Mock Paediatric Anaesthetic Answer Booklet for Paper 1
April 2016

Question 1.

A 3-year-old with suspected meningococcal septicaemia requires urgent transfer to the regional specialist Paediatric Intensive Care Unit (PICU) for on-going management.

a) Outline the critical steps required to arrange safe and timely interhospital transfer for this child by road (9 marks)

- Refer to local guidelines regarding emergency paediatric transport
- Initiate initial stabilisation at the base hospital

  Follow an ABC approach:

  Secure airway. Intubation by senior anaesthetist.

  Ventilation with PEEP, establish ventilation on transfer ventilator prior to departure.

  Appropriate fluid resuscitation, cardiovascular support, 2 x iv access, consider invasive monitoring depending on expertise.

  Administer antibiotics, obtain baseline blood results, gases, imaging etc.
- Contact regional retrieval team

  Specialist transport teams have dedicated consultant intensivists and are a valuable source of advice and guidance for clinicians involved in initial stabilisation.
- Confirm the requirement for inter-hospital transfer to a specialist centre

  Directed advice and treatment goals may be given by the retrieval team regarding the child's specific management. If the child shows significant improvement, transfer may not ultimately be necessary.
- Determine mode and timeframe for retrieval

  Ascertain whether the child will be retrieved by a dedicated transfer team from the receiving institution, or whether the base hospital will be assembling their own transport team. This will depend on the urgency of the transfer, the needs of the child and the skillset of the personnel available. Time critical transfers may need to be performed by the base hospital.
- Assemble base hospital transfer team personnel

In the case of a base hospital based transport team, skills of the transport team should match the requirements of the patient. A 2-person transport team is the accepted minimum for ventilated patients. A transport team will typically comprise a Team Leader, Assistant and a Driver/Technician.

- Continue on-going stabilisation and treatment as necessary with support from retrieval team where available.
- Assemble equipment, drugs and monitoring necessary for transfer

  This will include airway equipment, transfer ventilator, calculations of oxygen requirements, spare batteries for monitors, syringe drivers for drugs etc. Ideally the majority of this would be readily available on a dedicated transfer trolley. In terms of drug calculations, local retrieval service websites often incorporate an easily accessible calculator based on the weight of the child.
- Ensure a means of communication during the transfer

  Use a mobile phone with essential contact numbers installed.
- Consider parents

  It may be appropriate to allow one parent to travel in the transport ambulance. Unnecessary separation can lead to significant distress and parents are an essential source of information. Where this is not possible or practical, ensure parents know where to go once at the receiving institution.
- Use of a pre-departure transfer checklist

  These have been show to reduce the incidence of adverse events.

b) *What particular information should be exchanged with the receiving hospital prior to departure from the base hospital? (6 marks)*

- Name of receiving institution
- Name of accepting Consultant
- Patient details
- Reason for referral
- Allergies
- Medications
- Immunisations
- Child protection issues
- Current condition of the child (ABCD, Everything else – blood results and gases, imaging, cultures)
- Immediate needs of the patient on arrival
- Exactly how to get from the ambulance entrance to the receiving ward/PICU/theatre

c) *List the specific complications you might anticipate occurring in a ventilated child requiring inter-hospital transfer by road? (5 marks)*

- Oxygen failure or insufficient oxygen

  The self-inflating bag can be used in the event of oxygen failure but the ambulance should then be diverted to the nearest hospital to replenish the supply.

- Power failure

  Some transport ventilators utilise an electrical power source but will have a limited battery life. Plug the ventilator into a suitable power source whenever one is available and ensure that you know the battery life of the ventilator. In this child, power failure is also likely to affect inotrope and fluid pumps.

- Ventilatory problems

  High peak pressures, poor capnograph trace, high FiO_2 requirements, inability to ventilate. Significant deterioration can occur during transfer, especially in cases where the child is unstable prior to transport. If ventilatory problems occur following intubation the mnemonic "DOPES" can be used to determine the case of the deterioration:

D	Displaced	Check position of ETT – these can easily migrate
O	Obstructed	Check the ETT is patent, suction secretions
P	Pneumothorax	Ensure equal air entry bilaterally
E	Equipment	Ventilator functioning correctly?
S	Stomach	NG to decompress, exclude oesophageal intubation

- Migration of tubes and lines

  Ensure all tubes and lines are adequately secured prior to departure.

