

# Acquire the Complete Knowledge of Paediatric General Anaesthesia

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## ABSTRACT

Before surgery, parents and children go through a lot of stress and anxiety. Anesthesiologists made a lot of efforts to lower anxiety before surgery and before induction. A variety of strategies were employed to shorten the induction period because an extended induction period can result in adverse psychological effects, including enuresis, eating disorders, nightmares, apathy and withdrawal, and separation anxiety during the postoperative phase. There are "stress points" in the preoperative phase when paediatric patients' anxiety reaches its peak. Stress points include being separated from the parents, going into the operating room, putting the child on the table, seeing the syringes, connecting the monitors, inserting the IV cannula, putting on the mask, and so on. Anesthesiologists should try to minimise these stressors as much as they can. until the patient enters the phase of anaesthesia. This review article will discuss several preinduction approaches for anxiolysis, starting with a conventional pharmaceutical intervention and progressing to a parental intervention and the most recent method of distraction—using electronic devices. Anaesthesia providers can create their own pre-induction techniques to get kids ready for general anaesthesia by combining both innovative and classic pre-induction practises. Traditional Pharmacological Intervention.

## Midazolam

The "gold standard" for preoperative anxiolysis has been midazolam. Due to its short half-life and high lipophilicity at physiological pH, midazolam is a benzodiazepine with a quick onset of

action. Midazolam has numerous advantages besides its rapid onset of action, including less respiratory depression, anterograde amnesia, and less emergence delirium. Owing to its quick onset of action, midazolam, at a dose of 0.5-0.75 mg/kg with a maximum dosage of 20 mg taken orally, produces adequate sedation and anxiolysis in 20 minutes [1,2]. With a peak effect occurring in 20–30 minutes, this dosage produces a satisfactory sedation in 10–15 minutes. Midazolam metabolism may be affected by medications and foods that inhibit cytochrome p3A isoenzymes, such as grape juice, erythromycin, diltiazem, verapamil, ranitidine, and citidine. extended sedation [3]. To help youngsters tolerate the harsh taste of oral midazolam better, it is available in chocolate or raspberry syrup [3]. Midazolam used intramuscularly at a dosage of 0.08–0.3 mg/kg has an action peaking in 10-15 minutes, with an onset time of less than a minute. Midazolam administered intramuscularly has a number of drawbacks, including a needle that poses a risk to children, discomfort during injection, the possibility of a sterile abscess, and the possibility that a child will recall receiving the dose [3]. Additional dosing methods include sublingual (0.3 mg/kg), rectal (0.5 mg/kg), intranasal (0.3 mg/kg), and intravenous (0.1 mg/kg).

## Clonidine

An additional drug used for preinduction anxiolysis is clonidine. Alpha2-adrenergic agonist clonidine has both sedative and analgesic effects. When given orally at a dose of 4 mcg/kg or nasally at a dose of 2 mcg/kg, clonidine functions as an analgesic, reduces the need for volatile anaesthesia, and enhances hemodynamic stability during surgery [4]. Clonidine has a 45-minute onset time, which is a disadvantage, but its analgesic and anesthetic-sparing qualities are advantages. The analgesic effect of clonidine is advantageous in situations where postoperative pain is a primary concern [4].

## Ketamine

Ketamine is a sedative and analgesic that is an antagonist of the NMDA receptor. Children have been successfully calmed with oral ketamine 3–10 mg/kg and atropine 0.02-0.04 mg/kg within 10–15 minutes of administration [3]. The idea behind combin-

## Case Study

ing ketamine with an antisialogogue like atropine is to lessen the possibility of laryngospasm brought on by increased secretion [3]. Negative side effects like emesis are linked to ketamine. Ketamine can be given intravenously (1-2 mg/kg), intramuscularly (4-8 mg/kg), or orally (5 mg/kg).

### Parents Involvement Techniques

Some disadvantages of the traditional pharmaceutical intervention include nausea and vomiting, a prolonged duration of action and effect onset, children refusing to take oral medication, and an increased risk of delirium, agitation, and pain during the postoperative period [3]. Parental involvement has been heightened due to concerns about the potential side effects of sedative premedication. After undergoing clinical trials, this technique has been expanded to include simple parental presence during induction, a family-centered preparation kit, in-hospital video preparation, and at-home video preparation.

### Parental presence during induction technique

It is preferred that parents of children undergoing surgery be present when anaesthesia is induced. The study conducted by Kain et al. involved the random assignment of 83 children into four groups: PPIA (parental presence during induction of anaesthesia), PPIA+midazolam (parental presence during induction of anaesthesia), and no intervention [5]. The children were given oral midazolam without parental intervention. Regardless of the intervention their children had received during the first surgery, over 80% of the parents elected for parental presence (with or without midazolam) during the follow-up procedure. On the other hand, only 23 percent of parents whose kids had midazolam during the first surgery asked for it during the follow-up procedure. Furthermore, just 15% of the patients who did not receive any treatment asked not to receive any treatment in the following surgery [5]. Therefore, parental presence reduces anxiety for both parents and children in most cases, and it is the recommended approach of intervention over medication intervention.

