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A comparative evaluation of nebulized dexmedetomidine and nebulized ketamine as a premedication in pediatric surgeries: A randomized controlled trial

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Abstract
Background: Preoperative anxiety and parental deprivation remains a challenge to anesthesiologists. Dexmedetomidine (DexM) has sedative and analgesic effects via central action. Ketamine (KET) is an N-methyl-d-aspartate (NMDA) receptor antagonist that produces a state of sedation. Nebulization is harmless, has rapid absorption, and an inexpensive administration route. The aim of this work was to compare the effectiveness of aerosolized DexM and aerosolized KET as a premedication to general anesthesia in pediatric surgeries.
Methods: This prospective double-blind randomized controlled research was carried out on 60 cases of both sexes aged (3-10) years with ASA physical status I, II who were undergoing elective surgery. Cases were divided equally into 3 groups; group D (Dexmedetomidine): received aerosolized dexmedetomidine (3mcg/kg), group K (Ketamine): received aerosolized KET (3 mg/kg) and group C (control): received aerosolized normal saline without drug.
Results: Ramsay sedation scale after 15 minutes was insignificant different between DexM and KET, and after 30 minutes was significantly better in DexM than KET. There was significant difference between DexM versus KET with better parental separation and mask acceptance in DexM than KET. There was a significant decrease in the HR before induction of anesthesia in DexM versus KET and controls. There was no significant difference in recovery and discharge time in all groups. Incidence of hypersalivation was significant in KET more than DexM and controls, while incidence of other complications was insignificant among all groups.
Conclusions: Aerosolized dexmedetomidine can be used with advantage versus aerosolized KET for preoperative sedation in pediatric surgeries.

Keywords: Dexmedetomidine, ketamine, pediatric surgeries

Introduction
Anxiety and familial deprivation can be traumatic for young children undergoing surgery and continue to present difficulties for anesthesiologists. Anxiety prior to surgery stimulates the sympathetic, parasympathetic, and endocrine systems, resulting in a rise in heart rate (HR), blood pressure, and cardiac excitability. The goal of pediatric anesthesiologists is to mitigate children's distress in the operating room (OR) environment and to ensure a seamless induction of anesthesia [1].
Diverse medications have been proposed as a premedication to alleviate children's anxiety and facilitate their separation from their parents [2].
The optimal premedication for children must be readily acceptable, have a rapid and dependable onset, and have minimal adverse effects [3].
Aerosolized medications may facilitate enhanced absorption via the nasal, oral, and respiratory mucous membranes, with advantage of better acceptability by the patient [4].
Dexmedetomidine (DexM) is a tasteless, odorless, and colorless drug that functions as a selective α-2 adrenergic agonist and promotes cardiac, respiratory, and neurological stability. Sedative and analgesic effects through central nervous system action. Its primary effect is on the locus coeruleus in the CNS, where it induces EEG activity similar to that of natural sleep with simple external stimulation arousal [2, 5].

Bioavailability of aerosolized DexM is 65% via the nasal mucous membranes and 82% through the oral mucosal lining; therefore, nasal and aerosolized routes have been tried for preoperative anxiolysis in children. Aerosolized drug administration may be preferred to intranasal drug administration because it prevents temporary nasal irritation, congestion, vocal cord irritation, and laryngospasm [5].

Ketamine (KET) is an NMDA receptor antagonist that induces sedation, anesthesia, immobility, analgesia, amnesia, and dissociation from the surrounding environment [6]. KET induces dissociative anesthesia, a state entirely distinct from that produced by other anesthesia techniques. In this cataleptic state, the case's eyes are still open, and the laryngeal, corneal, and pupillary reflexes are preserved. It can be administered via a variety of routes in minors. (intravenous [IV], intramuscular [IM], subcutaneous, oral, rectal, sublingual, intranasal and aerosolized). Oral administration is the most prevalent route because it is safe, effective, acceptable, and familiar to pediatric cases [4]. Aerosolized KET is a safe, rapid, and cost-effective route of administration [7].

This research aimed to compare the efficacy of aerosolized DexM and aerosolized KET as premedications for general anesthesia in pediatric surgical procedures.

