

Non-pharmacological Preoperative Anxiety Treatments In Pediatric Anesthesia

Kameko Edgecombe, AA-S, Nova Southeastern University

Introduction

- Preoperative and induction anxiety has been associated with undesirable patient outcomes including increased postoperative pain, prolonged healing, emergence delirium, and increased incidence of postop complications.
- In children, additional outcomes include worsened behavior, aggression, interpersonal withdrawal, bed wetting, trouble sleeping, appetite changes, and general anxiety.
- Post procedure behavioral changes can last up to a year and beyond.
- In addition, anxious children make administration of anesthesia difficult which prolongs OR time and increases cost to the family.
- Current methods of anxiolysis used in pediatric anesthesia are:
 - Pharmacological (oral Versed/Midazolam)
 - Parent presence during induction of anesthesia (PPIA)
 - Preparation programs
 - Play/Distracted Therapy
 - Combination of the above
- This literature review seeks to compare and contrast current methods to find the most effective non-pharmacological anxiety treatments for children due to regular difficulties with the administration of Versed.

Methods

- In general the studies used for this literature review evaluated children between the ages of 3-12, undergoing outpatient ENT procedures, ASA 1 or 2 classification, without any developmental delays or cognitive disabilities.
- Anxiety measurement tools:
 - Modified Yale Preoperative Anxiety Scale (mYPAS)- observer based evaluation of 5 behavior domains (activity, vocalization, expressing emotion, state of arousal, and interaction with family members). Values ranged from 23.3 to 100 with higher values being more anxious
 - Child Drawing: Hospital (CD:H)- a blank sheet of paper is given to the child and they are asked to draw a person in the hospital. The drawing is then evaluated on items such as positioning, length, facial expression, number of colors, etc. A higher overall score equates with a higher level of anxiety.
 - State-Trait Anxiety Inventory for Children (STAIC)- self report anxiety instrument that measures baseline (trait) and situational (state) anxiety. In some studies the full 40 item questionnaire was given to parents instead of the children.
- Additionally, some studies evaluated behavior changes before and after the procedure using the EASI Scale of Child Temperament (EASI), induction compliance using the Induction Compliance Checklist (ICC), and emergence delirium using the Emergence Delirium scale.
- All of the studies evaluated the child's anxiety multiple times throughout the child's experience.

Results

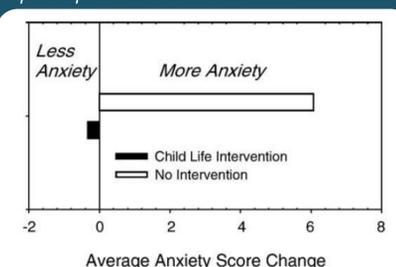
Midazolam: Effects on Amnesia and Anxiety in Children

- Table 4 shows the amount of time needed for adequate anxiolysis to take effect after administration of oral midazolam

Time Point	Group				P Value
	5-min	10-min	20-min	Placebo	
Holding area	27 ± 7	31 ± 10	28 ± 8	29 ± 9	NS
Entrance to OR	30 ± 12*	30 ± 13†	27 ± 8†	33 ± 11	0.01
Introduction of anesthesia mask	33 ± 14†	34 ± 15†	27 ± 10†	45 ± 18	0.003

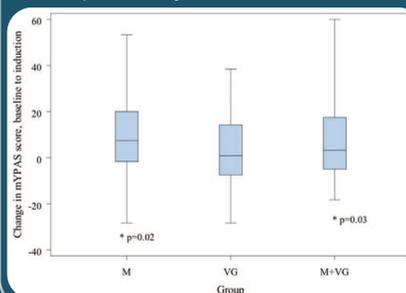
Pediatric Anxiety: Child Life Intervention in Day Surgery

- This same day preparation program shows a reduction in anxiety for children who participated in the intervention.



