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Comparison between Effect of Dexmedetomidine and Dexamethasone as an Additive to Subtenon Block with General Anesthesia on Perioperative Outcomes for Pediatric Strabismus Surgeries

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ABSTRACT

Introduction: Dexamethasone is given to the patient during surgery to decrease the possibility of post-operative nausea and vomiting (PONV), alleviate pain, and make the patient feel better. Dexmedetomidine is a strong and highly selective alpha 2-adrenoreceptor agonist utilized nowadays in the ICU as a continuous infusion for sedation and analgesia.

Aim of the work: This study aimed to compare the effectiveness of pre-operative injection of dexmedetomidine or dexamethasone in sub-tenon block (STB) in conjunction to bupivacaine anesthesia under general anesthesia on reducing pain in the immediate postsurgical period (VAS) emergence agitation, hemodynamic stability and attenuating airway reflex to extubation in cases who were undergone strabismus operations.

Patients and Methods: This study was conducted on a total of 80 cases who were divided into two groups (n=40). Group I received sub-tenon mixture of, bupivacaine 0.5% (2 ml) and dexmedetomidine 0.5 μg/kg (1 ml). Group II received sub-tenon bupivacaine 0.5% (2 ml) and dexamethasone 0.1 mg/kg (1 ml). Postoperative pain (POP) was evaluated by using a verbal pain scale (VPS). Emergence agitation (EA) was assessed with the PAED scale.

Results: Dexmedetomidine was associated with a lower analgesic requirement, minimal VAS score and lower emergence agitation and lower complications compared to dexamethasone.

Conclusion: Dexmedetomidine as an adjuvant to STB in conjunction to general anaesthesia had promising outcomes in pain reduction, lower analgesic requirement and emergence agitation and low possibility of complications compared to dexamethasone.

Keywords: Dexmedetomidine, Dexamethasone, Sub-tenon block, Strabismus.

INTRODUCTION

Strabismus surgery is a frequent ocular surgery in pediatric population. Squint operation in children has been demonstrated to be often associated with discomfort or pain, based on the number of muscles that need to be corrected and the technique of surgery. Intravenous opioid agents and NSAIDs are the mainstays of analgesia in the intraoperative and postoperative periods. A high possibility of intraoperative oculo-cardiac reflex (OCR) and PONV are frequently seen in squint surgeries [1, 2].

Regional analgesia approach has been suggested in combination with general anaesthesia in recent years [3]. One of the local anesthetic approaches utilized in ocular surgeries is the STB. In such approach, local anesthesia is injected posterior to Tenon's capsule [4]. Dexmedetomidine is a highly selective centrally acting α-2 agonist with analgesic and sedative actions with no respiratory depressing effects [5]. It has been used in regional anesthesia in addition to local anesthesia to increase the analgesic duration [6]. Dexamethasone is a potent steroid that can be effective as an adjunct to local anesthesia in several researches [7, 8].

The current study aimed to compare the effectiveness of pre-operative injection of dexmedetomidine and dexamethasone in sub-tenon block in conjunction to general anesthesia under sevoflurane anesthesia on reducing pain in the immediate postsurgical period (VAS) emergence agitation, hemodynamic stability and attenuating airway reflex to extubation in patients undergoing strabismus surgeries.

Outcomes: Primary outcome involved the effect on postoperative visual analogue score (VAS). While **secondary** outcomes involved total analgesic requirements in the 24 h postoperative emergence agitation, Ramsay sedation score, intraoperative hemodynamic stability, the occurrence of OCR and the incidence PONV.

PATIENTS AND METHODS

This was a prospective randomized controlled study conducted at Ophthalmology Centre Mansoura University following approval from the IRB (**MS.20.01.1016)**. This study involved 80 ASA I and II participants, aged 6- 12 years of both sexes, who were arranged for elective squint operations with general anesthesia. Patients were interviewed and enrolled in this study after obtaining written informed consents from parents.

Exclusion criteria: Patients having redo surgery, hypersensitivity to any of the study medications (including postoperative analgesia), having heart, liver, kidney or respiratory disease and patients whose parents refuse.

