation.

Discussion and Conclusion

The survey has raised awareness in the department about the paediatric DAS guidelines and provided education about an airway technique useful as a plan B to those who may occasionally encounter a paediatric difficult airway. The airway video will be made available throughout the anaesthetic department and deanery. We also found the technique possible without the use of an airway catheter which saves an additional step and reduces equipment required in a stressful situation.The departmental paediatric airway trolleys have been revised to reflect the paediatric DAS guidelines such that each drawer represents plan A to D.[2] This technique could also be used with cuffed endotracheal tubes by cutting off the balloon and repairing later with a 22G cannula.[4] We plan to repeat the survey locally and nationally via PATRN to ascertain practice and confidence in paediatric difficult airway management outside of a specialist paediatric centre.

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084

The Leeds Neonatal Airway Training (NAT) Course - a Fresh Approach to Training and Cross Speciality Networks

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Introduction and Aims

An increase in emergency airway management calls to the neonatal intensive care unit led to the recognition of the need for improved neonatal airway training. Paediatric trainees lacked a structured approach to airway management and had little formal airway teaching. Anaesthetic trainees were unfamiliar with the environment and equipment, and anxious about patient size and comorbidity. With a paucity of neonatal airway courses the Neonatal Airway Training (NAT) course was created, aiming to improve education and training. We developed a one-day structured multidisciplinary course delivering practical basic and advanced neonatal airway training for trainees ST3 and above, and consultant pediatricians covering level 2 neonates.

Methods

A course was designed for 12 candidates and included lectures, skills stations and simulation. Advertised regionally it was rapidly oversubscribed. Approval was granted from both Royal colleges for 6 CPD points. Teaching was delivered by consultant paediatric anaesthetists, neonatologists and tracheostomy nurse consultants to candidate groups of mixed grade and specialty. Following lectures (anatomy, physiology and pharmacology), groups rotated through 3 core skills stations: bag mask ventilation (BMV) with Neopuff, T-piece, and SMART trainer, LMA insertion, and intubation. A difficult airway lecture preceded 3 advanced stations: tracheostomy management, videolaryngoscopes and difficult airway equipment and algorithm. Candidates managed simulated airway emergencies on the neonatal unit, labour ward and emergency department. Questionnaires using a 5 point likeart scale assessed experience, confidence, knowledge and post course improvement; Skills scored from 1 (not all confident) to 5 (very confident). Knowledge was graded 1 (very poor) to 5 (excellent).

Results

The course was universally well received. All candidates improved in confidence and knowledge. Questionnaires confirmed no prior formal teaching except APLS or NLS (50%). Neonatal experience increased with training grade with anaesthetists having the least. BMV and intubation scored highest (4.1 and 2.75), paediatricians being most confident. Advanced skills (LMA, bougie, GlideScope, difficult airway prediction and tracheostomy management) scored lower (2.25, 1.87, 1.38, 2.5, 1.62 respectively) with paediatricians scoring lowest. Post course, mean skill scores increased by at least 1 point with the greatest improvement in advanced skills (3.5, 3.25, 3.38, 3.63, 3.25 respectively as above). Science knowledge increased by 0.7 from 3.1.

Discussion and Conclusion

This course provided a much need opportunity for focussed airway training. Candidates increased their skills and confidence in managing routine and complex neonatal airways. They particularly enjoyed the cross specialty approach learning from each other and sharing experiences which will improve neonatal airway care. We shared drug protocols, difficult airway and tracheostomy guidelines. Links were improved between specialties and across tertiary and district hospitals. Based on this success, we plan to run courses twice yearly. The NAT course has a simple, reproducible concept and design that could be extended nationally.

085

Low Quality of Evidence for Standards: Should We Use It For Audit?

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Introduction and Aims

Looking at standards prior to an audit I noticed that the quality of evidence the recommendations for the standards were based on was moderate. In agreement with the department I carried out the audit, but the question remained: should we be assessing ourselves against standards based on poor evidence?

Methods

I looked not only at the evidence, but also how guidelines are written, how judgements are formed and recommendations made.

Results and Discussion

Guidelines are issued by a number of health authorities to help clinicians to make decisions without having to assess the evidence for each decision themselves. However, different organisations might come to different conclusions or recommendations based on the same evidence. There are a number of different systems to assess and grade the quality of evidence and to judge the evidence to make a recommendation. Users of these guidelines need to know how these recommendations are reached to know how much confidence they can place in such recommendations.