### Family-centered preparation for surgery

Family-centered preparation is a more sophisticated approach to the induction technique of parental presence. Involving the family in behaviour management is thought to be a very successful intervention. Creating new alliances with patients and families was advised in the Institute of Medicine report "Crossing the Quality Chasm: A New Health System for the 21st Cen-

ture." In reaction to this report, Kain et al. conducted a controlled trial in which 408 patients were randomised into four groups: the Advance group with family-centered preparation, the parental presence during induction, the oral midazolam group, and the control group [6]. Parents in the Advance group received a kit comprising a mask, three pamphlets, and a videotape as part of their preparation. Parents were directed to view the video recording twice before to the procedure. The three brochures included advice on how to assist the youngster in the operating room, divert their attention both before and during the anaesthetic induction, and demonstrate how to perform a mask-based induction practise. A face mask, a hairnet, and an induction mask were included in the mask practise set. Two days before to the procedure, calls were placed to the parents to ensure they were adhering to the instructions, and one day prior, questions about their precise preparations for diverting their child on the day of the procedure were asked. Children received a bag of distracting toys to play with on the day of operation, which they could bring into the operating room. How long did direct staff-parents take in total? lasted no more than thirty minutes. The Advance group achieved a great deal of success. In comparison to other groups, the Advance group's kids and parents showed noticeably less anxiety in the preoperative holding area. In comparison to the control, midazolam, and parental presence groups, children in the Advance group were also less likely to display severe emergence delirium symptoms like thrashing, inconsolable crying, and a need for restraining. Furthermore, for pain control following surgery, children in the Advance group required only half as much fentanyl as those in the parental presence group and one-third as much fentanyl as those in the midazolam and control groups. With an average discharge time of 20 minutes, children in the Advance group were also discharged much earlier than those in the other groups. According to the study's findings, Advance intervention works better for emergency delirium, analgesic consumption, anxiety reduction, and discharge timings than midazolam [6]. Additionally, the training programme gives families a new set of skills that they can use for future medical procedures their children may require. Parental and child anxiety can be effectively reduced with the help of the family-centered preparation.

### In-hospital preparation video

Research indicates that children's anxiety is a result of inadequate communication and information sharing. Thus, one of the key strategies for reducing anxiety is patient education.

## Case Study

Training programmes improve patients' endurance and positive behaviour while reducing health expenditure, stress, anxiety, and complications [7]. Ninety children with inguinal hernias were randomly assigned to three groups in the study by Karabulut and Duygu: thirty were assigned to the control group, thirty to the video group, and thirty to the booklet group. A 12-minute video in the surgery clinic was required to be watched by the kids and their parents in the video group. The kids and parents were then asked to complete an anxiety inventory 24 hours prior to and 24 hours following the procedure. In a vacant room, the booklet group received instruction using booklets that lasted 20 to 30 minutes, during which time the video group completed the identical inventory. The information in the pamphlet and movie covered topics such as the hospital's physical layout, daily operations, personnel, operating room protocols, equipment, and recovery area. The findings demonstrated that the video group had the greatest reduction in anxiety levels among kids and parents 24 hours prior to and following the procedure, compared to the booklet and control groups. The stress levels of the parents and kids in the video group favourably impacted each other, demonstrating the value of parents' presence [7]. As a result, watching a video programme that engages the eyes and ears can help reduce anxiety in both parents and children [7]. An in-hospital preparation video helps parents and children feel less anxious by explaining what to expect prior to surgery.

### At-home preparation video

A specifically created at-home preparation programme can be utilised to lessen anxiety in both parents and children by promoting verbal communication between parents and children regarding surgery. A control group and an experimental group were randomly assigned to 161 patients in the Wakimizu et al. study [8]. Before being admitted to the hospital, both groups watched a patient education video for hemiorrhaphy as outpatients. Before being admitted to the hospital, the control group had surgery without any prior preparation, while the experimental group watched the same video at home with a booklet. Because they could discuss the procedure more comfortably at home rather than in a hectic hospital setting, the kids and parents who got home video education were happy with the audiovisual intervention. Thus, by exposing kids to materials related to procedures before surgery, at-home videos can help them feel in control of the stressful situation [8].

