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ROLE OF AUDIOVISUAL PRESENTATION AND NUTRITIONAL STATUS ON PREOPERATIVE ANXIETY AND POSTOPERATIVE DELIRIUM IN CHILDREN UNDERGOING ELECTIVE SURGERY- A PROSPECTIVE STUDY

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Abstract

Background: Within the spectrum of pediatric anesthesia, postoperative emergence delirium (ED) is an area with room of development. Although many predisposing factors to ED are known, we still cannot predict precisely those who are at substantial risk. This study was conducted to assess the role of preoperative audio-visual presentation and nutritional status on incidence of preoperative anxiety and postoperative ED in children. **Material and Methods**: After ethical clearance and written informed consent, this single blind study was conducted in 70 patients aged 3-7 years. Patients were allocated into two groups randomly. Group A (n=35) were shown audio-visual presentation one day prior to surgery & Group B (n=35) were not shown audio-visual presentation. Nutritional status was recorded as weight for age according to WHO growth chart. Preoperative anxiety was assessed using mYPAS score. Behavior of the child at the time of separation from parents and during induction was noted. Postoperatively, delirium was evaluated using PAED score from extubation up till 30 minutes. Post-operative analgesia was recorded by FLACC scale. **Results**: Total incidence of ED was 34.28%. The incidence of ED in group A was 17.14% while in Group B was 51.42% and was statistically significant (p value 0.00). Preoperative anxiety was less in Group A than in Group B and was statistically significant (p value 0.00). Total nine patients were underweight among which two had delirium postoperatively. **Conclusion**: Audiovisual presentation can effectively lower the preoperative anxiety and postoperative ED in children. Those who were underweight had no association with postoperative ED.

INTRODUCTION

Eckenhoff and colleagues first described Emergence Delirium in the early 1960s.[1] According to them ED is a state of disturbance in a child's awareness or attention towards his/her environment and manifests as disorientation, increased sensitivity to stimuli and hyperactive motor behavior in the early post-operative period.[2]

The incidence of ED in pediatric population ranges from 2% to 80%.[3] The incidence is two to three times more common in children than in adults.[2] Therefore, ED should be considered important in pediatric population and should be reported in all children in the recovery period.[4]

Numerous contributing risk factors for ED in children are volatile anesthetics, nature of surgery, age (2-7 year), patient and parental anxiety and patient existing behavior.[5]

Emergence Delirium leads to long lasting cognitive complications such as postoperative maladaptive behavioral changes and anxiety, sleep disturbance, eating disturbance, prolonged stay in recovery area, aggression and apathy.[4] Therefore, ED should be reported and the risk factors should be recognised preoperatively to avoid it.[6]

Pharmacological as well as non-pharmacological methods are utilized to take care of preoperative anxiety and postoperative delirium in children.[6,7] Parental presence, distraction methods, preoperative information programs, music, fun transportation

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systems, hypnosis and acupuncture are some of the non-pharmacological methods used.[8]

Malnutrition has shown its association in development of post -operative delirium in patient undergoing surgery. Researches have shown that incidence of postoperative delirium was more common in patient with poor nutritional status.[9]

So far, no studies have been done to find a correlation between nutritional status and incidence of delirium in children. Thus, the purpose of this study was to evaluate the effect of audio-visual presentations showing perioperative events in reducing the incidence of preoperative anxiety and postoperative delirium in children. The study also aims to evaluate the role of nutrition in emergence delirium in children who underwent elective infraumbilical surgery in the tertiary care center.

MATERIALS AND METHODS

We conducted a prospective randomized study which took place in a tertiary care hospital after clearance from the institutional ethical board over a period of one year from October 2019 to November 2020. Informed consent from the parents was taken and the procedure was conducted in accordance the Helsinki Declaration – 2013. Children included in the study were those with American Society of Anaesthesiology (ASA) physical status I-II and aged 3 to7 years that were scheduled for elective infraumbilical surgeries under general anaesthesia.

Exclusion criteria was patients with chronic illness, any degree of communicative and cognitive impairment and parents' refusal for participation in the study.