By utilizing a software-derived random number sequence, 80 patients were randomly assigned by sealed opaque

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envelopes into two separate groups (each group contain 40 patient). These randomly allocated patients received sub-tenon block (STB) under general anesthesia. SB was given according to randomly allocated group in the following regimen:

- **Group (I) (Sub-tenon Dexmedetomidine) (n=40):** received sub-tenon mixture of, bupivacaine 0.5% (2 ml) and dexmedetomidine 0.5 μg/kg (1 ml).
- **Group (II) (Sub-tenon Dexamethasone) (n=40):** received sub-tenon bupivacaine 0.5% (2 ml) and dexamethasone 0.1 mg/kg (1 ml).

The enrolled cases were assessed before the operation regarding their medical history, clinical examination, laboratory analysis (such as CBC and coagulation profile). Twenty four hours prior to the operation, the study design was clarified to parents of whole enrolled cases.

After application of pulse oximetry, anesthesia was induced by inhalation using face mask with 8% sevoflurane in 100% O_2 after that peripheral intravenous cannula was inserted. Monitor was applied to all patients such as electrocardiography, non-invasive BP monitor, pulse oximetry (Helsinki, Finland) and baseline values were documented. Endotracheal tube insertion and spontaneous ventilation was allowed. Sub-tenon block was done followed by maintenance of anesthesia using sevoflurane 2%, O_2- air all through the operation. Maintenance infusion of fluids was given to patients according to their weight (Ringer solution) using "4:2:1 rule":4mL/kg/h for the first 10kg of weight, 2mL/kg/h/Sec 10kg, 1mL/kg/h for the remaining kilograms. On termination of the operation, and after discontinuation of all infusions and the stoppage of sevoflurane, Extubation was performed after the patients fulfilled whole the criteria of the extubation. Extubation was performed and 100% oxygen was given using a face mask. As a result, cases were transported to the PACU to be noticed for two hours, and after that transported to the ward where they were followed up for 24 hours.

During the procedure, if there was arrhythmia or abrupt drop in heart rate by more than 25% from the basal value, it was taken to be an oculo-cardiac reflex that was managed by asking the surgeon to stop activation, but if this was ineffective or HR is < 50 beats/min, IV atropine (0.01mg/kg) was given. When peri-operative hypotension (MAP < 25% of baseline value) was recorded, it was treated with intravenous fluid bolus.

POP was evaluated by utilizing a VAS (0=no pain and 10=very severe pain) at 30 min 1, 3, 6, 12, 24 hours. On VAS score > 3 a bolus dose of paracetamol was given at a dose of 10 mg/kg per dose, to a maximum of 1 g per dose, can be repeated every 4 to 6 h till visual analogue scale score was < 3, with a maximal of 60 mg/kg daily (not more than four grams per day). Emergence Agitation degree was assessed by using the PAED scale devised by **Sikich and Lerman [9]**. The possibility and the degree of emergence agitation were evaluated at extubation (E0), 15 min following extubation (E1), and 30 min following extubation (E2). The total PAED score was obtained by using summarization of all items. Of note, the grade of emergence delirium has a positive correlation with the total score.

The sedation level was evaluated by the RHS which was clarified to the cases in the preoperative visit, at the end of the operation, and at 4 h, 8 h, 12 h, 18 h, and 24 h postoperatively. Anxiety was evaluated every ten minutes with a four-point scale: I=cooperative and calm, II=anxious but could be reassured, III=anxious and could not be reassured, and IV=resisting or crying **[10]**.

Collected data:

Hemodynamic changes, as mean SPO_2, HR, BP, mean ET/CO_2, postoperative visual analogue score (VAS) in the 24 h postoperative, cumulative oral analgesia consumption (doses) was reported at 24 h. Emergence agitation by PAED scale (devised by Sikich), sedation level by RHS, intra-operative complications (OCR) and post-operative complications were recorded.

Ethical approval: The study was approved by the Ethics Board of Mansoura University and an informed written consent was taken from the parent of every participant in the study. This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki).

Statistical analysis

Data were introduced to the software and analysed by utilizing IBM SPSS Corp. Released 2013.Version 22.0. Armonk, NY: IBM Corp. Qualitative data were defined by utilizing number and percentage. Quantitative data were defined by utilizing median for non-parametric data and mean ± SD for parametric data following testing normality by utilizing Kolmogorov-Smirnov test. The level of significance of the acquired outcomes was put at 0.05. Qualitative date comprised Chi-square test utilized for comparison of at least two. Fischer exact test was utilized as correction for Chi-square test when more than twenty five percent of cells have count below 5 in 2 tables. For quantitative data, which include parametric tests, Student t-test was used for comparison between two independent groups and non-Parametric tests which utilized Mann-Whitney U test to compare among independent groups.