Materials and Methods

This prospective double-blind randomized controlled research was conducted on 60 children age between 3 and 10 years old were belonging to American Society of Anesthesiologists (ASA) I, II physical status scheduled for elective procedure ranging in time between 30 - 90 minutes under general anesthesia in Tanta University Hospitals in Anesthesia Department for 6 months from June 2021 to November 2021.

The research was done after approval from the Ethical Committee Tanta University Hospitals (approval code: 34717.5.21) and registration on clinicaltrials.gov (ID: NCT05719506). An informed written consent was obtained from relatives of the cases.

Parental reluctance to participate was one of the conditions for exclusion, also a chest infection or respiratory distress, cardiac illness, mental or physical disability, allergy to drugs or their ingredients, nasal disorder as mass or bleeding, treatment with sedatives or anticonvulsants, and any other condition that would have prevented an individual from participating.

Preoperative evaluation

The child and his parents were seen the day before the scheduled elective operation to establish trust and become acclimated to the nebulization procedure. Parents were given an explanation of the procedure in their native tongue and we took their written consent. An exhaustive evaluation was performed, including taking a full medical history, performing a physical examination, and conducting any necessary laboratory tests (a complete blood picture, bleeding time, clotting time, blood group, or chest x-ray).

Parents were given directions to make their children fast for six hours until procedure and to administer only clear fluids up to two hours before procedure.

Premedication

Prior to aerosolization, HR, MAP, and SpO_2 were measured in the preoperative holding area.

Randomization and blindness

The randomization process was carried out with the assistance of a computerized random number generator, and the assignment were entered inside of sealed envelopes. After receiving the patients' informed permission, the chief nurse was the one to open the envelopes and reveal the results of the randomization. Everyone who worked in the operating area remained blind to the research medications. Cases were divided equally into 3 groups; group D (Dexmedetomidine; DexM): received aerosolized DexM (3mcg/kg) (Precedex Hospira, USA), group K (Ketamine): received aerosolized KET (3 mg/kg) (Ketalar Sigma Tec, Egypt) and group C (control): received aerosolized normal saline without drug.

An independent nurse who was not involved in the surveillance or the administration of the anesthetic was the one who prepared all of the solutions, ensuring that they were contained in identical syringes with matching random numbers. Anesthesiologists were blinded which drug was being given.

In all groups: The child was on the mother's legs during medication administration by nebulization to decrease the fear and make the child cooperative in accepting mask nebulization. The medications were diluted to a final volume of 3ml in 0.9% NACL. Aerosolized was accomplished with a nebulizer and wall oxygen source. Cases received aerosolized drug almost over 10-15 mins through nebulizer facemask for pediatric and nebulization was stopped when the nebulizer began to sputter. The case was transferred to the OR after 30 mins from end of nebulization.

Cases were assessed for Ramsay sedation scale 15 and 30 mins after end of nebulization session by an anesthesiologist blinded to the research medication. The score was as 1: Anxious and agitated, restless, or both, 2: Cooperative, oriented, and calm, 3: Responsive to commands only, 4: Exhibiting brisk response to light glabellar tap or loud auditory stimulus, 5: Exhibiting a sluggish response to light glabellar tap or loud auditory stimulus and 6: Unresponsive [8]. Our target was score (2 or 3 or 4) on the other side score 1 was failure of sedation and score 5 or 6 was over sedation.

Cases also were assessed for parental separation anxiety scale (PSAS) during transferring the case to OR. Scores of excellent (case unafraid, cooperative, or asleep) or good (slight fear and or crying, quiet with reassurance) were classified as an acceptable separation, whereas fair (moderate fear and crying, not quiet with reassurance) or poor (crying, need for restraint) were considered difficult separations from the parents [9].

In the OR

Cases were assessed for HR, MAP and SpO_2 at 30 min after end of nebulization sessions (preinduction values) and were assessed also for any complications during receiving the nebulization like bradycardia, tachycardia, hypotension and hypoxia.

Induction of anesthesia was done by nebulization of 8% sevoflurane in 100% oxygen by Jackson-Rees circuit through well fitted mask during that moment mask acceptance was evaluated,

After loss of consciousness, an IV line was inserted and secured on the dorsum of the hand, then IV fentanyl (1 mcg/kg) and atracurium (initial dose 0.5 mg/kg) was given and appropriately sized endotracheal tube was inserted,

secured and confirmed by chest expansion, auscultation and square waves of capnogram.