The primary outcome of this study was to evaluate the role of pre-emptive audio-visual presentation on anxiety levels and emergence delirium.

The secondary objective was to assess the role of nutrition on incidence of post- operative delirium, the behaviour of the child on separation and induction, intraoperative haemodynamic parameters and complications postoperatively.

Preoperative protocol

Data collected of all eligible patients in the preanesthetic clinic included age, sex, weight, height and duration of surgery. We used Standard WHO growth chart for girls and boys for assessing the nutritional status of the children. WHO growth chart interpretation for weight for age, was done after plotting points on the graph.

Random allocation of patients was done into two groups. Group A (n=35) was shown audio-visual presentation in preoperative period which illustrated the course of events in the pre anaesthetic check-up (PAC) area, operation theatre and post anaesthesia care unit (PACU). It included information about intravenous cannulation, preoperative fasting, induction and face mask practising, drug delivery and monitors to be applied. The parents accompanied their children during this time. Group B (n= 35) was not shown audio-visual presentation. Random numbers generated by the computer were placed in opaque envelops by anesthesiologist in charge of randomization. The participants were assigned groups according to the numbers indicated. The Modified Yale Preoperative Anxiety Scale (short version) was recorded before and after showing the AV presentation to compare the child's anxiety. The five behavioural categories of child's anxiety are assessed by this score which includes activity, vocalization, emotional expressivity, state of apparent arousal, use of parents. The score ranges from 22.9 - 100. The cut-off point of >= 30 leads to high sensitivity and specificity and predictive value was 79%.[10]

Baseline pain score of the patients was assessed by using the Facies, Legs, Activity, Cry and Consolability (FLACC) scale. Each category was scored on the scale of 0-2, which resulted in a total score" of 0-10. Score 0 was graded as no pain, score between 1-3 was graded mild discomfort, score of 4-6 as moderate pain and score of 7-10 as severe discomfort or pain or both [11]. On the day of surgery children were allowed to be accompanied by parents to the preoperative area. At this time m YPAS anxiety scale was observed again in both the groups. After this children of both the groups were given intranasal Midazolam 0.2 mg / kg through nasal spray in both the nostrils, 15mins prior to surgery. Here, the child's behaviour was observed by the anaesthesiologist on separation from their parents and at time of induction with GA and this was marked as calm and cooperative, slightly anxious or fearful and restless or uncooperative.

Operation theatre

Patients were taken in operation theatre and standard monitors were attached ECG, EtCO2, Oxygen saturation (Spo2) and non-invasive blood pressure, heart rate and temperature. Children were induced using scented face mask (informed in the presentation) with 6-8% sevoflurane and mixture of 50:50 concentrations of nitrous oxide and oxygen. After intravenous (IV) cannulation of appropriate size, all patients received 2 mcg/kg of fentanyl IV, atracurium 0.5 mg/kg IV. After this an appropriate size second generation laryngeal mask airways (LMA) was inserted. Sevoflurane was discontinued 10 minute before extubation and 100% oxygen was administered. Neuromuscular blockade was antagonized with neostigmine 0.05mg/kg I/V. Ondansetron 0.15mg/kg IV was administered towards the end of surgery. Paracetamol 15 mgs/ kg was administered IV,15 min before extubation.

Post operatively after shifting patient to PACU, analgesia requirement was assessed by using the FLACC scale. The pain score was recorded at 0 min (after extubation), and at every 5min till 30min. A score of >3 was considered as a sign of inadequate analgesia and 1 mcg/ kg of fentanyl was administered intravenously.

Emergence delirium was assessed using Paediatric Anaesthesia Emergence Scale (PAED Scale)

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postoperatively. This score was recorded from 0min (after extubation) and at every 5 minutes till 30 minutes. PAED score of >10 was the cut off. If score of more than ten persisted for 10 min then 1 mcg /kg of fentanyl was administered intravenously. Post-operative complications like desaturation, laryngospasm, nausea/vomiting, pulling of IV line was noted.