A systematic approach to developing guidelines for standards is essential. This should be transparent, provide explicit definitions and a protocol of the process. Good examples for this are the Cochrane Collaboration and SIGN.

Studies are assessed for risk of bias as well as quality with study design, study quality, consistency and directness as separate criteria. The components are then assessed together for an overall quality of evidence.

Recommendations of guidelines are based on that quality assessment and an additional judgement of the benefits, risks of intervention or treatment, applicability, baseline risk, cost and the values of the health system, population and the reviewer.

Conclusion

Assessing quality of evidence and making an informed judgement on the strength of any guidelines or recommendations is a difficult process. As with all evidence-based medicine the individual clinician needs to make an informed choice whether to follow a guideline or make a deviation from it based on his/ her own judgement.

As a department we decided to follow the recommendations and adopt the standard as one we assess our performance against.

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Educational Videos Using a Head-Mounted Device to Gain Expert Perspective in Complex Neonatal and Paediatric Procedures

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Introduction and Aims

In the learning of skills, videos can add an opportunity for concise explanation and visual modeling of the steps in a task. Additionally, head-mounted cameras capture subtle positioning and ergonomics, that may be lost in a close up video(1), or ill-conveyed by verbal tuition. This study investigates the educational value of point-of-view videos in paediatric anaesthetic procedures.

Methods

Three videos were made; central line insertion in a neonate, lumbar epidural insertion in a 1 year old, and an asleep fibreoptic intubation in a young child with reduced mouth opening. Consent was taken for videoing for educational purposes. During filming, an anaesthetist wore a head-mounted GoPro Hero4, firmware v 01.02.01, and a videographer held a GoPro Hero 4+ with a Steadicam Curve. They filmed with 2700p resolution at 25 frames per second with medium field of vision. The videos were edited in Adobe Premiere Pro, digitally zoomed and combined to produce a video. Anaesthetic trainees at Great Ormond Street Hospital took a survey before and after watching the videos, to establish their educational value. The surveys included factual questions, free text and rating of confidence and usefulness from 1(Disagree) to 10(Agree).

Results

Neonatal central line; Twenty two respondents to the pre-video survey rated confidence inserting a central line with a bimodal distribution, peaks at 3 and 8. In the post-video survey, asked if the video aided learning, the median score of 17 respondents was 10, range 7-10. Asked if the video reduced fear associated with line insertion, median score was 9, range 5-10. When asked for cannula gauge appropriate to the guidewire in a 5 French line set 27% were correct before and 88% correct after watching the video. Lumbar epidural; respondents rated confidence with a bimodal distribution, peaks at 1 and 6. Respondents found the video aided learning with a median score of 10, range 7-10. In reducing any fear, the median score was 9, range 6-10. Knowledge of 1mm/kg depth only applying over 10kg increased from 19% to 88% post video. Knowledge of the markings on an 18G 5cm needle increased from 14% to 82%. Overall the head-mounted view was beneficial and allowed good visualisation for trainees with a median score of 9, range 7-10.

Discussion and Conclusion

Point-of-view cameras, not previously described for anaesthetic educational videos on live patients, offer an intuitive view for training. They provide opportunity to rehearse and visualise the steps mentally, before facing the task. They also serve as a resource to maintain skills and knowledge over time. The system is efficient, with minimal cost or personal technical requirement. The cameras capture high-definition footage, are portable, lightweight and compact.

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087

Improving Performance: Format and Feedback from a Paediatric Anaesthesia FRCA Study Day

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Introduction and Aims

Anaesthetic trainees preparing for the final FRCA examination often have limited exposure to paediatric patients and cases during their training. With the majority having only completed intermediate training in paediatrics (and some even less than this), candidates are forced to rely largely on theoretical preparation, which may contribute to the generally poor examination performance in this area. The review of the RCOA Final Exam 2014-2015 cited "high levels of poor fail rates" across the paediatric anaesthesia questions [1]. Considering the past 3 years of final examinations, short answer questions achieved a pass rate above 50% in only 2 out of the 6 papers. We wanted to deliver a dedicated paediatric anaesthesia study day aimed at regional trainees preparing for the final examination.

Methods

Learning goals were identified and a teaching structure developed utilising a number of different learning methods. Candidates were welcomed with a short multi-choice question paper, and answers reviewed at the end of the day. Paediatric anaesthetists and senior trainees with a paediatric interest provided 6 lectures on core paediatric topics, incorporating pre-operative assessment, common paediatric conditions, neonates, ENT, post-operative pain and fluid management, congenital heart disease and paediatric emergencies. The afternoon provided time for small group work with case-based discussions and viva practice for those interested. The day was completed with an "Ask the experts" session, providing an open forum for trainees to direct questions to a panel of experienced paediatric anaesthetists.