Anesthesia was maintained with 2% sevoflurane in a mixture of (50% air with 50% O_2) and maintenance dose of atracurium (0.1 mg/kg). PCVG mode with adjusted pressure and tidal volume that keeps end-tidal carbon dioxide pressure ($PaCO_2$) between 32 and 38 mmHg. An intraoperative IV infusion of ringer lactate was started at a rate of 5 ml/kg/h. case's hemodynamics (HR, MAP and SpO_2) were measured after induction of anesthesia, after intubation and continuously throughout the procedure every 15 mins until the end of surgery.

When the surgery ended, sevoflurane discontinued, and residual neuromuscular blockade was antagonized with IV atropine 0.02 mg/kg and IV neostigmine 0.05 mg/kg then tracheal extubation was done.

The recovery time was measured from the end of anesthesia until the child opened his eyes on command. The child was transferred to the PACU once spontaneous airway maintenance was achieved.

In PACU, cases received IV paracetamol 15 mg/kg and case's hemodynamics (HR, MAP and SpO_2) were measured after 30, 60 mins. Discharge time from discharge from OR until the case could be discharged from PACU using Modified Aldrete Score ≥ 9. Table 1

Incidence of any complication was recorded perioperatively. Bradycardia (20% decrease in HR from baseline value) was treated by IV injection of atropine (0.02 mg/kg). Hypotension (20% decrease in MAP from baseline value) was treated with fluid bolus administration. Desaturation (SpO_2< 95%) was treated with oxygen supplementation by mask. A personally unpleasant feeling accompanied by an overwhelming desire to vomit was identified as nausea. Vomiting was defined as the violent ejection of stomach contents and treated with IV Ondansetron 0.1mg/kg.

The primary outcome was examination of the sedating effects of the drugs. The secondary outcomes were ease of parental separation, face mask acceptance and hemodynamic stability.

Table 1: Modified Aldrete Score [14].

Criteria	Characteristics	Points
Activity	Able to move 4 extremities	2
	Able to move 2 extremities	1
	Unable to move extremities	0
Respiration	Able to breathe deeply and cough freely	2
	Dyspnea or limited breathing	1
	Apneic	0
Circulation	BP +/- 20% of pre-anesthetic level	2
	BP +/- 20-49% of pre-anesthetic level	1
	BP +/- 50% of pre-anesthetic level	0
Consciousness	Fully awake	2
	Arousable on calling	1
	Not responding	0
Oxygen saturation	Able to maintain O_2 saturation >92% on room air	2
	Needs oxygen to maintain O_2 saturation >90%	1
	O_2 saturation <90% even with supplemental oxygen	0

Sample Size Calculation

The sample size was determined by using 95% confidence limit, 95% power of the research and the groups ratio is 1:1:1. Based on a previous research [4], 18 cases in each group were sufficient to detect a difference between means of the Ramsay sedation scale of 0.6 and a common standard deviation of 0.48. 2 cases were added to each group to overcome dropout. Therefore, we recruited 20 cases in each group.

Statistical analysis

SPSS v20 was used for the statistical study. (Armonk, NY: IBM Corp). To make sure everything was distributed normally, we ran the Shapiro-Wilk test. Qualitative data were described using number and percent, Post Hoc test (Tukey) for pairwise comparisons, ANOVA with repeated measures was employed for normally distributed quantitative variables, to contrast more than two periods, and Post Hoc test (Bonferroni adjusted) for pairwise comparisons. When comparing two sets of data based on category factors, the chi-square test was used. A 5% threshold of relevance was applied to the data collected.