Statistical analysis- The sample size calculation was performed on the basis of pilot study. The difference in incidence of ED between two groups was 30%. By calculating the power of 80% and type 1 error of 5% each group required 34 patients.

The data was collected and entered in MS excel 2010. Different statistical analysis will be performed using SPSS software version 22. Descriptive statistics was calculated for quantitative variables like age, weight, WHO growth chart, mYPAS, FLACC scale, PAED score. Independent t-test was applied for comparison of means between two the groups. Correlation was applied to assess the strength of relationship between two or more quantitative variables for which ANOVA test was applied. We considered $p<0.05$ to be statistically significant and if $p>0.05$ said to be statistically insignificant.

RESULTS

After the exclusion of 8 children due to certain reasons, a total of 70 children were included in the study. [Figure 1] Sample demographics are shown in table 1. The two groups did not differ in age, gender, and anthropometry, ASA physical status, and previous anesthesia experience.

The majority of the patients 32 (91.43%) in Group A had normal nutritional status and 3 patients (8.571 %) belonged to underweight category according to WHO growth chart. In Group B, 29 patients (82.86%) had normal nutritional status and 6 patients (17.14%) belonged to underweight category and there was no statistical significant difference in nutritional status among the groups ($p>0.05$). [Table 1] Anxiety scores showed statistically significant difference ($p=0.000$) between both the groups in preoperative area. [Table 2]

On separation from parents, 71.43% patients in group A and 40% patients in group B were calm and cooperative. However, at induction 57.14% patients in group A and 53.28% patients in group B were calm and cooperative.

Post-operative pain scores were less in group A than in group B and was statistically significant at 5, 10, 20,25, and 30 minutes. [Table 3] On comparison of mean PAED score at different time interval, a better score with a statistically significant difference was observed in group A as compared to group B at 5 minutes ($p=0.010$), 10 min ($p=0.000$), 15 min ($p=0.004$) and 25 minutes($p=0.024$). [Table 4] On comparison of different factors showing its association with delirium it was observed that preoperatively anxiety has higher association with delirium and is statistically significant ($p=0.007$). Post-operative pain has also shown to have a higher association with delirium and was observed to be statistically significant ($p=0.010$). [Table 5] Six patients required injection fentanyl in the recovery period due to emergence delirium while one patient required fentanyl due to pain. [Table 6] There was no significant difference in post-operative complications when two groups were compared. [Table 6]

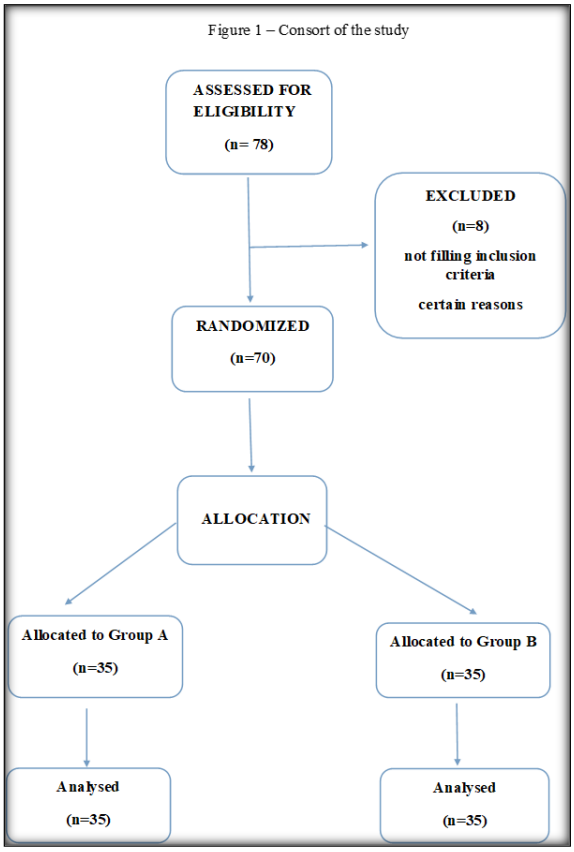

Figure 1: Consort of the study

Table 1: Demographic profile and other parameters of the study population in different groups