Results

A total of 20 Imperial School of Anaesthesia trainees attended, with feedback provided by 15. All candidates found the day enjoyable with 14/15 claiming it would help them with the exam. 80% considerd the day excellent and would recommend it to colleagues. Half (7/15) thought it should be more exam focused whilst an equal number (7/15) considered it just right, requesting more of the same. Two thirds (10/15) agreed that the training day had stimulated further reading or training. Considering the teaching sessions independently, the case-based discussions were the best received with 9/11 claiming they found it excellent.

Discussion and Conclusion

Trainee exam performance in answering questions on topics relating to paediatric anaesthesia has been below average in the recent past. It is possible that this reflects limited competence and confidence with the practice of paediatric anaesthesia at their current level of training. We developed this dedicated paediatric study day in an attempt to address both these potential deficiencies and received very positive feedback from trainees as a result. A broad range of teaching methods seemed to work well and maintain candidate interest, with more informal case-based discussions and smaller group work better received. The plan is to implement this as an annual training day, ideally available to all training schools.

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Neonatal Difficult Airway Algorithm

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Introduction and Aims

We would like to present our algorithm for the management the difficult airway in neonates. It was devised by a multidisciplinary team consisting of paediatric anaesthetists, neonatologists, paediatric ENT surgeons and other healthcare professionals. It was implemented following a series of neonatal cases in our trust than required a higher than usual level of airway intervention. Up to 1% of neonates require extensive resuscitation at birth, while 10% need assistance to begin breathing.1 With an annual live birth rate of approximately 700 000 this equates to a significant number of neonates requiring specialised intervention.

Airway management is the priority during neonatal resuscitation to ensure adequate oxygenation and ventilation, and therefore reduce devastating morbidity and mortality. NAP 4 highlighted an area of great concern - where the unanticipated difficult airway is managed by repeated attempts at direct laryngoscopy.2 One of the paediatric deaths in NAP 4 was a neonate that developed complete airway obstruction following unsuccessful attempts to reinsert a displaced ETT.

Methods

We incorporated the following recommendations from NAP4 into our algorithm:

- Clinical areas which care for children should have advanced airway equipment rapidly available
- Involve ENT specialists early
- Seek alternative solutions especially in children with congenital abnormalities

The algorithm describes the stepwise progression through plans A to D (see summary below). The full algorithm has prompt boxes at each stage suggesting additional airway manoeuvres, alternative equipment and other interventions e.g. insertion of NGT to decompress stomach. In addition to the algorithm there is a Neonatal Difficult Airway Box that contains all the equipment detailed in the algorithm. This is kept on our neonatal unit. The algorithm and equipment box were introduced to staff during a simulation based training course, which is run regularly throughout the year.

- Plan A – Failed intubation – Priority Oxygenation & Ventilation
  - Optimise face mask ventilation
  - Call for SENIOR HELP EARLY
  - Attach Saturation and heart monitoring if available
- Plan B – Failed Intubation **CAN** Ventilate
  - Maintain OXYGENTATION and VENTILATION
  - Consider calling for anaesthetic/ENT support if rapid deterioration
- Plan C – Failed Intubation **CANNOT** Ventilate
  - Maintain OXYGENTATION and VENTILATION
  - Call for Anaesthetic Support
  - Consider calling for ENT/surgical support
- Plan D – **Can't Intubate Can't Ventilate**
  - Rescue Techniques
  - Only to be attempted by experienced personnel in life threatening situations

Discussion and Conclusion

Most tertiary hospitals have a locally agreed guideline for the management of the difficult neonatal airway but we would urge the Difficult Airway Society, Association of Paediatric Anaesthetists and the Royal College of Paediatric and Child Health to establish a national guideline for the wide variety of health care professional who are involved in the resuscitation of neonates. This would ensure rapid decision making during this demanding situation.