- Monitoring issues

  Monitoring may be problematic due to movement artefact, power failure etc.

- Injury from inadequately secured oxygen cylinders and/or ventilator

  Oxygen cylinders in particular are large, heavy items which may cause significant injury if they are not adequately secured in the back of a moving ambulance.

Question 2.

a) List the common causes of status epileptics in children. (6 marks)

- Metabolic abnormalities (hypoglycaemia, hyponatraemia, hypocalcaemia)
- Febrile illness
- CNS infections (e.g. meningitis)
- Epilepsy
- Anticonvulsant withdrawal
- Trauma
- Poisoning

b) What is your management plan for a child in status epilepticus (8 marks)

- ABCD
    - Emphasis on establishing a patent airway/provision of high flow oxygen/checking blood glucose
    - IV or IO access
- Cessation of convulsions
    - Lorazepam 0.1mg/kg IV/IO or Midazolam 0.5mg PO or Diazepam 0.5mg/kg PR
    - After 10 minutes, one further dose of lorazepam 0.1mg/kg
    - Early senior input
    - 10 minutes after second benzodiazepine dose, phenytoin 20mg/kg IVI +/- paraldehyde 0.4ml/kg PR, or phenobarbitone 20mg/kg if patient already on phenytoin
    - Thiopentone induced anaesthesia if all above fails

c) List the potential complications of prolonged convulsions. (4 marks)

- Respiratory
    - airway obstruction
    - aspiration
    - LRTI
    - pulmonary oedema
- Cardiac
    - hypo/hypertension
    -brady/tachyarrhythmias
- Cerebral
    - hypoxic brain injury
    - raised ICP (e.g. cerebral oedema)
    - cerebral haemorrhage

- Other
    - electrolyte abnormalities (e.g. hypoglycaemia)
    - rhabdomyolysis
    - acute tubular necrosis
    - acute pancreatitis
    - disseminated intravascular coagulopathy

Question 3.

Near Infra-Red Spectroscopy (NIRS) can be used to monitor the pre-term neonate during anaesthesia.

(a) How does NIRS work (4 marks) and where specifically can it be placed? (2 marks)

Near-infrared light (700 to 1000 nm)

Penetrates through the superficial layers of the head, including the scalp and the skull

$rScO_2$ is the percentage of oxyhaemoglobin over the sum of oxy- and deoxyhaemoglobin in pooled arterial, capillary and venous blood.

$rScO_2$ is essentially determined by cerebral oxygen demand and supply

Cerebral - head

Splanchnic - abdomen

Renal - abdomen

(b) List intra-operative factors known to cause a reduction in NIRS (7 marks)

Low haematocrit/anaemia

Increased cerebral oxygen consumption - seizures

Hypotension/Hypovolaemia

Hypoxia

Misplacement of NIRS probe

Deep hypothermic cardiac arrest

Cardiac shunt – large VSD, large PDA

Hypocapnia

(c) What are the potential post-operative complications of a severe and prolonged reduction in NIRS. (7 marks)

Major organ hypoperfusion

- Myocardiac ischaemia
- Cerebral hypoxia/Stroke
- Acute kidney injury
- Necrotising enterocolitis

Post-operative cognitive dysfunction

Increased morbidity and mortality

Prolonged length of hospital stay

Question 4.

Congenital heart defects can be cyanotic or acynotic.

a) What do these terms refer to? (4 marks)

Those with a L to R shunt and those with a R to L shunt

b) Give 4 examples of each (8 marks)

Left-to-right: ASD, VSD, AVSD, Patent Ductus Arteriosus;
Right-to-left: Tetralogy of Fallot, Transposition of the Great Arteries, Truncus Arteriosus, Tricuspid Atresia, Ebstein's Anomaly

c) What is Eisenmenger's syndrome? Describe the cardiac abnormality (8 marks)

Chronic L to R Shunt caused by a congenital heart defect e.g. VSD
Causes pulmonary hypertension
Chronic R to L shunt resulting in RV overload and RVH
Chronic Pulmonary overcirculation
Eventual reversal of the shunt which becomes predominantly Right to Left
Presents with cyanosis, heart failure, polycythaemia

Question 5.

a) Describe the anatomical features of the normal paediatric airway (7 marks)