Newest Trend: Distraction Technology

The "Traditional" forms of technological distraction included

doctors dressing up as clowns or giving kids tasks like "blow up the balloon." Distraction with electronic technology is the new trend. Even young children now find electronic technology to be popular. Using electronic devices as a distraction method provides a more comprehensive approach to anxiety and distraction management. Using the newest technology, including video glasses, smartphones, YouTube clips, handheld video games, and smart phones, there is a global trend towards the use of distraction techniques. It has been demonstrated that playing video games cognitively produces greater anxiolysis than midazolam and parental presence. 112 kids between the ages of 4 and 12 were randomly assigned to one of three groups in a research by Patel et al.: Parent Presence (PP), PP+ a handheld video game, and PP+0.5 mg/kg oral midazolam (M), which was given 20 minutes before going into the surgery room [9]. The findings indicate that whereas anxiety in the video game group did not significantly increase, it did in groups M and PP during induction of anaesthesia when compared to baseline. As opposed to the parent presence group, the video game group showed a significant decrease in anxiety from baseline. A portable, affordable, and simple-to-use tool for giving paediatric patients anxiolysis is a handheld video game [9].

### Smartphone game application

According to research by Lee et al., adopting smartphone game apps as a behavioural intervention programme reduces children's preoperative anxiety quickly and effectively [10]. One hundred and twenty patients, ages one to ten, were divided into three groups at random: the low dose IV midazolam 0.05 mg/kg plus smart phone application programme (SM group), the smart phone application group (S group), and the intravenous midazolam sedation group (M group). The majority of parents already own smartphones, so using them to treat anxiety is a cost-effective option because the hospital doesn't need extra equipment, and age-appropriate games, animations, and video clips can all be found on one device. Children do not require extra training to use smartphones because they are typically introduced to them at an early age. One disadvantage is that some kids could be so anxious about being separated from their parents that they don't seem to be interested in smartphone apps [10]. Despite this limitation, the SM group was discovered to be the most successful in reducing anxiety, followed by the S group (smartphone group), the M group (midazolam group), and the final group (group). The smartphone is a useful anti-anxiety substitute that works well and can be customised to each child's

## Case Study

unique needs [10]. Therefore, it seems that playing interactive activities with kids can help them feel less anxious than just having parents around or taking midazolam by itself.

### Video (YouTube) clips

In order to lessen anxiety during minor medical and dental procedures, video and television distraction are frequently utilised. A control trial study was conducted by Mifflin et al. to investigate whether video distraction aids in lowering anxiety during the induction of anaesthesia [11]. 89 kids between the ages of 2 and 10 were split into two groups at random: the control group and the video distraction group. Children in the video distraction group were found to be significantly less anxious at induction and to have exhibited a smaller change in anxiety level from holding area to induction than the control group [11]. The video distraction group used a YouTube video clip of the child's choosing during induction, while the control group used traditional distraction methods. As a result, using video clips can be a different way to provide a seamless transition in paediatric anaesthesia.

### Video glasses

Since it offers a portable means of viewing video at a magnified scale, video glass is a more sophisticated version of playing video clips. Up until the induction of anaesthesia, this video glass can fully isolate the perioperative environment's auditory and visual senses. The video glasses can also be used for inhaled induction because of their narrow design. 96 kids between the ages of 4 and 9 were randomly assigned to one of four groups in the study conducted by Kerimog-lu et al.: video glasses, control group, midazolam group, or both [12]. The outcome demonstrated that there was no difference in anxiety levels between baseline and operating room transport within any of the groups. But in the midazolam and control groups, there was a slight rise in anxiety during the induction period [12]. Furthermore, when parents provide their kids with audiovisual aids for distraction, they themselves experience relief [13]. Video glasses have a benefit over other technologies, including a computer, video games, and a mobile smart phone, in that they can be utilised constantly during mask induction [12]. Consequently, video glass offers a nice substitute for midazolam in terms of safe, non-pharmacological anxiolysis.

### Conclusion

Children, parents, and anesthesiologists may experience stress when their children are put to sleep for surgery. A portion of anesthesiologists' duties include minimising anxiety and stress by preparing parents and children for surgery. Pharmaceuticals like midazolam, clonidine, and ketamine can be used for preparation. Parental involvement techniques, such as having parents present during induction and psychologically preparing parents and children through kits and at-home and in-hospital videos, can be combined with medication. These days, a new trend combining electronic technology is gaining popularity. Examples include video glasses, smartphones, YouTube videos, and portable video games. This is because it's a safe, non-pharmacological, and affordable method that makes it enjoyable for both parents and kids. By combining techniques such as pharmacological and parental involvement, pharmacological and distraction technique using electronics, or pharmacological and parent involvement and distraction technique using electronics, anesthesiologists can create their own custom preinduction practises. Anaesthesia professionals may give children the most beneficial and secure pre-induction method by implementing these evidence-based pre-induction techniques.

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