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089

A Plastic-Fantastic Solution... In-Situ Recovery Simulation

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Introduction and Aims

Simulation has been used widely in medical and nursing education for at least the last 50 years and has also been recommended by the Department of Health as a direct way of learning to improve patient safety (1). Group practice of realistic scenarios, for example laryngospasm, can help improve teamwork, leadership and communication within teams. Though the overall incidence of laryngospasm in paediatric practice has been reported by Olsson and Hallen to be just under 1%, it can be as high as 25% in patients undergoing tonsillectomy and adenoidectomy (2,3). Thus, prompt recognition and early correction is essential to re-establish ventilation and oxygenation as soon as possible and avoid significant morbidity. Laryngospasm is often seen during emergence from anaesthesia, which commonly occurs in Recovery. It is therefore imperative that the recovery team is confident in being able to recognise and commence the first steps in managing this rapidly evolving clinical situation.The aim of this training session was to deliver in-situ simulation to the recovery team to improve confidence relating to the recognition and management of laryngospasm in children. We also hoped to highlight any issues with our local safety procedures in recovery.

Methods

Two multi-disciplinary simulation sessions were held three weeks apart in the theatre recovery area at Royal Berkshire Hospital. Recovery nurses, ODPs and anaesthetic nurses attended the training and were given the scenario of a young child being brought out of theatre into recovery and developing laryngospasm. The scenario continued until resolution of laryngospasm. A paediatric mannequin was used and events were allowed to run in real-time. An extensive debrief was carried out at the end, facilitated by a Consultant Anaesthetist and the Lead Recovery Nurse.

Results

Feedback received suggested that attendees strongly agreed the simulation was useful (score 9.7/10) and that it helped improve their recognition and confidence in dealing with laryngospasm. We also demonstrated the first cohort took over 10 minutes to access and prepare emergency drugs. Following interventions, including development of an emergency drug tray, this time reduced to 98 seconds for the second cohort undertaking the simulation.

Discussion and Conclusion

Issues highlighted by the initial scenario training session were discussed in our Clinical Governance meeting and raised via the Trust incident reporting system. Before the second simulation training session, we helped develop an emergency drug tray, and improved access to the recovery fridges. This led to a reduction in preparation time of emergency drugs from over ten minutes to 98 seconds during the second in-situ simulation training. This, we hope, will help improve safety in the event of a real paediatric emergency in our Recovery.

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Ultrasound Evaluation for the Pediatric Upper Airway

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Introduction and Aims

Ultrasound evaluation for assessing the airway has been previously investigated to predict difficult endotracheal intubation or severity of obstructive sleep apnea (OSA) in adults. However, there are limited data regarding its use in the pediatric population.

The current study provides preliminary feasibility data regarding the use of ultrasound to evaluate the upper airway in the pediatric population.

Methods

After institutional IRB approval, we enrolled pediatric patients, ranging in age from 1 to 8 years, scheduled for tonsillectomy and/or adenoidectomy for sleep disordered breathing. After general anesthesia was induced and the trachea was intubated, measurements of upper airway structures were obtained via ultrasound. A linear probe and a convex probe were applied for evaluating the tonsils and the other measurements respectively. The greatest tonsil diameter was measured via ultrasound, and the measurement was compared with actual measured size following removal. The measurements were analyzed using simple linear regression. A p-value < 0.05 was considered statistically significant.

Results

A total of 37 patients were included in the study. The mean age was 4.6 ± 2.3 years old and the weight was 20.4 ± 9.5 kg. The body mass index (BMI) percentile was $59.8 \pm 33.7\%$. The hyoid mental distance (HMD) ratio of extension to neutral position was 1.07 ± 0.05 [range 1.02 to 1.21]. Eleven patients had their greatest tonsil diameter measured. The ultrasonic tonsil size measurements were smaller than the size after removal. No correlation was noted between them. No patient had difficulties with airway management such as difficult mask ventilation or Cormack-Lehane view > 2.

Discussion and Conclusion

This preliminary study provides baseline airway ultrasound measurements in children with OSA. Currently, no such data are available. Although it was difficult to detect tonsillar size correctly using ultrasound, it was possible to use ultrasound to measure the distance of lingual.

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Abnormalities of the Trachea in Mucopolysaccharidoses Patients

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Introduction and Aims

Mucopolysaccharidoses (MPSs) refers to group of lysosomal storage disorders. These are characterised by a lysosomal enzyme deficiency that leads to an accumulation of glycosaminoglycans (GAGs). The GAGs accumulate in bone, connective tissue and organs. Over time this results in dysfunction of the effected system. These patients present a challenge to the anaesthetist as GAG deposition can lead to significant upper airway abnormality [1] and has been attributed to difficult intubation [2]. Appropriately, attention has been directed towards the upper airway, however, changes in the lower airway may impact both the anaesthetic and surgical procedures of the trachea. We aimed to explore the potential involvement of the trachea in our MPS population.