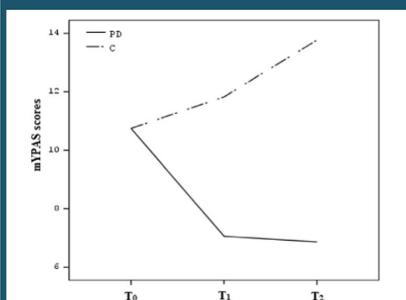
Anesthesia Induction Using Video Glasses as a Distraction Tool for the Management of Preoperative Anxiety in Children

- This study showed that the use of video glasses with or without midazolam is effective in attenuating induction and transport anxiety.



The effect of play distraction on anxiety before premedication administration: a randomized trial

- This trial showed that the utilization of play-dough or similar manipulatives decreases preoperative anxiety in children
- The main goal of this study was to make administration of midazolam easier however this technique could be utilized without medicinal intervention.

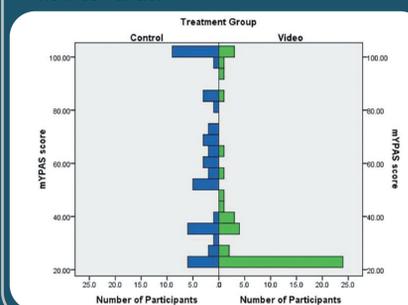


PD: Play-dough group
C: Control group

T₀: immediately after entering preoperative area
T₁: 6 minutes of play (PD) or 9 minutes of waiting (C)
T₂: Administration of .5 mg/kg of oral midazolam

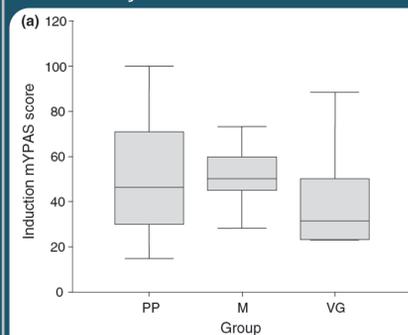
Streamed Video Clips to Reduce Anxiety in Children During Inhaled Induction of Anesthesia

- This graph shows that children who viewed video streamed clips during induction were significantly less anxious than children with no intervention.



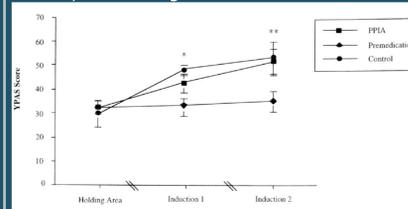
Distraction with a hand-held video game reduces pediatric preoperative anxiety

- This study compared parental presence alone, midazolam with PPIA, and video games with PPIA. The graph below shows that the children who utilized the video game had significantly less anxiety on induction of anesthesia.



Parental Presence during Induction of Anesthesia versus Sedative Premedication: Which intervention is more effective?

- This study showed parental presence on its own has little to no effect on pediatric anxiety once the child is taken to the operating room and during introduction of the anesthesia mask.
- As well premedicated children were more compliant during induction.



Control: No parent presence or premedication
Premedication: .5 mg/kg oral versed with 10 mg/kg acetaminophen at least 20 min before procedure
PPIA: a parent went into the operating room and remained through the induction of anesthesia

Discussion/Conclusion

- The major finding of this review is that when implemented correctly non-pharmacological anxiety treatments can be equally if not more effective than oral midazolam especially considering midazolam's cost, safety concerns, timing issues, and administration difficulties.
- Oral Midazolam requires at least 15 mins to be effective for anxiolysis and is not always consistent. As well the long term consequences of amnesia on behavior and emotional development in response to stressful situations has not been evaluated in any research study. Midazolam has also been shown to delay recovery and may be contraindicated in pts with moderate to severe OSA.
- Issues with research:
 - Although the interventions in this literature review have been shown to be effective on their own, there are very few studies that evaluate the effectiveness of combination therapy that utilizes more than one of the methods described previously.
 - Most data is collected using observers which means that the studies cannot be performed double blind so there is a high risk of observer bias.
 - Also the use of observers means that data collected from different studies cannot be compared to each other because observer's are calibrated to each other within the scope of the investigation. So further research needs to be done to compare these techniques utilizing the same observer pool.
 - This review also found that the techniques were tested on a fairly narrow sample pool. Many of them did not include adolescents or more serious surgeries where anxiety might be the greatest. In addition, children who present for multiple procedures has not been evaluated. Perhaps one technique helps attenuate the anxiety for subsequent procedures better than another.
 - With PPIA specifically, the research has shown that it is only effective when the parent is adequately prepared and calm. An anxious parent actually increases the anxiety of the child. Also PPIA should be used in combination with other therapies because alone it is not as effective as oral midazolam.