RESULTS

Table (1) demonstrated that there were no significant changes among both groups regarding whole sociodemographic features.

Table (1): Sociodemographic features of the studied groups

	Group I N=40	Group II N=40	Test of significance
Age/years Mean ± SD	8.21 ± 2.44	7.83 ± 2.42	t=0.714 p=0.477
Gender	N (%)	N (%)	
male	18 (45.0)	15 (37.5)	χ^2=0.464
female	22 (55.0)	25 (62.5)	p=0.496
weight/kg Mean ± SD	25.38 ± 5.85	23.48 ± 5.67	t=1.48 p=0.144

Table (2) illustrated the mean SPO_2 of the studied groups. There were no significant changes among both groups regarding mean SPO_2 at all times (0 min, 15 min, 30 min, 45 min) **(P > 0.05) . Table (3)** revealed mean PACU SPO_2 of the studied groups. There were no significant differences among both groups regarding mean PACU SPO_2 (P>0.05).

Table (2): Mean SPO2 of the studied groups

SPO2	Group I N=40	Group II N=40	Test of significance
0 Min	99.0 ± 1.11	98.85 ± 1.17	t=0.589 p=0.557
15 Min	99.70 ± 0.46	99.53 ± 0.51	t=1.61 p=0.111
30 Min	99.40 ± 0.67	99.20 ± 0.76	t=1.25 p=0.215
45 Min	99.08 ± 0.92	98.58 ± 0.87	t=2.49 p=0.215
60 Min	99.35 ± 0.66	98.85 ± 0.77	t=2.05 p=0.015
75 Min (end of surgery)	98.88 ± 0.88	98.65 ± 0.86	t=1.98 p=0.45

Table (3): Mean PACU SPO2 of the studied groups

PACU SPO2	Group I N=40	Group II N=40	Test of significance
0 Min	98.70±1.11	98.40±1.03	t=1.25 p=0.215
15 Min	99.20±0.757	99.10±0.95	t=0.519 p=0.605
30 Min	99.0±0.91	99.35±0.80	t=1.83 p=0.071
45 Min	99.50±0.51	99.45±0.59	t=0.404 p=0.687
60 Min	99.40±0.67	99.30±0.79	t=0.609 p=0.544
90 Min	99.20±0.61	99.10±0.71	t=0.677 p=0.50
120 Min	99.78±0.53	99.60±0.63	t=1.34 p=0.184

*significant if p < 0.05 SPO2: described as mean ± SD

Table (4) displayed mean heart rate of the studied groups. There were no significant changed among both groups regarding mean heart rate (P > 0.05). **Table (5)** illustrated mean PACU heart rate of the studied groups. There were no significant changes among both groups regarding mean PACU heart rate (P > 0.05).

Table (4): Mean heart rate of the studied groups

heart rate	Group I (N=40)	Group II (N=40)	Test of significance
0 Min	108.5±22.56	101.10±19.24	t=1.58 p=0.118
15 Min	109.70±22.07	106.30±15.32	t=0.801 p=0.426
30 Min	111.60±17.24	103.35±22.59	t=1.84 p=0.07
45 Min	112.05±18.14	104.53±18.65	t=1.83 p=0.08
60 Min	110.05±11.0	108.50±13.61	t=0.560 p=0.577
75 Min (end of surgery)	**110.55±11.55**	**109.23±13.89**	**t=0.464 p=0.644**

Table (5): Mean PACU heart rate of the studied groups

PACU HR	Group I (N=40)	Group II (N=40)	Test of significance
0 Min	109.60±15.54	110.35±19.46	t=0.190 p=0.849
15 Min	108.20±13.68	109.90±15.66	t=0.517 p=0.607
30 Min	104.7±11.87	107.20±17.89	t=0.736 p=0.464
45 Min	101.90±11.65	105.95±16.98	t=1.24 p=0.217
60 Min	105.30±14.33	107.70±14.31	t=0.749 p=0.456
90 Min	103.0±14.34	105.60±12.74	t=0.857 p=0.394
120 Min	100.90±12.90	103.55±11.47	t=0.971 p=0.335

*significant if p<0.05 heart rate: described as mean ± SD

Table (6) demonstrated mean MAP of the studied groups. There were no significant differences among both groups regarding mean MAP (P>0.05). **Table (7)** illustrated mean PACU MAP of the studied groups. There were no significant differences among both groups regarding mean PACU MAP (P>0.05).