Results

Eighty-nine cases were examined to be included in the research. Twenty-nine cases were excluded; twelve did not meet the inclusion criteria and seventeen cases refused to participate in this research. The remaining 60 cases were allocated in the three studied groups (20 cases in each group). Figure 1

Demographic data (age, gender, weight, ASA score), type and duration of surgery were insignificantly different between the three studied groups. Table 2

Ramsay sedation scale after 15 minutes was significantly different between DexM and KET versus controls with (p value < 0.05) while there was no significant difference between the DexM and KET. After 30 minutes, there was significant better sedation in DexM and KETs versus controls, with significant better sedation in DexM than KET (p value < 0.05). Table 4

Noticeable differences existed in the DexM versus KET and controls with better parental separation and mask acceptance in DexM than KET and controls with (p value < 0.05), while it was insignificantly difference between KET and controls. Table 3

There was a significant decrease in the mean value of heart rate before induction of anesthesia in DexM versus KET and controls (p-value < 0.05) while there was no significant difference between the three studied groups in the mean value of heart rate at the remaining time intervals. There was statistically insignificant difference in the mean values of mean arterial blood pressure and SpO_2 at all-time intervals in all groups. Figure 2

There was no significant difference in mean values of recovery time and discharge time in all groups. The incidence of hypersalivation was significant in KET more than DexM and controls with (p-value < 0.05), on the other hand, the incidence of other complications was insignificant among all groups. Table 4

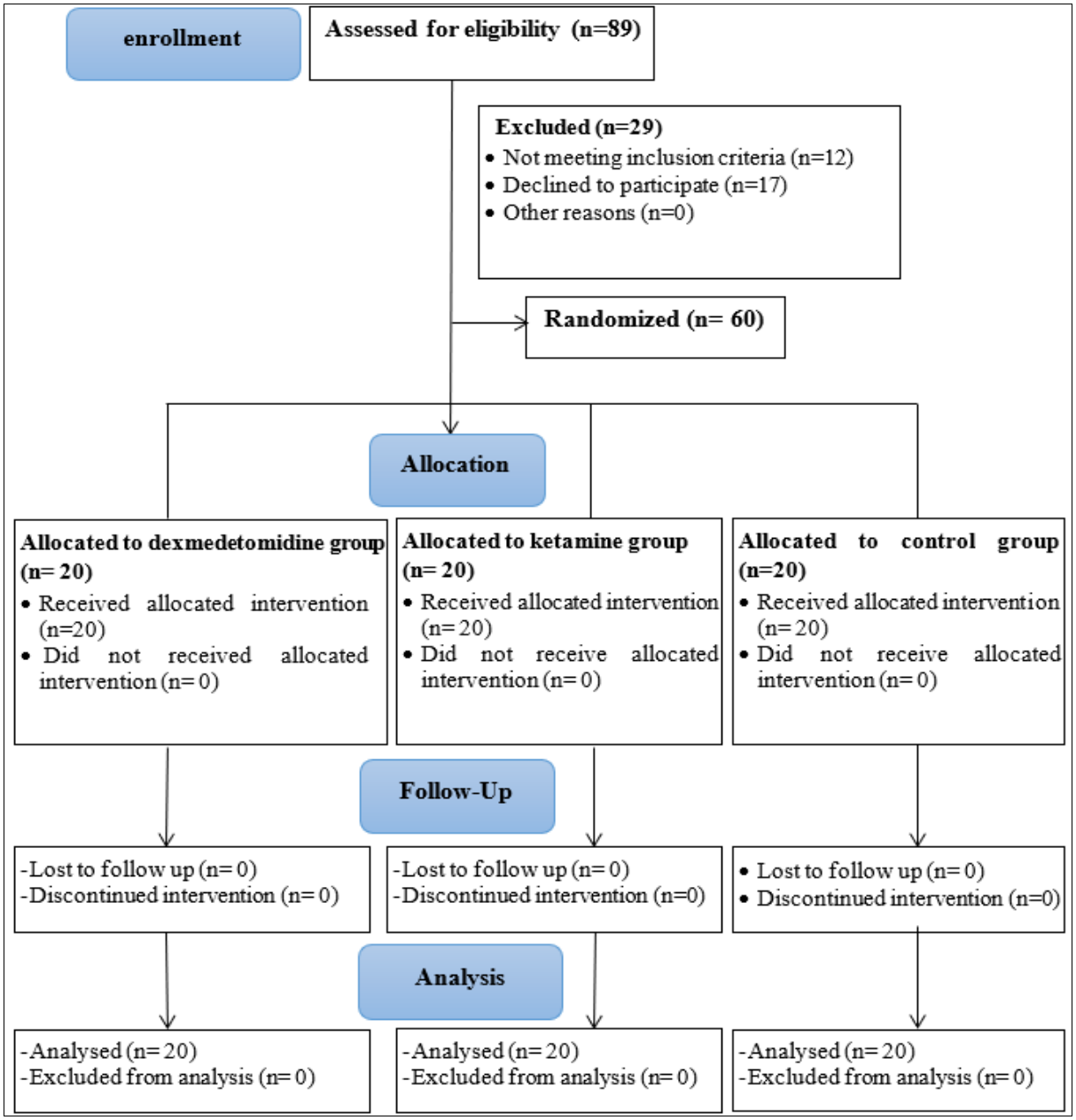
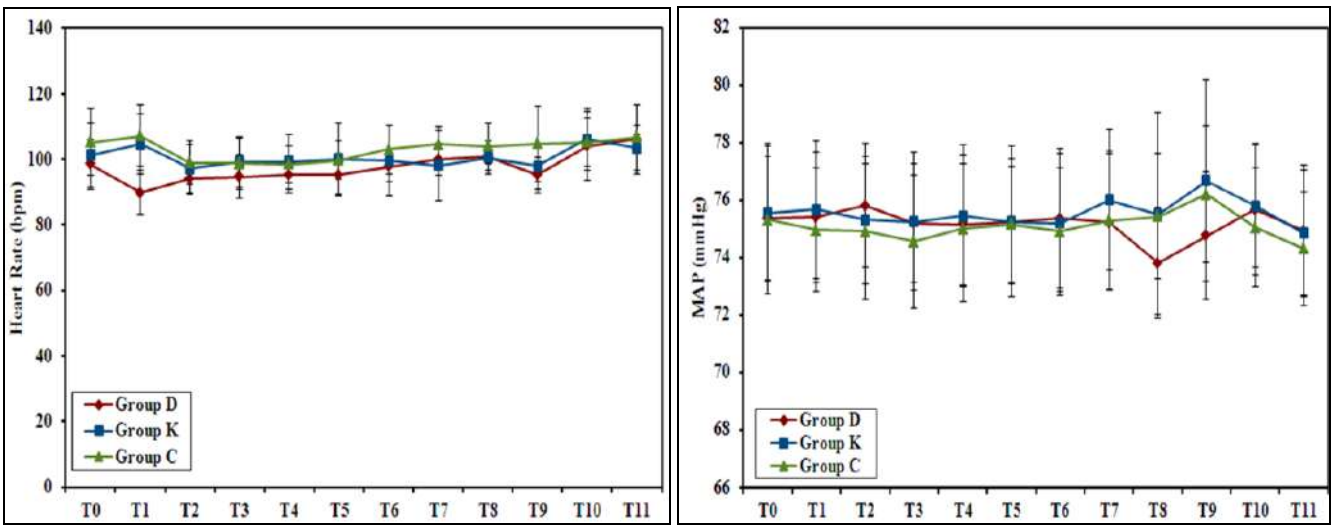


