HOT TOPIC

SHOULD WE BE UTILISING NOVEL ANXIOLYTIC STRATEGIES IN PAEDIATRIC ANAESTHETICS?

SUMMARY OF KEY POINTS:

- Early identification of children at high risk of perioperative anxiety can allow for a wider range of non-pharmacological strategies to be considered.
- There is an increase in the incidence of autistic spectrum conditions in the paediatric population, managing anxiety in this group can be more challenging to the anaesthetist.
- New technology in the form of virtual reality, augmented reality or app-based learning may show promising new strategies.

REVIEW OF EVIDENCE

Perioperative anxiety in children is associated with various negative outcomes including increased post-operative pain and new post-operative maladaptive behaviours. Strategies for managing children's perioperative anxiety can be broadly classified into non-pharmacological and pharmacological methods.

Identification of high-risk children

Risk factors for pre-operative anxiety include:

- Younger age
- Temperament of the child
- Prior medical visits – history of difficult induction or emergence from anaesthesia
- Parental anxiety
- Developmental delay
- Neurodiversity
- Poor coping strategies

Autistic spectrum disorders

There is an increasing incidence of autism diagnoses with approximately 1 in 90 children being diagnosed. Commonly there may be behavioural challenges at induction. There is a wide range of how children with ASD present, however commonly they respond positively to very straightforward and honest explanations alongside approaches used in all children. Pharmacological methods are often not required in this group, however when used a dual approach is often more effective.

Non-pharmacological strategies

Parent and child education schemes are designed to address expectations for the day of surgery. A range of methods can be used to develop engagement with the anaesthetic technique and allow for adjustment to the clinical environment. Programmes include tours of the pre-operative ward and operating theatre and the use of story books or videos tailored to the child's age to give them an idea of what to expect.

In recent years immersive reality technologies have been introduced as exciting new tools for tackling perioperative anxiety. Programmes include the use of virtual reality headsets and augmented reality devices or apps on smart phones or tablets.

Virtual reality headsets offer a fully immersive environment which are generally used to create calming and distracting environments. Both commercially available and custom healthcare design led headsets and software are available. Difficulties posed include ability to create a seal with a facemask during inhalational induction.

Augmented reality tools provide a partially immersive experience. We are trialling the 'Little Journeys' app in our centre. These can be used to create interactive educational tools or gamify elements of healthcare experiences to transform stressful healthcare scenarios into something ideally more fun. The overall aim being to desensitise them to the anxiety inducing aspects of their perioperative journey. All these immersive techniques can be designed to be adapted to different age groups to pitch the information to a suitable level.

More traditional distraction techniques are often employed in the anaesthetic room – this may include input from other professionals such as play-therapists. Parental presence at induction of anaesthesia and its benefits with regards to paediatric anxiety will depend on the temperament of the child and parents individually and have been discussed in a recent APAGBI Hot Topic.

Pharmacological strategies

In cases where a child is deemed to be high risk for pre-operative anxiety or in whom non premedicated anaesthesia has been unsuccessful, the use of pharmacological agents can be considered. Common classes used include:

- Benzodiazepines – midazolam
- NMDA receptor antagonists – ketamine
- Alpha-2-receptor agonists – clonidine, dexmedetomidine

The most used single agent is midazolam, which usually provides anxiolysis, anterograde and retrograde amnesia with a quick and reliable onset time. However, in 5-10% of children, a paradoxical reaction which may include agitation, confusion, delirium, aggression, and restlessness may occur. The risk of this paradoxical reaction is increased with increasing doses and decreasing age of the child.

Oral premedication drugs can be given mixed with a small volume of clear solution (.e.g cordial) in order to mask the unpleasant taste of the medications . The drugs may potentiate the effect of other sedative drugs given peri-operatively e.g. opioids and therefore must be used with caution.

Nasal pre-medication drug forms exist – including the novel agent dexmedetomidine. These could be considered either as first line strategies or in children who are deemed likely to refuse an oral medication.

Dual agent strategies

Midazolam as a sole agent has around a 60-80% success rate in providing optimal anxiolysis. Therefore in young children, and children who are more anxious or emotional, a dual agent strategy may be more appropriate. Commonly used dual pharmacological strategies include combinations of the following:

Midazolam and ketamine – these drugs have a synergistic effect, and notably combination of these two agents will provide a quicker onset time. Oral combination of these drugs has been reported to have a 90% success rate in providing successful anxiolysis. This combination is frequently used for children who have more of a behavioural focus to difficulties around induction of anaesthesia. It also has the added potential benefit of the ketamine providing a degree of analgesia.

Midazolam and clonidine – combination of these two agents with provide a longer duration of action of premedication and is reported to be more helpful in children who present with generalised anxiety disorders.

As with any pharmacological intervention, careful consideration of dosages, pre-existing medical history and potential side effects should all be considered. We could not find literature comparing these two pharmacological strategies directly in the paediatric population. Routes of administration of drugs mayn include oral, buccal, intranasal and in select cases, intramuscular.

Ketamine dart

Intramuscular ketamine – or a 'ketamine dart' can be considered on cases where other methods of sedation have failed and the procedure is deemed to be necessary. This may be painful and traumatic for the child and physical restraint may be required. Therefore, parental counselling and team preparation is required with a clear plan prior to administration.

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