There are marked anatomical and physiological variants between the paediatric population and adults. These tend to be more pronounced in the neonatal population (<4 weeks of age) and become less significant as the child ages. Children's heads are proportionately larger compared to their bodies, and have a more prominent occiput. This, combined with shorter necks, means that the ideal position to maintain the airway in is in the neutral position rather than "sniffing the morning air" as in the adult patient. A large tongue can crowd the mouth; micrognathia and limited mouth opening compound potentially difficult laryngoscopy. The larynx is more anterior, more cephalad, and funnel shaped int the paediatric patient. The cricothyroid cartilage is at the higher level of C3/4 in infancy, changing to C5 by 6 years. An anterior larynx can make laryngoscopy more challenging. The epiglottis is longer and U shaped and can become an obstacle to intubation. The cricothyroid membrane is smaller in width then in adults. Endotracheal tubes should be sized according to the cricoid cartilage diameter, which is the narrowest part of the paediatric airway (contrast with adults, where it is the laryngeal inlet). The Trachea is shorter (4cm neonates) making accidental endobronchial intubation more common.

b) What are the advantages (5 marks) and disadvantages (3 marks) of using cuffed endotracheal tubes in the paediatric population?

Advantages

'Tighter' fit leads to less leak: reduced need for tube changes; able to produce and maintain PEEP; reduces anaesthetic gas pollution; more accurate monitoring of capnography and gas analysis; low flow anaesthesia can be employed with cost and environmental implications

Disadvantages

High cuff pressures can cause laryngeal oedema/upper tracheal necrosis; cuffed tubes have a reduced internal diameter to allow for the cuff so work of breathing is higher in the setting of spontaneous ventilation

c) Compare the characteristic airway complications of Downs Syndrome with Piere Robin syndrome (5 marks)

Down's syndrome is one of the most common congenital syndromes. Airway Difficulties include potential or actual atlanto-occipital instability, macroglossia, small oral cavity and poor pharyngeal tone making upper airway obstruction more likely. Pierre Robin Sequence has a number of features that can make intubation more challenging. Micrognathia, relative macroglossia with or without cleft palate all complicate airway management. These patients tend to become less prone to airway obstruction and difficult intubation as they get older.

Question 6.

You are pre-assessing a 3-year old child with Down's syndrome for dental extractions under general anaesthesia on the day of surgery. On examination, you find a systolic murmur which has not previously been described.

a) How would you evaluate the significance of the murmur? (8 marks)

The significance of a murmur discovered in any child should be evaluated via a thorough history, physical examination and investigations as appropriate. Due to the increased incidence of pathological cardiac abnormalities associated with Down's syndrome, particularly endocardial cushion defects (AVSDs, ASDs, VSDs) a higher degree of suspicion for a non-innocent murmur should be assumed.

Features from the history of the child which would be a cause for concerns and further investigation include cyanotic episodes, evidence of heart failure such as dyspnoea, orthopnoea or paroxysmal nocturnal dyspnoea, and syncope. Poor growth and feeding may also be associated with a pathological murmur, and details of general poor health or recurrent hospital admissions should be investigated. Also, if the child has a history of a known cardiac condition, the details of this should be available before proceeding with elective surgery.

On examination, innocent murmurs tend to occur in early systole, are soft and vary with posture. In contrast to this, any harsh or high grade murmur, or one occurring in late systole, pansystole or diastole should be investigated. For example, a VSD would cause a harsh, pan-systolic murmur. Also, if there are any other positive features on cardiac examination such as a palpable heave or thrill or abnormal heart sounds, the child's elective procedure should be delayed until the murmur can be more formally investigated with ECG for arrhythmias, chest radiograph for evidence of cardiomegaly or failure, echocardiography and referral to a paediatric cardiologist if appropriate.

b) What, if any, are your specific anaesthetic considerations when caring for a child with Down's syndrome? (10 marks)

There are multiple peri-operative concerns requiring careful considerations prior to anaesthetising a child with trisomy 21, the main being communication difficulties due to intellectual impairment, underlying cardiac disease and increased incidence of difficult airway management due to anatomical anomalies.

<u>Pre-operative:</u>

a. Careful airway assessment looking in particular for relatively large tongue, crowding of midfacial structures, high arched palate, micrognathia and short broad neck may all indicate a difficult airway and if I was concerned, the case would require a skilled paediatric anaesthetist with appropriate difficult intubation equipment available as well as a second anaesthetist for assistance.