Fig 1: Case flow diagram



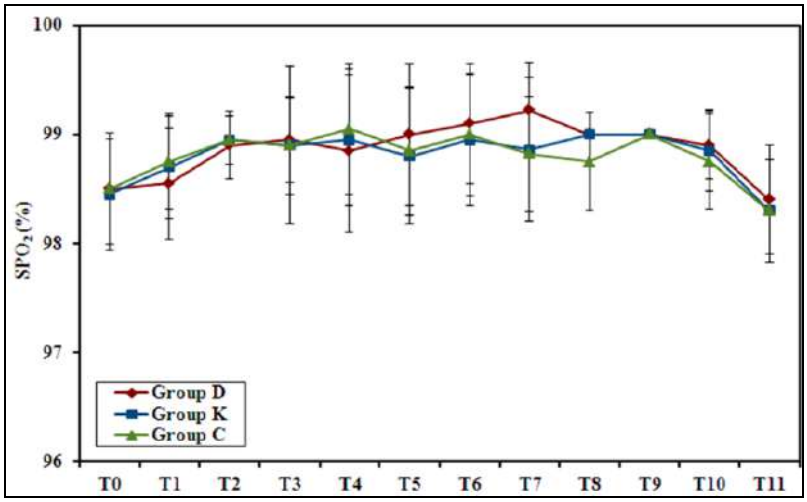


Fig 2: Comparison between the three studied groups according to (A) heart rate (beat. minute), (B) mean arterial blood pressure (mmHg), (C) O_2 saturation (%). T0 = baseline, T1= before induction, T2 = after induction, T3 = after intubation, T4 = 15 min, T5 = 30 min, T6 = 45 min, T7 = 60 min, T8 = 75 min, T9 = 90 min, T10 = PACU after 30 min, T11 = PACU after 60 min