Table (6): Mean MAP of the studied groups

MAP	Group I N=40	Group II N=40	Test of significance
0 Min	79.20±17.17	73.55±13.54	t=1.63 p=0.106
15 Min	73.60±11.06	70.65±9.43	t=1.28 p=0.203
30 Min	67±5.38	66.05±4.97	t=0.821 p=0.414
45 Min	66.60±5.89	64.95±4.83	t=1.37 p=0.175
60 Min	64.15±4.48	63.95±3.38	t=0.225 p=0.822
75 Min (end of surgery)	67.92±6.18	68.8±6.65	t=0.609 p=0.544

Table (7): Mean PACU MAP of the studied groups

PACU MAP	Group I (N=40)	Group II (N=40)	Test of significance
0 Min	70.50±8.64	72.85±8.38	t=1.23 p=0.221
15 Min	78.93±8.20	81.25±6.19	t=1.43 p=0.157
30 Min	79.28±9.31	77.68±7.22	t=0.859 p=0.393
45 Min	77.15±9.39	77.95±9.51	t=0.379 p=0.706
60 Min	78.10±8.99	79.50±9.01	t=0.695 p=0.489
90 Min	76.78±9.65	78.58±9.33	t=0.848 p=0.399
120 Min	78.30±9.75	80.40±10.13	t=0.944 p=0.348

*significant if p <0.05 MAP: described as mean ± SD

Table (8) demonstrated mean ET/CO_2 of the studied groups. There were no significant differences among both groups regarding mean ET/CO_2 ($P > 0.05$).

Table (8): Mean ET/CO2 of the studied groups

ET/ CO2	Group I (N=40)	Group II (N=40)	Test of significance
0 Min	38.70±5.84	38.60±6.0	t=0.076 p=0.940
15 Min	39.40±3.63	39.80±3.79	t=0.483 p=0.631
30 Min	40.50±3.85	41.0±3.27	t=0.626 p=0.533
45 Min	41.40±3.48	41.95±3.59	t=0.696 p=0.488
60 Min	41.30±3.32	42.20±3.29	t=1.22 p=0.227
75 Min (end of surgery)	40.40±4.02	41.15±3.59	t=0.879 p=0.382

*significant if p<0.05 **ET/CO2**: described as mean ± SD

Table (9) demonstrated median VAS score of the studied groups. There were significant increase in VAS score among group II compared to group I ($P < 0.05$).

Table (9): Median VAS score of the studied groups

VAS score	Group I (N=40)	Group II (N=40)	Test of significance
30 Min	1(0-1)	1(0-1)	z=2.42 (p=0.015)
1 h	1(0-1)	1(0-2)*	z=2.08 (p=0.04*)
3h	1(0-1)	1(1-2)*	z=4.97 (p<0.001*)
6h	1(0-3)	2(1-3)*	z=5.24 (p<0.001*)
12h	1(0-3)	3(2-3)*	z=7.64 (p<0.001*)
24 h	2(1-3)	4(3-5)*	z=7.26 (p<0.001*)

*significant if p < 0.05, VAS score described as median (Min-Max)

Table (10) demonstrated mean PAED of the studied groups. There were highly significant increases in group II compared to group I regarding mean PAED (P < 0.001).

Table (10): Mean PAED of the studied groups

PAED	Group I N=40	Group II N=40	Test of significance
E0 (at extubation)	10.55±0.98	12.10±2.20*	t=4.06 (p<0.001*)
E1 (15 min after extubation)	11.08±1.37	13.80±1.74*	t=7.78 (p<0.001*)
E2 (30 min after extubation)	**11.40±1.75**	**13.93±1.73***	**t=6.49 (p<0.001*)**

*Significant if p < 0.05 **PAED:** described as mean ± SD.

Table (11) demonstrated mean total paracetamol of the studied groups. Mean total paracetamol was significantly increased in group II in comparison with group I (P=0.01).