A smaller endotracheal tube should also be available for the possibility of subglottic stenosis.

b. Careful airway manipulation is also warranted because of the incidence of atlanto-axial instability although screening xrays are not advised if the child is asymptomatic.
c. Intravenous access may be difficult and so specific equipment such as an ultrasound and two skilled anaesthetists should be available.
d. A calm environment and the use of a light sedative premedication may be helpful in an anxious child with trisomy 21 where communication is difficult as long as it is not precluded by the risk of hypoxia due to underlying cardiorespiratory disease.

Intra-operative:

a. Strict asepsis for all procedures due to relative cellular immunodeficiency putting the child at a greater risk of infection.
b. Increased vigilance for aspiration due to the increased incidence of gastro-oesophageal reflux disease and use ranitidine pre-opertively to minimise the risk.
c. Attempt to optimise cardiorespiratory function due to possibility of underlying pathology and if there is a known cardiac condition, the anaesthetic should be performed in a centre with the appropriate skill base and services to manage congenital heart disease peri-operatively.

Post-operative:

a. Judicious use of opiates due to increased sensitivity and incidence of obstructive sleep apnoea.
b. Attempt to optimise rapid recovery through the use of shorter acting anaesthetic agents and ensure the child is nursed in a monitored environment overnight, such as HDU as they are more prone to hypotonia which may cause airway compromise, atelectasis and increased risk of chest infection. Supplemental humidified oxygen and physiotherapy should be implemented early if required.
c. Careful multi-modal analgesic planning and involvement of the parents and the pain team if possible due to the challenges of assessing pain due to communication difficulty balanced with the risk of airway obstruction and opioid sensitivity.

c) Would you provide antibiotic prophylaxis for this child when you proceed to surgery? If so, what? (2 marks)

The current AHA and NICE guidelines recommend that routine dental procedures without gingival manipulation (eg. fillings) do not require antibiotic prophylaxis unless the child has an unrepaired cyanotic cardiac lesion, is within 6 months of a repair, or has previously had bacterial endocarditis. The emphasis is instead on maintaining good oral health and dental hygiene. Planning for this procedure would require a discussion with the operating dentist as to the extent of the treatment required and a discussion with the parents to manage their expectation for prophylactic antibiotics as they may have some concerns.

Question 7.

A 3-year-old boy has a history of intermittent episodes of stridor. He is booked for a microlaryngoscopy and bronchoscopy on your ENT list.

a) List potential causes of intermittent stridor in this boy. (5 marks)

Laryngomalacia
(or pharyngo/trachea/bronchomalacia)
Laryngeal web
Laryngeal stenosis (subglottic stenosis)
Laryngeal papillomatosis
Foreign body
Vascular ring
Tumour eg haemanigioma

b) Describe different methods of maintaining oxygenation for ENT airway surgery and their relative merits (15 marks)

Independent of bronchoscope: Intermittent BMV; Nasopharyngeal tube; THRIVE; MLT
Through bronchoscope: Ventilating (Storz); Venturi

• Intermittent bag-mask ventilation and apnoea
pro's: familiar technique, can use inhalation agent to maintain anaesthesia
cons: no airway protection; risk of gastric insufflation, may prove difficult to ensure adequate mask-seal every time; interrupts surgery; risk of desaturation

• Nasopharyngeal airway (or endotracheal tube in nasopharynx)
pro's: simple technique; inhalational agents can be used
cons: relies on patent airway and patient spontaneous breathing; risk of epistaxis; significant leak of anaesthetic gas; inaccuracy/inability to adequately monitor airway gases

• High-flow nasal cannula (THRIVE)
pro's: reliably prolongs apnoeic window with minimal rises in CO2
cons: relies on patent airway; gastric insufflation; pneumothorax; relatively expensive equipment (and unfamiliar to many staff); maintenance of anaesthesia by IV drugs

• MLT and IPPV
pro's: familiar equipment and intubating technique; maintain inhalational anaesthesia; monitor airway gases; 'secures' airway
cons: can obstruct surgical view; accidental extubation; operative field relatively mobile

• Ventilating bronchoscope (Storz):
pro's: can be used with spontaneous ventilation or IPPV via a Jackson-Rees T-piece attached at the operator end; inhalation agents can be used to maintain anaesthesia
cons: greatly increases the work of spontaneous breathing by reducing the cross-sectional area of the trachea; invariably causes hypercarbia; environmental leak of anaesthetic gases

• Venturi bronchoscope using intermittent jet ventilation (Sanders):
pro's: facilitates a motionless operating field; minimal equipment requirements;
cons: maintenance of anaesthesia by IV drugs; entrained air 'dilutes' FiO2; unable to adequately monitor gas delivery; hypercarbia is problematic; risk of barotrauma; risk of gas trapping; gastric insufflation when used supra-glottically

Question 8.