	Group A(n=35)	Group B (n=35)	p value
Age in years (Mean ±SD)	4.97 ±1.69	5.08±1.31	0.767
Sex (Male: Female)	26:09:00	30:05:00	0.057
ASA physical status I: II	31:04:00	32:03:00	
Weight in Kg (Mean ±SD)	14.67±4.11	13.92±3.64	0.468
Underweight (number of patients)	3	6	
Height in cm (Mean ±SD)	104.40±40	103.67±8.38	0.738
Mean Duration of surgery (minutes)	79.14±40.520	79.71±48.71	0.059

One-way ANOVA test was used

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Values were presented as numbers or mean ±SD
ASA – American society of Anesthesiologists
Kg- kilogram
cm- centimeters
SD – standard deviation

Table 2: Comparison of mean Modified Yale's Preoperative Anxiety Scale (m YPAS) between group A and B

	Group A (n=35)		Group B (n=35)		p value
	Mean ±SD	p value	Mean ±SD	p value	
mYPAS score before showing AV presentation	54.72±11.66	0.001*	51. 59±14.02	0.047*	0.281
mYPAS score in preoperative area (after showing AV presentation)	33.53±9.15		58.11±12.86		0.000**

Independent t- test
P<0.05 *Statistically significant
P< 0.01* * statistically highly significant
mYPAS score -Modified Yale Preoperative Anxiety Scale (short version)

Table 3: Comparison of mean FLACC scale between Group A and Group B

	FLACC scale (Mean ± SD)			PAED (Mean± SD)		
Time (minutes)	**A (n = 35)**	**B (n = 35)**	**p value**	**A (n = 35)**	**B (n =35)**	**p value**
Preoperative/ At Extubation	2.828 ± 3.138	3.942±3.262	0.15	9.68±1.67	11.00±2.80	0.197
T0	1.600±1.8012	2.257±2.173	0.173	9.02±1.29	10.31±2.86	**0.010***
T5	0.685 ±1.843	2.028 ±2.369	**0.010***	7.62±1.53	9.05±3.36	**0.000****
T10	1.542 ±2.318	2.400±2.724	**0.036***	6.42±1.97	7.57±3.57	**0.004***
T15	2.057±1.814	3.400 ±2.158	0.105	5.25±2.47	6.85±3.50	0.068
T20	1.542±1.787	3.771±2.044	**0.000****	3.91±2.41	5.40±3.44	**0.024***
T25	0.857±1.536	2.857±1.880	**0.000****	3.49±2.62	5.22±3.54	0.085
T30	0.885±1.640	2.571±1.753	**0.000****	9.68±1.67	11.00±2.80	0.197

T0- At extubation, T5- 5 minutes after extubation, T10- 10 minutes after extubation, T15-15 minutes after extubation, T20- 20 minutes after extubation, T25- 25 minutes after extubation, T30- 30 minutes after extubation.
Independent t – test
P<0.05 * Statistically significant
P< 0.01* * statistically highly significant

Table 4: Comparison of mean Pediatric Anesthesia Emergence Delirium (PAED) score between Group A and B

Time (min)	PAED (Mean± SD)		*p value
	A (n = 35)	B (n =35)	
At extubation	9.68±1.67	11.00±2.80	0.197
T5	9.02±1.29	10.31±2.86	**0.010***
T10	7.62±1.53	9.05±3.36	**0.000****
T15	6.42±1.97	7.57±3.57	**0.004***
T20	5.25±2.47	6.85±3.50	0.068
T25	3.91±2.41	5.40±3.44	**0.024***
T30	3.49±2.62	5.22±3.54	0.085

Independent t -test
**P<0.05 ***Statistically significant
P< 0.01* * Statistically highly significant
T0- At extubation, T5- 5 minutes after extubation, T10- 10 minutes after extubation, T15-15 minutes after extubation, T20- 20 minutes after extubation, T25- 25 minutes after extubation, T30- 30 minutes after extubation.