Table (11): Mean Total paracetamol of the studied groups

Group I(N=40)	Group II (N=40)	Test of significance
Total paracetamol (mg)	**201.3±33.8**	**246.3±49.8***	**t=2.63 (p=0.01*)**

t:Student t test *significant if p < 0.05 Total paracetamol: described as mean ± SD

Table (12) demonstrated mean Ramsay score of the studied groups. There were significant increases in group II regarding mean Ramsay score compared to group I (P < 0.05) at 8 h, 12 h, 18 h and 24 h with no significant difference at 4 h (P > 0.05).

Table (12): Mean Ramsay score of the studied groups:

Ramsay score	Group I N=40	Group II N=40	Test of significance
4 h	1(1-2)	1(1-2)	Z=0.693 (P=0.488)
8h	1(1-1)	1(1-3)*	Z=2.75 (P=0.006*)
12h	1(1-2)	1(1-3)*	Z=2.65 (P=0.008*)
18h	1(1-2)	1(1-3)*	Z=3.20 (P=0.001*)
24 h	1(1-2)	1(1-3)*	Z=2.80 (P=0.005*)

Z: Mann Whitney U test, *significant if p < 0.05, VAS score described as median (Min-Max)

Table (13) demonstrated that there were no significant differences among both groups regarding intra-operative complications (Oculo-cardiac reflex), nor in post-operative complications (PONV)**.** No other intra- and post-operative complications.

Table (13): Intra-operative complications (Oculo-cardiac reflex) and post-operative complications (PONV) of the studied groups

	Group I N=40 (%)	Group II N=40 (%)	Test of significance
Occulo-cardiac reflex	2(5.0)	4(10.0)	FET (P=0.675)
PONV	2(5.0)	8(40.0)	FET (P=0.263)

*Significant if p<0.05

DISCUSSION

To the best of our knowledge, this was the first research, which compared the effects of dexmedetomidine versus dexamethasone as an additive to STB with GA on perisurgical outcomes in the context of strabismus surgeries in children. The majority of previous researches mainly emphasized on comparing the effect of dexmedetomidine placebo. Throughout operation, dexamethasone has been administrated to decrease the possibility of PONV and to alleviate pain, with more patient compliance. However, no well-established data in the context of the potential adverse effects [11]. However, dexmedetomidine as a potent and highly selective α 2-adrenoreceptor agonist nowadays is utilized in the context of continuous IVI as a sedating and analgesic agent in the ICU [12]. It was demonstrated that; the most frequent adverse events of pediatric strabismus surgery were EA and PONV as well as POP [13].

The outcomes of the current study come in the same line with prior researches, which have recorded promising efficiency of adding dexmedetomidine as an adjuvant to STB for cataract operation in adults. As regards pediatric ocular operations, STB associated with general anesthesia was utilized only in a limited number of researches [14, 15]. Both groups were similar regarding SPO_2 and hemodynamic parameters indicated that both drugs have no effect on these parameters on the net results.

Concerning emergence agitation, there were highly significant increases in group II in comparison with group I regarding mean PAED (P<0.001). Emergence agitation is a frequent postsurgical complication in pediatric population, in particular preschoolers [16] and pediatric cases who were undergone strabismus operation [17]. The potential predisposing factors of emergence agitation involve rapid emergence from anaesthesia, usage of volatile anesthesia, POP, age, and operation type [18]. On the contrary, the possibility of emergence agitation incidence in children, even within certain groups of pediatric cases (such as cases undergoing strabismus surgery), is still a matter of controversy [18]. **Duan and his colleagues** (19) have recorded that dexmedetomidine usage decreased the possibility of emergence agitation in the adults. In addition, **Ni and his colleagues** (20) have displayed that IV dexmedetomidine could induce a significant reduction in emergence agitation in children undergoing different forms of surgeries. On the contrary since the investigators didn't carry out surgery-type-based subgroup assessment, the generalization of their outcomes was restricted to only a certain group of cases. **Cho and his colleagues** (21) have displayed that in pediatric cases who were undergone adenotonsillectomy, perioperative dexmedetomidine was accompanied by a decrease in emergence agitation possibility. As a result, it was suggested that in a certain high-risk emergence agitation population, which include pediatric cases who were undergone strabismus operation, physicians have to choose dexmedetomidine to decrease emergence agitation development [13]. On the other hand, when dexmedetomidine was given by oral, intranasal, and caudal administration, it didn't decrease emergency agitation possibility. However, such findings were restricted by a single trial for all administration routes, with exception of the intravenous injection. Another meta-analysis reported that emergency agitation possibility was reduced when dexmedetomidine was given alone throughout the postoperative period [19]. The discrepancies among the results of prior researches and the present study may be owing to alterations in the surgical time for different operations or dexmedetomidine pharmacokinetics. In our comprised researches, the operative time of strabismus surgery was comparatively short (about 15–48 minutes), while the terminal half-life of IV dexmedetomidine was to some extent long [22].