A 6-year-old boy, normally fit and well, presents for emergency appendicectomy. He has been vomiting and unable to tolerate oral fluids for the last day. He has a temperature of 38.5°C.

a) What are the clinical features of dehydration in children? (6 marks)

RESP – tachypnoea
CVS – tachycardia; hypotension; prolonged CRT; weak peripheral pulses; cool peripheries
CNS – altered consciousness
RENAL – oliguria/anuria
OTHER – sunken eyes; dry mucus membranes; reduced skin turgor

b) Calculate an initial resuscitative intravenous fluid bolus and ongoing maintenance fluids for this child, showing your working. (6 marks)

Weight estimation = (agex3) + 7 = (6x3) + 7= 25kg

Fluid bolus: 20mls/kg of a non-glucose containing isotonic crystalloid with a sodium concentration of 131-154mmol/litre.
20 x 25 = 500mls
0.9% sodium chloride or Hartman's solution acceptable

Maintenance fluids:

4mls/kg for first 10 kg	4x10 = 40
2mls/kg for next 10kg	2x10 = 20
1ml/kg for each extra kg	1X5 = 5
	Total = 65mls/hour of a non-glucose containing isotonic crystalloid with a sodium concentration of 131-154mmol/litre.

Or, the same formula used to calculate the total daily requirement:
100mls/kg/day for first 10kg
50mls/kg/day for next 10kg
20mls/kg/day for each extra kg
which gives 1600mls/day

c) State what monitoring and clinical assessments are required if this child remains on intravenous fluids. (4 marks)

Serum urea and electrolytes at least every 24 hours
Blood glucose at least every 24 hours
Daily weight
Fluids input, output and balance
Assessment of fluid status
Assessment of ongoing losses (eg. gastrointestinal losses)

d) *List the symptoms of hyponatraemia. (4 marks)*

- Headache
- Nausea and vomiting
- Confusion
- Reduced consciousness/irritability
- Lethargy
- Seziures
- Apnoea
- Coma

Question 9.

a) Define 'sedation' and outline the different stages (3 marks)

Three levels of sedation (American Society of Anesthesiologists):

- Minimal
- Moderate
- Deep

Minimal: patient responds normally to voice though may be cognitively impaired; no effect on A,B,C

Moderate: patient is sleepy but rousable, responds purposefully to voice or light tactile stimuli (approximates to 'conscious sedation', defined specific as a state of CNS depression that enables treatment to be carried out, but during which verbal contact is maintained)
A: maintained, B: adequate breathing spontaneously, C: usually maintained

Deep: patient is asleep, not easily roused, can respond purposefully to repeated painful stimuli
A: may need assistance to maintain patent airway
B: spontaneous ventilation may be inadequate
C: usually maintained

b) Name 3 diagnostic and 3 therapeutic procedures that would be suitable for conscious sedation in an otherwise healthy child. (6 marks)

Diagnostic includes:
- ECHO
- CT
- MRI
- gastroscopy
- colonoscopy

Therapeutic includes:
- Dental procedures
- Wound care ie burns dressings, suturing lacerations
- Radiotherapy
- Fracture manipulation

c) What issues may contradict sedation in children? (6 marks)
Abnormal airway anatomy
Known difficult airway (congenital defects – micrognathia etc) or documented from previous anaesthetics
Pathology: adenotonsillar hypertrophy; OSA; cardiorespiratory disease; bowel obstruction
Patient: allergies to sedative; refusal; significant behavioural problems

d) What are the minimum standards of monitoring required for conscious sedation? (5 marks)
- Pulse oximetry
- ECG
- NIBP

Good practice to use capnography.

Other monitoring dependent on specific needs of child.