References

- Aydin, G. B., Yuksel, S., Ergil, J., Polat, R., Akelma, F. K., Ekcici, M., ... Odabas, O. (2017). The effect of play distraction on anxiety before premedication administration: a randomized trial. *Journal of Clinical Anesthesia*, 36, 27-31.
- Bhalla, T., & Cartabuke, R. S. (2017, February 14). Mom...Stop stressing me out!! Parental presence and its effect on cortisol levels in children. 39, 32-33. *Journal of Clinical Anesthesia*.
- Brewer, S., Gleditsch, S. L., Sybilik, D., Teltjens, M. E., & Vacik, H. W. (2006, February). Pediatric Anxiety: Child Life Intervention in Day Surgery. *Journal of Pediatric Nursing*, 21(2), 13-22.
- Kain, Z. N., Caldwell-Andrews, A. A., Maranets, I., McClain, B., Gaal, D., Mayes, L. C., ... Zhang, H. (2004). Preoperative Anxiety and Emergence Delirium and Postoperative Maladaptive Behaviors. *Anesthesia Analgesia*, 99, 1548-1554.
- Kain, Z. N., Fortier, M. A., Chorney, J. M., & Mayes, L. (2015, April). Web-Based Tailored Intervention for Preparation of Anxious and Children for Outpatient Surgery (WebTIPS): Development. *Anesthesia & Analgesia*, 120(4), 905-914.
- Kain, Z. N., Hofstadter, M. B., Mayes, L. C., Krivutza, D. M., Alexander, G., Wang, S.-M., & Reznick, S. (2009, September). Midazolam. *Anesthesiology*, 99(3), 676-684.
- Kain, Z. N., Mayes, L. C., Caldwell-Andrews, A. A., Karas, D. E., & McClain, B. C. (2006). Preoperative Anxiety, Postoperative Pain, and Behavioral Recovery in Young Children Undergoing Surgery. *Pediatrics*, 118(2), 651-658.
- Kain, Z. N., Mayes, L. C., Wang, S.-M., Carmico, L. A., & Hofstadter, M. B. (1998, November). Parental Presence during Induction of Anesthesia versus Sedative Premedication. *Anesthesiology*, 89(5), 1147-1156.
- Kerimoglu, B., Neuman, A., Paul, J., Stefanov, D. G., & Twersky, R. (2013, December). Anesthesia Induction Using Video Glasses as a Distraction Tool for the Management of Preoperative Anxiety in Children. *Anesthesia & Analgesia*, 117(6), 1373-1379.
- Liquori, S., Stacchini, M., Ciofi, D., Olivini, N., Bisogni, S., & Festini, F. (2016). Effectiveness of an App for Reducing Preoperative Anxiety in Children: A randomized clinical trial. *JAMA Pediatrics*.
- Manyande, A., Cyna, A., Yip, P., Chooi, C., & Middleton, P. (2015). Non-pharmacological interventions for assisting the induction of anaesthesia in children (Review). *Cochrane Database of Systematic Reviews*(7).
- Miffilin, K. A., Hackmann, T., & Chorney, J. M. (2012, November). Streamed Video Clips to Reduce Anxiety in Children During Inhaled Induction of Anesthesia. *Anesthesia & Analgesia*, 115(5), 1162-1167.
- Patel, A., Schiebale, T., Davidson, M., Tran, M. C., Schoenberg, C., Delphin, E., & Bennett, H. (2006). Distraction with a hand-held video game reduces pediatric preoperative anxiety. *Pediatric Anesthesia*(16), 1019-1027.
- Watson, A. T., & Vivram, A. (2003). Children's preoperative anxiety and postoperative behavior. *Paediatric Anaesthesia*, 13, 188-204.