Table 2: Comparison between the studied groups according to demographic data (n = 60)

Demographic data		Group D (n = 20)	Group K (n = 20)	Group C (n = 20)	P
Age (years)		6.05 ± 2.11	6.10 ± 2.36	5.95 ± 2.11	0.976
Gender	Male	11 (55.0%)	9 (45.0%)	10 (50.0%)	0.819
	Female	9 (45.0%)	11 (55.0%)	10 (50.0%)	
Weight (kg)		20.80 ± 5.28	21.05 ± 6.14	20.65 ± 5.46	0.975
ASA score	I	17 (85.0%)	16 (80.0%)	15 (75.0%)	0.920
	II	3(15.0%)	4 (20.0%)	5 (25.0%)	
Type of surgery	Cochlear implant	4 (20.0%)	3 (15.0%)	4 (20.0%)	0.985
	Laparoscopic hernia repair	5 (25.0%)	7 (35.0%)	6 (30.0%)	
	Tonsillectomy	11 (55.0%)	10 (50.0%)	10 (50.0%)	
Duration of surgery (min.)		58.50 ± 18.14	60.75 ± 14.98	67.50 ± 12.82	0.071

Data are presented as mean ± SD or frequency (%). ASA: American Society of Anesthesiologists, group D: Dexmedetomidine, group K: Ketamine, group C: Control.

Table 3: Comparison between the three studied groups according to Ramsay sedation scale and parental separation and mask acceptance

			Group D	Group K	Group C	P	Sig bet groups
Ramsay sedation scale	After 15 minutes	1	13 (65.0%)	14 (70.0%)	20 (100.0%)	0.008*	p1=0.736 p2=0.004* p3=0.008*
		2	7 (35.0%)	6 (30.0%)	0 (0.0%)		
		3	0 (0.0%)	0 (0.0%)	0 (0.0%)		
		4	0 (0.0%)	0 (0.0%)	0 (0.0%)		
	After 30 minutes	1	3 (15.0%)	9 (45.0%)	20(100.0%)	<0.001*	p1=0.026* p2<0.001* p3<0.001*
		2	12 (60.0%)	11 (55.0%)	0 (0.0%)		
		3	3 (15.0%)	0 (0.0%)	0 (0.0%)		
		4	2 (10.0%)	0 (0.0%)	0 (0.0%)		
Parental separation and mask acceptance	Excellent		8 (40.0%)	1 (5.0%)	0 (0.0%)	<0.001*	p1=0.028* p2<0.001* p3=0.414
	Good		6 (30.0%)	5 (25.0%)	2 (10.0%)		
	Fair		4 (20.0%)	7 (35.0%)	11 (55.0%)		
	Poor		2 (10.0%)	7 (35.0%)	7 (35.0%)		

Data are presented as frequency (%), * significant as P value < 0.05. group D: Dexmedetomidine, group K: Ketamine, group C: Control.

Table 4: Comparison between the three studied groups according to recovery time, discharge time and complication

		Group D	Group K	Group C	P
Recovery time (min.)		8.45 ± 3.32	8.25 ± 2.79	8.1 ± 3.06	0.936
Discharge time (min.)		32.9 ± 8.66	32.55 ± 10.22	31 ± 9.08	0.792
Complication	Nausea	0 (0%)	0 (0%)	0 (0%)	–
	Vomiting	0 (0%)	0 (0%)	0 (0%)	–
	Hypotension	0 (0%)	0 (0%)	0 (0%)	–
	Hypertension	0 (0%)	0 (0%)	0 (0%)	–
	Tachycardia	0 (0%)	0 (0%)	0 (0%)	–
	Bradycardia	0 (0%)	0 (0%)	0 (0%)	–
	Hypoxia	0 (0%)	0 (0%)	0 (0%)	–
	Salivation	0 (0%)	4 (20%)	0 (0%)	0.029*

Data are presented as mean ± SD or frequency (%), * significant as p-value < 0.05. group D: Dexmedetomidine, group K: Ketamine, group C: Control.

