



Postanesthesia complications in pediatric patients with previous SARS-CoV-2 infection: A cohort study

Geng-Ramos et al. *Pediatric Anesthesia* Jan 2023; 33:79-85 DOI: [10.1111/pan.14585](https://doi.org/10.1111/pan.14585)

This is a single-centre, retrospective, case-control study of paediatric patients undergoing anaesthesia within 90 days of a diagnosis of SARS-CoV-2.

- SARS-CoV-2 positive and negative groups were matched 1:2 by age and procedure and further grouped by time between positive PCR and anaesthesia (0-7, 8-42, >42 days)

Primary outcome: rate of post anaesthesia complications

- Immediate: unplanned escalations of care (ICU, prolonged ventilation, Vasopressors).
- Within 30 days: cardiac, respiratory, thrombotic, haemorrhagic.

Secondary outcomes: 30-day mortality and length of stay (LOS).

Study Group:

341 patients were included. 114 patients were SARS-COV-2 positive and 227 were negative. There was no significant difference in age, gender, anaesthesia type and emergency status.

Key findings:

Diagnosis of SARS-CoV-2 0-7 days prior to anaesthesia was associated with a **higher rate of post-anaesthesia complications** (LOS $P < 0.001$, 30-day pulmonary complications $P = 0.001$, mechanical ventilation $P = 0.006$, vasopressors $P = 0.017$, SIRS $P = 0.017$). In this group the probability of having any of the recorded complications was 27%.

There was no significant difference in complications between negative patients and those diagnosed with SARS-CoV-2 8-42 days prior to anaesthesia.

There was an increased risk in 30 day cardiac complications ($P = 0.029$) in patients diagnosed with SARS-CoV-2 > 42 days prior to anaesthesia.

Discussion & Key Findings:

Study limitations include: small sample size, groups not matched for ASA, evolving strains in different areas and over time may have different clinical implications.

Post-anaesthesia complications are greatest in paediatric patients positive for SARS-CoV-2 0-7 days pre-anaesthesia. Pulmonary complications were not shown to be increased after this.

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Increased complications are also present in asymptomatic patients.

Risk of cardiac complications may persist longer than other complications, possibly due to undiagnosed multisystem inflammatory syndrome.

Further studies are needed to guide the ideal timing for non-emergent surgery following a diagnosis of SARS-CoV-2.

Reviewed by Dr Katherine Harvey-Kelly

A comparison of operative and anesthetic techniques for inguinal hernia repair in infants

Song et al. *J Pediatr Surg.* 2023 Jan 20:S0022-3468(23)00053-2.

DOI: [10.1016/j.jpedsurg.2023.01.034](https://doi.org/10.1016/j.jpedsurg.2023.01.034)

This is a single-centre, retrospective cohort study looking at surgical and anaesthetic technique for Inguinal hernia repair (IHR) in infants (< 1 year) over a five year period. Infants were excluded if the IHR was an emergency or if other concomitant procedures were performed.

Infants were split into four groups depending on the anaesthetic and surgical technique used: GA-Open (GO), caudal-open (CO), GA-laparoscopy (GL), caudal-laparoscopy (CL).

Primary objective: to compare surgical outcomes and resource utilisation between the four groups.

Study Group:

338 patients were included in the study. 87.6% were male with a history of prematurity. 84.1% had an open procedure with an even split in caudal and GA in both open and laparoscopic groups.

Key findings:

Outcomes:

- There were only 2 crossover events between groups: one case of conversion from GL to GO due to desaturation and one case of conversion from CO to GO due to inadequate anaesthesia.

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- There were 22 postoperative complications (6.5%), with hernia recurrence being the most common (n=9). There was no significant difference in incidence of postoperative complications between the groups.

Resource utilisation:

- Total OR time was significantly shorter in the CO group compared to GO (9 minutes) and CL (15 minutes).
- Post procedure time was significantly shorter in patients who received caudal anaesthesia in both open (8 minutes) and laparoscopic groups (4 minutes).

Take home messages:

1. Rates of postoperative complications appear to be similar irrespective of combination of anaesthetic and surgical technique.
2. CO was found to be the most efficient method of IHR, with caudal anaesthesia significantly reducing post-procedure time.
3. Use of caudal anaesthesia for laparoscopic IHR appears to be safe and effective.
4. Reduction of exposure to GA and need for intubation by using caudal anaesthesia is particularly relevant in this group with a majority having a history of prematurity.

Reviewed by Dr Katherine Harvey-Kelly

Hypnosis as an alternative to general anaesthesia for paediatric superficial surgery: a randomised controlled trial

Sola et al. *British Journal of Anaesthesia* 2023; 130 (3): 314 – 321

DOI: [10.1016/j.bja.2022.11.023](https://doi.org/10.1016/j.bja.2022.11.023)

This single-blinded randomised controlled trial (RCT) aims to compare general anaesthesia (GA) against intraoperative hypnosis on recovery and patient experience during “superficial surgery”.