Question 10.

a) Describe the blood supply and venous drainage of the tonsils. (5 marks)

The palatine tonsil has a rich blood supply from the external carotid artery (*1/2 mark*) branches. The lower pole of the tonsil receives branches from:

- Dorsal lingual artery (*1/2 mark*).
- Ascending palatine artery from the facial artery (*1/2 mark*).
- Tonsillar branch of the facial artery (*1/2 mark*).

The upper pole of the tonsil receives branches from:

- Ascending pharyngeal artery (*1/2 mark*).
- Lesser palatine artery (*1/2 mark*).

(Note that the internal carotid artery lies approximately 2cm from the palatine tonsils, but contributes no branches).

Venous drainage is more diffuse with a venous peritonsillar plexus (*1/2 mark*) about the capsule. The venous blood flows into:

- Lingual (*1/2 mark*) and pharyngeal veins (*1/2 mark*).
- Which feed into the internal jugular vein (*1/2 mark*).

b) What are the anaesthetic considerations in bleeding tonsil? (5 marks)

The anaesthetic considerations in bleeding tonsil include:

- Hypovolaemia
- Risk of pulmonary aspiration (swallowed blood with or without oral intake)
- Potential for a difficult intubation because of:
    - Excessive bleeding obscuring the view
    - Oedema after earlier airway instrumentation
- A second general anaesthetic (residual effects of first; issues of dosing)
- Stress to both child and parents.
- Full stomach
- Cardiovascular collapse on induction of anaesthesia

1 mark for each of the above, up to a maximum of 5 marks

c) Before induction, in addition to the standard equipment, what other equipment should be immediately available? (3 marks)

- A selection of laryngoscope blades (*1 mark*).
- Smaller than expected tracheal tubes, two of each size (*1 mark*).
- Two suction catheters should be immediately available (*1 mark*).

d) Describe two techniques for induction of anaesthesia for post tonsillectomy haemorrhage (4 marks), and briefly outline steps to be taken prior to extubation? (3 marks)

There is little agreement on the safest technique of anaesthesia for a bleeding tonsil; the anaesthetist should adopt an approach with which they are comfortable, cognizant of the potential hazards. Two options include:

- A rapid sequence induction (*1 mark*) with pre-oxygenation (*1/2 mark*) and cricoid pressure (*1/2 mark*).
- Inhalational induction with sevoflurane in oxygen (*1 mark*) starting in a head down lateral position (*1 mark*).

If using inhalational induction, a laryngoscope blade can be gently introduced after the child should be to moved to the supine position, suxamethonium may be given and cricoid pressure applied until the trachea is intubated. Facemask ventilation should be avoided as it may precipitate regurgitation of blood from the stomach.

- Further fluid and blood should be given as required (*1 mark*).
- Before termination of anaesthesia a wide bore orogastric tube should be passed in an effort to empty the stomach (*1 mark*).
- Extubation should be in a lateral, head down position (*1 mark*).

Question 11.

A 4 year old child who had a blow from a cricket bat arrives at the emergency department. He briefly lost consciousness at the time. His GCS was 15 on arrival to hospital and during triage. You are asked to review him prior to a head CT scan. He has since become sleepy and agitated.

a) Describe your immediate management (6 marks)

Primary survey: C spine immobilisation, ABCD approach in accordance with ATLS/APLS
IV access
AVPU
Consolidate history, sequence of events, drugs given, medical and anaesthetic history.

b) What signs might indicate a basal skull fracture? (4 marks)

CSF leak from ears, nose
Battles sign: bruising behind the ears
Panda/racoon eyes
Haemotympanum

c) You decide that general anaesthesia is warranted for transfer to CT. How would you conduct anaesthetic to try and minimise secondary brain injury? What physiological parameters would aim for whilst under anaesthetic? (10 marks)

RSI if indicated with in line C spine stabilisation – consider using opiate to obtund pressor response to laryngoscopy
Ventilation to maintain adequate oxygenation. Aim for normal range $PaCO_2$ to promote adequate cerebral perfusion. Capnography.
Controlled ventilation with neuromuscular blockade to allow tight control of gas exchange and prevent surges in ICP secondary to coughing.
Arterial line to monitor BP and extrapolate CPP carefully and continually.
Analgesia. Anticonvulsants as required.
Maintain normothermia and normoglycaemia

Question 12.

A 15-year old girl is in agreement with her medical team for life-saving corrective heart surgery, who wish to perform the procedure imminently.