Table 5: Patient characteristic data presented with mean (Standard Deviation)

	With Delirium (n=24)	Without Delirium (n=46)	*p Value
Age in years	5.04±1.42	5.02±1.55	0.958
Weight for Age	14.37±4.03	14.64±3.99	0.793
m YPAS	53.16±10.48	41.99±17.97	**0.007***
FLACC	3.58±2.37	2.17±1.98	**0.010***

One-way ANOVA
**P<0.05 ***Statistically significant
mYPAS score -Modified Yale Preoperative Anxiety Scale (short version)

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FLACC score for pain assessment

Table 6: Comparison of patient requiring fentanyl postoperatively and complication between Group A and B

Patients requiring fentanyl and other Complications	A (n = 35)		B (n =35)		p value
	n = 35	(%)	n = 35	(%)	
No. of patients requiring fentanyl due to PAED	6	17.14%	18	51.42%	**0 .003***
No. of patients requiring fentanyl due to Pain	1	2.85%	8	22.85%	**0 .012***
Nausea / Vomiting	1	2.85%	3	8.57%	0.310
Desaturation	-	-	-	-	-
Laryngospasm	-	-	-	-	-
Pulling IV line	1	2.85%	2	5.71%	0.172

Chi -square test

P < 0.05 * Statistically Significant

DISCUSSION

In the present study, we found that audio visual presentation giving the information about the various events of the perioperative phase shown to the study group, is an effectual approach in lowering preoperative anxiety as well as postoperative delirium. Moreover, children who were well informed about perioperative events through the audio-visual presentation had less behavioral changes on separation from parents and also at induction.

There are few studies in the literature that used audio-visual presentation for providing information to the patients for lowering anxiety.[12] However, Gaskey in his study concluded that these audio-visual presentations shown in preoperative clinics do not significantly reduce anxiety in adults.[13] In contrast our study showed significant reduction in anxiety preoperatively by showing audio-visual presentations. According to the study of Kain Z et.al there is an association of high incidence of ED and maladaptive behavioral changes "in children with high level of preoperative" anxiety.[14] Persistence preoperative anxiety results in poor perioperative outcome.[15] In our study, mYPAS anxiety score in Group A after showing audio-visual presentation was significantly reduced in preoperative area in comparison to Group B who were not shown audio-visual presentation. There can be many reasons for preoperative anxiety in children like unfamiliar environment of operation theatre, fear of surgery, poor comprehension and lack of information to the child and parent regarding anaesthesia technique and post-operative care.[16]

The reported incidence of ED is about 2 to 80 % in children which varies according to age, assessment tool used, anaesthetic techniques, type of surgery and time of assessment during recovery" phase.[2,17] In our study the overall incidence of ED was observed to be 34.28%. The incidence of ED was 17.14% in A Group and 51.42% in Group B and was observed to be statistically significant ($p<0.05$) at most of the time interval.

We included children of age group 3-7 years in the study. This is because preschool children and children under the age of 8 years have a more distressing preoperative period because they are more anxious.[18,19] These children have psychological immaturity due to which they are less likely to cope up in a strange environment upon regaining consciousness.[16,20] History of previous hospitalization and distressing anaesthetic inductions increases the likelihood of adverse postoperative behaviour, including phobias and nightmares. Numerous preoperative measures to bring comfort to the children and their parents have been mentioned in previous studies. These include allowing a parent during induction of anaesthesia, giving sedative premedication, creating a helpful and sympathetic environment, providing pertinent information to children and parents through oral descriptions, videos, books, tours.[16] The increase in the incidence of ED correlates not only with the introduction of modern short-acting inhalation anaesthetics but also due to the fear of painful post-surgical dressings and troublesome preoperative period.[5]