Discussion

Pediatric preoperative anxiety is a significant and complex issue. It can cause distress for the infant, the parents, and the operating room personnel if it is not managed carefully and systematically [11].

The current research hypothesized that the drugs selected achieving a state of conscious sedation that decreased anxiety associated with parental separation and facilitated aerosolization induction by increasing face mask acceptance. The primary end point was examination of the sedating effects of these drugs using Ramsay sedation scale 15 min and 30 min after the nebulizer session. The secondary outcome included nebulizer mask acceptance, hemodynamic stability, and the ease with which parents could separate from their children.

Many drugs have been used as premedication are being studied with variable degrees of effectiveness, acceptance and safety to reduce preoperative anxiety in children. The ideal premedication should have rapid onset, short duration of action, be simple to administer, accepted by cases and should also have minimal side effects [10].

Regarding Ramsay sedation score, Sabry *et al.* [4] was in agreement with this research as they found sedation at 15 min and 30 min was better with aerosolized dexmedetomidine (DexM) (3 mcg/kg) than aerosolized Ketamine (KET) (3 mg/kg) and the combined DexM (1.5 mcg/kg) with KET (1.5 mg/kg) in children undergoing tonsillectomy.

Against the current research**,** Zanaty *et al.* [2] in their research on Sixty children aged 3 to 6 years scheduled for outpatient pediatric dental surgery evaluated the effect of aerosolized DexM (2 mcg/kg), aerosolized KET (2 mg/kg) and combined DexM (1 mcg/kg) with KET (1 mg/kg) on sedation. At 30 min, they found sedation in the combination group is better than DexM and KET alone. The difference between this research and our research is that they used a combined group of DexM and KET, but we didn't, this combination may give a synergistic effect of both drugs making it more potent than use of each drug alone, another reason could be that they used different scale for assessment of sedation (using Modified Observer's Assessment of Alertness Sedation Scale) rather than Ramsay sedation scale in our research.

Concerning hemodynamics in our research, in agreement with this research, as regard heart rate, Zanaty *et al.* [2] compared the effect of aerosolized DexM (2 mcg/kg), aerosolized KET (2 mg/kg) and combined DexM (1 mcg/kg) with KET (1 mg/kg) on heart rate of sixty children aged 3 to 6 years undergoing pediatric dental surgery. They found that heart rate decreased in DexM at 30 min from the end of nebulization session when compared with aerosolized KET and their combination.

As regard mean arterial pressure, in agreement with this research, Bhat *et al.* [11]in their research on fifty-four children aged 1-6 years scheduled to undergo elective minor surgery evaluated the effect of intranasal DexM (1 mcg/kg) and mixed intranasal DexM (1 mcg/kg) with KET (2 mg/kg). They reported no significant difference in mean arterial pressure between groups.

According to oxygen saturation, in agreement with our research, Singariya G *et al.* [12] in their research on seventy cases, aged 2 to 8 years scheduled for hernia repair surgery evaluated the effect of aerosolized DexM (2 mcg/kg) and aerosolized KET (2 mg/kg). They found no significant difference in oxygen saturation between the groups.

Against the current research, as regards heart rate, Charuta *et al.* [13] evaluated the effect of aerosolized DexM (2 mcg/kg), aerosolized KET (2 mg/kg) and combined DexM (1 mcg/kg) with KET (1 mg/kg) on heart rate. The research was carried out on seventy-five children aged between 3-6 years undergoing pediatric surgery. They reported no significant change in heart rate in all groups. This difference could be explained by the smaller dose used than our research.

Also, against this research, as regard mean arterial pressure, Ali *et al.* [9] compared the effect of two doses of aerosolized DexM (3 µg/kg) and (4 µg/kg) in cases undergoing cochlear implantation. Their research was carried out on fifty cases aged 1–8 years. They found that mean arterial pressure decreased immediately after induction of general anaesthesia in the group received DexM (4 µg/kg). The difference between their research and our research is that they used a higher dose of DexM combined with hypotensive effect of anesthetic drugs used in induction which led to this effect.