Population	Sixty ASA 1-2 children, aged 7-16 years at a single French centre undergoing elective day-case “superficial surgery” <60 minutes in duration.
Intervention	Hypnosis: 15-20 minute hypnosis preparation session pre-theatre. EMLA cream on incision site. Hypnotic ‘induction’ in theatre, then ‘trance’ maintained by communication. No venous access obtained as first line.

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Comparison	GA: midazolam pre-medication. Intravenous cannulation, then IV induction with propofol and sufentanil with sevoflurane/N ₂ O maintenance.
Outcome	Length of stay (LOS) from anaesthetic or hypnotic induction to hospital discharge.

In both groups, EMLA to cannula sites, local anaesthesia infiltrated to the surgical site. Post-operative analgesia differed between groups – paracetamol and ketoprofen IV if GA, and paracetamol and ibuprofen orally if hypnosis.

Primary outcome: Median LOS shorter in hypnosis group (120 minutes vs 240 minutes).

Secondary outcomes:

- High levels of anxiety occurred less frequently in the preoperative period in children undergoing hypnosis.
- No difference in pain scores, possibly more children back to normal levels of activity on day one post-operatively in hypnosis group.
- No difference in post-operative behavioural disorders between groups.
- No difference in satisfaction between groups.

Further commentary:

- A RoB-2 analysis suggest a low risk of bias. However, multiple patients declined participating, either deeming hypnosis to be unsuitable, or due to the lack of choice of intervention due to study allocation. Both can introduce bias.
- Multiple differences in interventions between arms, making it impossible to pinpoint which part is attributable to the differences seen between groups.
- Every child in GA group had midazolam pre-medication, which can increase LOS. No inhalational inductions in GA protocol means a need for awake IV cannulation, which can increase anaesthetic room duration. No explanation is given as to why median time from induction to start of surgery is 39.7 minutes in GA group vs 12.8 minutes in hypnosis group.
- A 15–20-minute pre-operative hypnotic preparation session has significant anaesthetic resource implications, especially as there may be a limited number of hypnosis-trained anaesthetists.
- Very limited range of procedures of very short durations only.
- Patient selection very important (those old enough to be “hypnotically suggestible”).

The authors’ conclusion was that hypnosis was feasible and acceptable, and that hypnosis is “an effective alternative to GA for paediatric superficial surgery”, but its practicality remains to be seen and requires further study.

Reviewed by Dr Edmund Chan

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Randomized controlled trial (RCT) comparing ultrasound-guided pudendal nerve block with ultrasound-guided penile nerve block for analgesia during pediatric circumcision

Boisvert-Moreau et al, *Regional Anesthesia & Pain Medicine* 2023; 48: 127-133

DOI: [10.1136/rapm-2022-103785](https://doi.org/10.1136/rapm-2022-103785)

This double-blinded RCT compared postoperative pain in children receiving either block under general anaesthesia (GA) for circumcision.

Population	160 ASA 1-3 boys, aged between 1-12 years at a single Canadian centre undergoing elective day-case circumcision for medical reasons
Intervention	Ultrasound-guided pudendal nerve block
Comparison	Ultrasound-guided dorsal penile nerve block
Outcome	Primary outcome FLACC scores at 5-30-60-120 minutes postoperatively

Primary outcome: there were no differences in FLACC scores between the two groups.

Secondary outcomes:

- Surgeon's satisfaction higher with UG-PNB, with the most commonly-cited reason being UG-DPNB local anaesthetic diffusion leading to distorted structures.
- Intraoperative haemodynamic changes (>20% heart rate and/or blood pressure) were noted at a higher frequency when UG-PNBs is compared against those with UG-DPNBs.
- Intraoperative fentanyl use was greater in patients undergoing UG-PNB when compared those undergoing UG-DPNB (1.3 mcg/Kg vs 1.0 mcg/Kg).
- No difference in parent's post-operative pain measure (PPPM) scores, time to perform blocks, analgesia consumption during the first 24 hours, time to first opioid consumption, parental satisfaction, and total time in PACU and total time to discharge.
- No complications were detected at the post-operative follow-up phone calls.

Although the greater frequency of haemodynamic changes and greater intraoperative fentanyl use in the UG-PNB group did not translate to difference in the post-operative measures, the authors acknowledge that a reasonable explanation may be that the UG-DPNB produces a faster-onset and/or denser block, which may provide surgical anaesthesia.

A RoB-2 analysis suggests low risk of bias. One important limitation is the lack of comparison with caudal analgesia, which is a well-established, familiar technique.

In summary, this RCT showed a lack of difference between UG-PNB and UG-DPNB in terms of post-operative pain scores and analgesia requirements. It highlights the potential for surgical field

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distortion if a penile block is performed. The lack of comparison with caudal block, and the lack of difference when compared to the penile block, means that the choice of block remains a balance between individual risk, surgical procedural requirements, and operator experience, and should be considered on a case-by-case basis.