Concerning postoperative median VAS score of the studied groups, there were significant increase in VAS score among group II compared to group I (P<0.05). Accordingly, mean total paracetamol was significantly increased in group II in comparison with group I **(P=0.01).** Also, there were significant increases in group II regarding mean Ramsay score in comparison with group I **(P<0.05)** at 8 h, 12 h, 18 h and 24 h with no significant change at 4 h **(P>0.05).** In accordance **Ali and his colleagues** (23) have demonstrated that the possibility of rescue analgesia requirement was significantly reduced in the SB group two infants versus eleven in SB and IV groups in consequence (p=0.006). Also, **Chiang and his colleagues** (13) have demonstrated that, in patients undergone pediatric strabismus surgery, dexmedetomidine was accompanied by lower incidence of POP [13].

With regard to complications, there were no significant changes among both groups concerning intra-operative complications, while group II demonstrated significant increase in post-operative complications in comparison with group I **(P<0.05).** Of note, PONV, a frequent presentation in cases undergoing pediatric strabismus operation, could possibly associated with substantial dehydration, electrolyte disturbance, development of aspiration pneumonia as well as postponed hospital discharge, which untimely were associated with more health care burden [24, 25].

Also, **Jin and his colleagues** [(26)] reported that compared to the control, dexmedetomidine had a more significant anti-emetic action in adults as well as in children under GA. In the same line, in **Chiang and his colleagues** [(13)] meta-analysis, six researches revealed that dexmedetomidine was demonstrated to be accompanied by a drop in PONV in comparison with the control group.

While, **Shen and his colleagues** [(27)] have displayed that the administration of dexamethasone, ondansetron, or both in the context of strabismus surgery in children could decrease PONV possibility. Similarly, another major research found that, premedication with clonidine (another α 2-agonist) reduced PONV possibility by 17% in children who were undergone strabismus surgery [24].

Therefore, **Chiang and his colleagues** [(13)] have confidence in suggesting dexmedetomidine usage for PONV prevention in the sitting of pediatric strabismus operation. On the contrary, they couldn't compare dexmedetomidine with other frequently utilized antiemetic medications as few relevant head-to-head comparative researches were recognized. Further research clarifying this issue is necessary. Also, they found that compared with the control group, dexmedetomidine use decreased relative OCR risk by 37%. However, such result has to be evaluated cautiously. Since OCR is accompanied by different stimuli, the extraocular muscles traction was often noticed. In addition, traction to the medial rectus increased more OCR incidence in comparison with traction to the remaining ocular muscles [28].

In contrast, in the comprised researches, such information wasn't obviously recorded. In addition, the heterogeneity was high and CI was very broad in the comprised researches. As a result, it was suggested that anesthesiologist has to consider utilization of dexmedetomidine to decrease OCR development in cases undergoing pediatric strabismus surgery [13]. Additionally, dexmedetomidine usage as a preventative plan might be associated with an increase in sedation and as a result has to be balanced against the possibility of delaying PACU discharge [18].

CONCLUSION

Dexmedetomidine as an adjuvant to STB together with GA was demonstrated to be associated with promising outcomes in terms of pain reduction, lower analgesic requirement, VAS score and emergence agitation and low possibility of complications with no effect on hemodynamic parameters compared to dexamethasone.

Strengths

This was the first study comparing the effects of dexmedetomidine versus dexamethasone as an additive to STB with GA on perioperative results in the context of pediatric strabismus surgeries. Despite the promising outcomes of the current study, small sample size was considered the main limitation.

RECOMMENDATIONS

Therefore, the current study recommended the performance of further studies on large sample size and utilization of dexmedetomidine as an adjuvant to sub-tenon block in conjunction to general anesthesia instead of dexamethasone.

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- **Conflict of interest:** No conflict of interest was reported by the authors.

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