As regard to parental separation and mask acceptance, in agreement with this research Singariya G *et al.* [12] in their research on Seventy cases, aged 2 to 8 years scheduled for hernia repair surgery evaluated the effect of aerosolized DexM (2 mcg/kg) and aerosolized KET (2 mg/kg) on parental separation and mask acceptance. They found satisfactory parent child separation and better mask acceptance in children premedicated with aerosolized DexM than aerosolized KET.

Against the current research, Zanaty *et al.* [2] conducted their research on Sixty children aged 3 to 6 years scheduled for outpatient pediatric dental surgery compared the efficacy of aerosolized DexM (2 mcg/kg), aerosolized KET (2 mg/kg) and combined DexM (1 mcg/kg) with KET (1 mg/kg). They found that the mixture gave better separation and mask acceptance. The difference between their research and the present one that they used combined DexM with KET, different doses, also different sample size as we studied wide range of pediatric age, but they used a narrow range.

As regards recovery time and discharge time, in agreement with this research, Sabry *et al.* [4] conducted their research on seventy-five children aged 4 years scheduled for ENT operation compared the effect of aerosolized DexM (3 mcg/kg), aerosolized KET (3 mg/kg) and combined DexM (1.5 mcg/kg) with KET (1.5 mg/kg) on recovery time and discharge time. There was no difference between all groups.

Against this research, Zanaty *et al.* [2] compared the effect of aerosolized DexM (2 mcg/kg), aerosolized KET (2 mg/kg) and combined DexM (1 mcg/kg) with KET (1 mg/kg) on Sixty children aged 3 to 6 years scheduled for outpatient pediatric dental surgery. They found that the mixture gave shorter recovery time and discharge time than aerosolized DexM and aerosolized KET. Early recovery can be explained by small dose of DexM and KET in the combination group which we didn't research in our research.

According to adverse events in our research, four cases developed hypersalivation and cough in KET, while no case in other groups. The incidence of hypersalivation was significant in KET more than DexM and control while there was no incidence of other complication such as nausea, vomiting, hypotension, hypertension, tachycardia, bradycardia or hypoxia in any group.

As regard to hypersalivation and cough, in agreement with this research, Sabry *et al*. [4] evaluated the effect of aerosolized DexM (3 mcg/kg), aerosolized KET (3 mg/kg) and combined DexM (1.5 mcg/kg) with KET (1.5 mg/kg) in their research on seventy-five children aged 3–6 years undergoing tonsillectomy. They reported five cases in KET developed excessive secretion and cough.

Against this research, Charuta *et al*. [13] in their research on seventy-five children aged between 3-6 years undergoing pediatric surgery evaluated the effect of aerosolized DexM (2 mcg/kg), aerosolized KET (2mg/kg) and combined DexM (1 mcg/kg) and KET (1 mg/kg). There was no cases in all groups that developed hypersalivation and cough. The difference could be explained by the small dose used in their research.

As regard to incidence of adverse events like hypotension, hypertension, tachycardia, bradycardia or hypoxia, in agreement with this research, Sabry *et al*. [4] in their research on seventy-five children aged 4 years scheduled for ENT operation evaluated the effect of aerosolized DexM (3 mcg/kg), aerosolized KET (3 mg/kg) and combined DexM (1.5 mcg/kg) with KET (1.5 mg/kg), they didn't report incidence of any complication.

In contrast, Ali *et al*. [9] conducted their research on fifty cases aged 1–8 years scheduled for cochlear implantation evaluated the effect of two doses of aerosolized DexM (3 µg/kg) and (4 µg/kg), they found seven cases in (4 µg/kg) group developed hypotension immediately after induction of general anaesthesia, also six cases in (4 µg/kg) group developed bradycardia but no case in (3 µg/kg) group developed bradycardia. The difference between this research and our research that DexM had been used in a higher dose.

Limitations: 1.Use of the facemask with nebulizer didn't deliver accurate dose of the drug as it wasn't tightly fitted to case, so it is better to use mouth piece if available. 2.Parent satisfaction, analgesia, onset of sedation and peak of sedation were not measured. 3. Small sample size may necessitate further research with a larger sample size.

Conclusions

Aerosolized dexmedetomidine can be used with advantage versus aerosolized Ketamine for preoperative sedation in pediatric surgeries.

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Conflict of interests: None to be declared.

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