Reviewed by Dr Edmund Chan

Needle free pharmacological sedation techniques in paediatric patients for imaging procedures: a systematic review and meta-analysis

Rover et al, *British Journal of Anaesthesia* Jan 2023; 130(1): 31-73

DOI: [10.1016/j.bja.2022.09.007](https://doi.org/10.1016/j.bja.2022.09.007)

This meta-analysis and systematic-review article analysed non- IV/IM sedation agents and sought to determine the optimum one for MRIs between 0 and 8 years.

Methods

Up to three reviewers analysed a heterogenous group of studies with the outcomes being:

1. Success rate: obtaining an MRI without converting to a needle technique or abandoning the procedure
2. Secondary outcomes: onset, duration, recovery times and adverse events

Results

77 papers (22,380 participants) were included in qualitative analysis and 52 papers were included in the quantitative (meta)-analysis.

There was a wide variation in dose and medication chosen.

Combined intranasal dexmedetomidine 3 mcg/kg and intranasal midazolam 0.3mg/kg had the best success rate (81 -100%) and lowest (serious) adverse events (2-8%). However, the authors were unable to statistically analysis adverse events.

Intranasal dexmedetomidine alone failed to last the duration of an MRI. (success 62%). A dose of 4mcg/kg increased success but greatly increased the incidence of adverse events, particularly bradycardia.

Oral Chloral Hydrate also had a high success rate (94%), but had a high incidence of adverse events, which was attributed to its long half-life.

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Discussion

Within the study the authors acknowledged that there are inconsistencies amongst assessing the depth of sedation, quality of MRI and follow-up of participants.

It is also difficult to account for the individual selection criteria of suitable participants.

There are no direct comparative pharmacological trials of needle free sedation for a specific procedure (in this case MRI) so difficult to say that an individual agent is superior.

The authors mention that a well organised team, dedicated to provision of service, rather than the choice of drug used is most important for high success rate and low adverse events.

Reviewed by Dr Ato Ocansey

Consequences of General Anaesthesia in Infancy on Behaviour and Brain Structure

Salaun et al, *Anesthesia and Analgesia* Feb 2023; 136(2): 240- 250

DOI: [10.1213/ANE.0000000000006233](https://doi.org/10.1213/ANE.0000000000006233)

A combined article: split between an animal and population cohort study. The animal study seeks to determine whether there is an association with mice repeatedly exposed to volatile anaesthesia and changes in grey matter/behaviours. The cohort component analyses MRI findings and behaviours of 102, 9-10 year olds. 24 had been exposed to a single GA for minor surgery.

Methods

The Animal Study (AS)

Part 1

- GA group- mice were exposed to 1.3% isoflurane in 100% O₂ for 90 minutes daily from day 4 – 10
- Control group-were exposed to 100% O₂ for 90 minutes daily from day 4 - 10

Part 2

Behaviour of these mice was assessed between 6-8 weeks:

- Actimetry: spontaneous locomotor activity to investigate for hypo and hyperactivity
- Contextual fear conditioning: Assessing acquisition and recall
- Y maze: Assessing acquisition and recall

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Part 3

At 8 weeks: anaesthesia-exposed and control mice were anaesthetised with isoflurane for MRI

The Cohort Study (CS)

The population

The study used data from an earlier study APEX about computerised and adaptive inhibitory control and effects on neuroplasticity.

The authors retrospectively analysed the study's baseline data.

Part 1

The following elements of cognition were assessed with corresponding methods.

- Working memory: Backward Digit Span Task + Behaviour Rating Inventory of Executive Function (BRIEF) parent form

- Nonverbal intelligence: Ravens progressive matrix

- Emotional control: BRIEF parent form

All the children had an MRI without GA

Results

AS

The authors found an exacerbated fear behaviour and 11% reduction in the volume of periaqueductal grey matter in GA-exposed mice

CS

The authors suggested lower emotional control in the GA exposed group and grey matter atrophy in the right pre-frontal gyrus. The earlier the anaesthetic exposure, the more pronounced.

Discussion

The authors postulate that exposure to anaesthetics result in structural and functional brain impairments. However, the cohort study had no access the anaesthetic agent used or duration. These are very small sample sizes, that could not be prospectively powered and children were exposed to anaesthetic at various ages and different surgical systems.

As with all animal studies, differences in brains preclude translation of results to humans. No single paper is definitive about the potential for neurotoxicity of anaesthesia. This research alongside the GAS trial, MASK and PANDA studies attempts to increase our understanding about the potential neurocognitive and developmental consequences of anaesthesia.

Reviewed by Dr Ato Ocanse

Edited by Dr Shivan Kanani
APAGBI Trainee Representative

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