In this context, Kian et al stated that family centered approach that include behavioural preparation program like ADVANCE (Anxiety reduction, Distraction on the day of surgery, Video modelling and education, including parents in the child's perioperative experience, Adequate reassurance, preparing of parents by staff is effective in reducing child's anxiety. Spending a 30-minute average time by health care professional with the child preoperatively showing videotapes, pamphlets and practicing induction masks, reduced the anxiety in children.[14]

Web-based Tailored Intervention for Preparation of parents and children undergoing Surgery (WebTIPS) is also effective method of reducing preoperative anxiety in children. This program consists of an animated children's Web site which includes educational training, and interactive games to prepare children for surgery. The coping skills are used to manage perioperative anxiety and pain.[21]

Chu L et al study, stated that when preschool children were premedication with dexmedetomidine along with viewing a cartoon video, they were less anxious and had more satisfactory experience.[22]

It is important to differentiate between delirium and pain. Frequently ED can be mistaken for pain. So, in

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patients who cannot express pain verbally, a vigilant evaluation of PAED score in relationship of pain score should be done.[4] Clinically, ED is characterised with the presence of no eye contact, non-purposeful action, and disorientation.[23] In the present study postoperative FLACC score was significantly less in Group A than in Group B. This showed that reducing preoperative anxiety by showing audio-visual presentation can also decrease the pain in post-operative period. The number of patients who required Fentanyl for PAED post operatively were 6 (17.14%) patients in Group A and 18 (51.42%) in Group B and fentanyl requirement due to pain was seen in 1(2.85%) patient in Group A and 8(22.85%) patients in Group B postoperatively. In our present study we observed statistically significant difference between both ($p<0.05$). [Table 6]

Paolo M et al resulted that the elderly patient who were at risk of malnutrition or those who were malnourished were more likely to develop post-operative emergence delirium.[9] In present study out of total nine patients who were underweight, two patients developed emergence delirium in Group B which was statistically not significant. Further studies involving a large study group might lead to some conclusive outcomes.

Mason KP stressed upon considering ED as a "vital sign" which should be regularly monitored and recorded in every child postoperatively. Standardised evaluating tool should be adopted for paediatric ED as most of the assessment tools have not been psychometrically tested and that they follow emotional pressure, agitation and apprehension as a substitute for delirium.[4]

Limitations of the study:

1. Our study included patients undergoing infraumbilical surgery. The result may differ in patients undergoing other surgery especially ENT surgery.
2. We included American Society of Anesthesiologist physical status I and II"and thus we cannot predict how outcome would change with ASA grading.
3. In our study the anxiety level of parents was not evaluated. "Parental anxiety has an influence on child in preoperative" period.

CONCLUSION

We conclude that audio-visual presentation in preoperative period providing brief information about the course of events in the pre anaesthetic check - up area, operation theatre and PACU can effectively decrease the incidence of anxiety and emergence delirium in children. There was no association between malnourishment and incidence of emergence delirium.