Methods

Thirty two CT scans of MPS patients were identified and retrieved. Their mean age was 9.4 years old. Helical CT had been performed using a high speed CT scanner. We adopted a method previously used to evaluate the shape of the trachea [3]. At levels Th1 and Th2 the morphology was characterised into four categories, dependent of the collapse of the trachea. N-shaped (normal), D-shaped (anteroposterior smaller then transverse), W-shaped (transverse smaller than anteroposterior) and O-shaped (slight deformity). The cross sectional area (CSA) was also measured at these intervals.

Results

There was significant abnormal morphology in the MPS patients. At level Th1 58% demonstrated abnormal morphology and 65% at Th2 level. All shapes (D, W , O) where represented at each level in all subtypes of MPS. In our study group the mean CSA was 88mm for both the TH1 and Th2 level. When compared to the average tracheal diameters for their respected ages there is a trend to stenosis in the over eight year olds. It should also be noted that substantial differences in CSA can exist between the two different levels within the same patient. A range of -56.5mm to 87.9mm difference was demonstrated.

Discussion and Conclusion

Over half of the patients had abnormal tracheal morphology as a result of collapse of the normal structures. Instrumentation (e.g intubation) or surgical procedures (e.g. Tracheostomy) may be adversely effected by this abnormal morphology. Conceivably the function of the trachea could be influenced although the CT scans are unable to demonstrate dynamic problems such as tracheal malacia. There appears to be a trend towards stenosis in the older children when compared to historic average CSA of the trachea[4]. Given the relative uniform shape of the trachea, marked differences are found between the two levels. This reinforces evidence of morphological disturbance to the normal structure of the trachea. Our data highlights the importance of the lower airway in these challenging patients. Further examination as to the extent of stenosis and frequency of occurrence is warranted.

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The Functional Impacts of Paediatric Chronic Pain

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Introduction and Aims

Chronic pain in the paediatric population is a growing problem and is often associated with significant functional disabilities. Coping skills, psychosocial and environmental factors contribute to behavioural patterns often resulting in discrepancies between pain severity and degrees of disability. To manage this complex health problem a multidisciplinary chronic pain clinic, with anaesthetist, pain nurse, psychologist and physiotherapist has been running at Alder Hey since January 2013. Over the past 3 years we have routinely assessed the functional impact of pain on quality of life measures such as sleep, participation in sports and social activities, sitting and walking tolerances and school attendance and present the data obtained below.

Methods

Retrospective analysis of data obtained from all patients seen in the multidisciplinary chronic pain clinic from January 2013 to December 2015.

Results

During the 3 years 127 patients were seen (76 girls and 51 boys). The median age at first appointment was 14 years (IQR 11.9-15.5 years). Median lowest and highest pain scores in the previous week were 3 (IQR 2-5) and 8 (IQR 7-9). School attendance was poor with only 38% having greater than 80% attendance. Sleep was disrupted in the majority of cases: severely 20%; moderately 24%; mildly 18%; delayed falling to sleep but undisturbed 18%; and unaffected 20%. Chronic pain disrupted activities and social participation. Sports: no participation 37%; greatly reduced 11%; moderately reduced 23%; mildly reduced 18%; and unchanged 8%. Social activities: no participation 10%; greatly reduced 24%; moderately reduced 38%; mildly reduced 13%; and unchanged 12%. Pain impacted on sitting (31% unable to sit for an hour); standing (43% unable to stand for an hour) and walking (55% unable to walk for an hour). A significant number of patients indicated on the Bath Adolescent Pain Questionnaire that their chronic pain was having a moderate / severe impact on their life: social function (19-36) 25%; physical function (19-36) 35%; depression (13-24) 34%; general anxiety (15-28) 27%; pain specific anxiety (15-28) 52%; family functioning (24-48) 9%; development (23-44) 48%; daily function (37-62) 30% and emotional function (41-80) 45%. This was mirrored by their parent's perception of the impact on their child: depression 40%; general anxiety 21%; pain specific anxiety 64%; daily function 35% and emotional function 45%.

Discussion and Conclusion

The impacts of chronic pain on many areas of a young person's life are becoming increasingly recognised. Chronic pain significantly impacts on mood, sleep, school attendance and participation in social activities. It has increasing prevalence during the teenage years, crucial times in social development and academic importance, can have long lasting effects on their future lives. The complex nature of chronic pain requires a multidisciplinary approach to address the wide reaching effects of pain and its associated disabilities.