(a) Who can give consent for this procedure? (8 marks)

Consent to treat an individual under the age of 18 years can be obtained from one of four sources:

1. Those with parental responsibility
2. A minor over the age of 16 years
3. A minor under the age of 16 years who is deemed to be *Gillick* competent
4. From the courts

Parents have legal obligations towards their child, enshrined in the 'Childrens Act 1989'. This states that "all the rights, duties, powers, responsibilities and authority which by law a parent of a child has in relation to the child and his property", and includes:

- The provision of a home for the child
- The provision of protection and maintenance of the child
- Disciplining the child
- Providing for education
- Agreeing to medical treatment

(http://www.legislation.gov.uk/ukpga/1989/41/section/3)

Parental responsibility is reiterated to some extent by article 8 of the European Court of Human Rights. This qualified right protects the private lives of individuals against arbitrary interference by a public authority and private organisations. However, the principle that health service provision constitutes an interference with the parental rights and responsibilities set out in 'The Childrens Act 1989' has been tested by the courts and dismissed (Silber J.)

Section 8(1) of the 'Family Law Reform Act 1969' states that a minor of 16 years of age may give consent for a medical or surgical procedure, and that in doing so it is unnecessary to obtain parental or guardian consent. This is a statutory presumption of capacity; rebuttal (in a 16- or 17-year old) is possible if the patient is unable to believe, retain, weigh information, or communicate a choice.

The basis of *Gillick* competence (*Gillick* vs West Norfolk and Wisbeach AHA, 1986) is that minors under the age of 16-years have sufficient maturity and understanding to make the decision in question if they:

- have the ability to understand the choices and the consequences
- are able to weigh up information in order to arrive at an answer
- understand the nature of the proposed intervention, including the risks and side effects, and an understanding of the alternative options
- communicate their decision

It is a developmental concept, neither gained nor lost on a day-to-day basis.

(b) List the Fraser-competence criteria (5 marks)

Although originally applied specifically with reference to contraceptive advice, the principles set out by Lord Fraser have been applied to other healthcare related procedures. It suggests that a treating doctor should be satisfied that:

1. The patient will understand the advice given
2. Every reasonable effort has been made to persuade the patient to inform their parents, or to allow the doctor to do so
3. That the patient is likely to continue to be exposed to the risk for which they have presented to the doctor for advice
4. That the patient will likely suffer physical or mental harm unless the doctor provides for them what they have presented for
5. That it is in the best interests of the patient that the doctor treats them without parental consent

Part of the 'understanding process' includes the patient demonstrating insight into the wider contextual issues of their request, with the onus remaining upon the doctor that this be satisfactorily met.

The General Medical Council have also provided direction for its members of issues of consent, stating in similar fashion that:

"(a doctor) must decide whether a young person is able to understand the nature, purpose and possible consequences of investigations or treatments… proposed, as well as the consequences of not having treatment. Only if they are able to understand, retain, use and weigh this information, and communicate their decision to others can they consent to that investigation or treatment"

(http://www.gmc-uk.org/guidance/ethical_guidance/children_guidance_24_26_assessing_capacity.asp)

(c) The patient changes her mind. Can she refuse treatment? (8 marks)

A person aged over 18-years of age may refuse to provide consent for a medical intervention, even if their reasons appear illogical to others. Where a 16- to 18-year old is presumed (rebuttable) competent to consent by statute, this is not the same for refusal of treatment.

This is principally because a child's capacity is determined within the context of the decision being made. Where a *Gillick* competent child, or one aged 16- or 17 years old, refuses an intervention in the full knowledge that such a decision will result in harm or their death, the courts have overruled on the basis that the child does not fully understand the wider implications of their decision, which may include the effect on family members, the manner of death itself, and any pain and suffering that may be incurred. They are then, *by definition,* lacking competence.

The courts have gone further: a 14-year old who refused a life-saving blood transfusion because of her profound religious beliefs was overruled on the grounds that her upbringing had an unavoidable and profound influence on her decision; she therefore lacked the constructive formulation of beliefs that come with adult experience. She could not be deemed *Gillick* competent as she lacked sufficient information, and, on the facts, treatment was in her best interests.

This may seem like the courts wielding too much power; however, it must be remembered that the guiding principles for the courts as outlined in the 'Childrens Act 1989' is that the welfare or best interests of the child is the paramount concern. The graver the risks of refusal, the greater the likelihood that refusal will be overruled.