REFERENCES

1. Mohkamkar M, Farhoudi F, Alam-Sahebpour A, Mousavi SA, Khani S et.al Postanesthetic emergence agitation in pediatric patients under general anesthesia. Iran J Pediatr. 2014 Apr;24(2):184.
2. Nair S, Wolf A. Emergence delirium after paediatric anaesthesia: new strategies in avoidance and treatment. BJA Educ. 2018;18(1):30-33.
3. Vlajkovic GP, Sindjelic RP. Emergence delirium in children: many questions, few answers. Anesth Analg 2007; 104: 84–91
4. Mason KP. Paediatric emergence delirium: a comprehensive review and interpretation of the literature. Br J Anaesth. 2017;118(3):335-343.
5. Reduque LL, Verghese ST. Paediatric emergence delirium. Continuing Education in Anaesthesia, Critical Care & Pain. 2013 Apr 1;13(2):39-41.
6. Aldakhil SK, Salam M, Albelali AA, Alkanhal RM, Alnemer MJ, Alatassi A. The prevalence of emergence delirium and its associated factors among children at a postoperative unit: A retrospective cohort at a Middle Eastern hospital. Saudi J Anaesth. 2020;14(2):169-176
7. Kawai M, Kurata S, Sanuki T, Mishima G, Kiriishi K et al. The effect of midazolam administration for the prevention of emergence agitation in pediatric patients with extreme fear and non-cooperation undergoing dental treatment under sevoflurane anesthesia, a double-blind, randomized study. Drug Des Devel Ther. 2019; 13:1729-1737.
8. Hatipoglu Z, Gulec E, Lafli D, Ozcengiz D. Effects of auditory and audiovisual presentations on anxiety and behavioral changes in children undergoing elective surgery. Niger J Clin Pract. 2018;21(6):788-794.
9. Mazzola P, Ward L, Zazzetta S, Broggini V, Anzuini A, Valcarcel B,etal. Association Between Preoperative Malnutrition and Postoperative Delirium After Hip Fracture Surgery in Older Adults. J Am Geriatr Soc. 2017;65(6):1222-1228.
10. Kain ZN, Mayes LC, Cicchetti DV, et al. The Yale Preoperative Anxiety Scale: how does it compare with a "gold standard"? Anesth Analg. 1997;85(4):783–788.
11. Hauber JA, Davis PJ, Bendel LP, et al. Dexmedetomidine as a rapid bolus for treatment and prophylactic prevention of emergence agitation in anesthetized children. Anesth Analg. 2015;121(5):1308–1315.
12. Cumino DO, Vieira JE, Lima LC, Stievano LP, Silva RA, Mathias LA. Smartphone-based behavioural intervention alleviates children's anxiety during anaesthesia induction: A randomised controlled trial. Eur J Anaesthesiol 2017; 34:169-75.
13. Gaskey NJ. Evaluation of the effect of a preoperative anesthesia videotape. AANAJ 1987; 55:341-5.
14. Kain ZN, Caldwell-Andrews AA, Maranets I, McClain B, Gaal D, Mayes LC, Feng R, Zhang H. Preoperative anxiety and emergence delirium and postoperative maladaptive behaviors. Anesth Analg. 2004;99(6):1648-1654.
15. Das S, Kumar A. Preoperative Anxiety in Pediatric Age Group – a Brief Communication. J Anesth Crit Care. 2017:8:5-9.
16. McGraw T. Preparing children for the operating room: psychological issues. Can J Anaesth. 1994 ;41(11):1094-103
17. Kim YH, Yoon SZ, Lim HJ, Yoon SM. Prophylactic use of midazolam or propofol at the end of surgery may reduce the incidence of emergence agitation after sevoflurane anaesthesia. Anaesth Intensive Care. 2011 ;39(5):904-8
18. Lee CA. Paediatric emergence delirium: an approach to diagnosis and management in the postanaesthesia care unit. J Perioper Crit Intensive Care Nurs. 2017;3(2):1-3.
19. Gonsalvez G, Baskaran D, Upadhyaya V. Prevention of Emergence Delirium in Children - A Randomized Study Comparing Two Different Timings of Administration of Midazolam. Anesth Essays Res. 2018;12(2):522-527.
20. Aono J, Masaki E, Kato F et.al. Greater incidence of delirium during recovery from sevoflurane anesthesia in preschool boys. Anesthesiology. 1997:87:1298.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

21. Fortier MA, Bunzli E, Walthall J, Olshansky E, Saadat H, Santistevan R, Mayes L, Kain ZN. Web-based tailored intervention for preparation of parents and children for outpatient surgery (WebTIPS): formative evaluation and randomized controlled trial. Anesth Analg. 2015 Apr;120(4):915-22
22. Chu L, Wang Y, Wang S, Su S, Guo Z, Wang G. Intranasal Dexmedetomidine Accompanied by Cartoon Video Preoperation for Reducing Emergence Delirium in Children Undergoing Strabismus Surgery: A Prospective Randomized Trial. Front Surg. 2021 Oct 22; 8:754591.
23. Mehrotra S. Postoperative anaesthetic concerns in children: Postoperative pain, emergence delirium and postoperative nausea and vomiting. Indian J Anaesth. 2019 Sep;63(9):763-770.

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