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Demographics of Patients Referred to Paediatric Chronic Pain Clinic

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Introduction and Aims

Paediatric chronic pain is increasingly recognised. Much of the literature on its demographics has been extrapolated from experiences in adults. Paediatric patients have been referred to our multidisciplinary chronic pain clinic for 3 years. We have reviewed these patients looking at sources of referrals, pain severity, distribution of pain, current medications and therapies, interventions initiated and outcomes.

Methods

Retrospective analysis of data obtained from all patients seen in the multidisciplinary chronic pain clinic from January 2013 to December 2015.

Results

During the 3 years 127 patients were seen (76 girls and 51 boys). The median (interquartile range (IQR)) age at first appointment was 14 years (11.9-15.5). The majority of referrals came internally (85%). Orthopaedics had the greatest number of referrals (35%). Other referrals came from General Paediatrics 16%, Neurosurgery / Neurology 13%, General Surgery and Urology 11%, Rheumatology 9%, General Practice 8% and other surgical specialities 8%. The cause of the pain was: not known 43%; injury 24%; disease 24% or surgery 9%. Lower limb pain was the most prevalent (43%). Other locations of pain included: back / neck 20%; abdominal 13%; head / facial 9%; upper limbs 5%; genital 5%; widespread 3% and chest 2%. Median pain scores in clinic were 5 (IQR 3-6.3). Current medications included: paracetamol 65%; NSAIDs 51%; Opioids 25% (Codeine 11%, tramadol 10%, morphine/oxycodone 4%); gabapentin/pregabalin 22%; amitriptyline 19%; melatonin 6%; lidocaine patches 9%; physiotherapy 17%; acupuncture 2%; TENS 2% and hypnotherapy 1%. No investigations were requested. In the first year (2013) 28 new patients were seen in monthly clinics. Fortnightly clinics were introduced in 2014 increasing new patient numbers to 55 in 2014 and 44 in 2015 (increasing number of follow up appointments). Median (IQR) time from referral to being seen in clinic was 4 (3-4.5) months in 2013, 4 (3-4) in 2014 and 4.5 (3-6) in 2015. Management plans included pharmacological (simple analgesia 42%, opioid 21% (mild 20%, strong 1%), gabapentin/pregabalin 23%, amitriptyline 15%, lidocaine patch 25%), non-pharmacological (TENS 52% and acupuncture 2%), physiotherapy (59%) and psychological interventions (52%). Follow-up has been undertaken in 75 patients: 5% pain free; 23% greatly improved; 36% some improvement in function or pain; 31% unchanged; and 5% worse. Fifty patients have been discharged: 40% pain free; 32% greatly improved; 12% partial improvement; 4% no impact; and 2% worse (10% DNA follow up).

Discussion and Conclusion

The majority of paediatric chronic pain is managed in primary care and other specialities, with only resistant cases being referred to tertiary multidisciplinary clinic. Teenage females made up the largest group seen. Musculoskeletal pain dominated (68%) with over a third of referrals from orthopaedic surgeons. Unlike adult chronic pain a large proportion of patients were greatly improved or pain free (72%) at the time of discharge.

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Paediatric Ear Reconstruction - An Analgesic Problem

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Introduction and Aims

Ear reconstruction is an uncommon, but challenging paediatric surgical procedure. It involves removing cartilage from the patient's ribs to form the framework for the new ear. This part of the procedure can prove to be particularly sore postoperatively. Recently the team at the Royal Hospital for Sick Children in Edinburgh looking after these patients introduced local anaesthetic wound catheters. We aimed to examine a year's worth of cases to see if the institution of wound catheters had improved analgesia.

Methods

We reviewed the cases of ear reconstruction in Edinburgh over the last 12 months. We looked at the anaesthetic management plan and postoperative scores. We compared the pain scores for those patients who had had a wound catheter with those who had not, plus opioid requirements.

Results

There were 10 patients who had had ear reconstruction surgery over the past year. Five patients had had wound catheters, five had not. There was no difference in age between the two groups. There was a trend towards lower postoperative pain scores in the group with local anaesthetic wound catheters, however there was not a significant difference. There were still regular pain scores of moderate (4-6 out of 10) in the wound catheter group. The intraoperative and postoperative usage of morphine was similar in both groups.

Discussion and Conclusion

As an uncommon surgical procedure, this is a small study group. However, it does seem that despite the addition of a local anaesthetic wound catheter, postoperative analgesia following ear reconstruction surgery has improved, though it remains suboptimal. We propose that an alternative local anaesthetic technique using paravertebral blocks, which can be used after thoracic surgery (1), may provide better analgesia.

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