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ORIGINAL RESEARCH

Evaluation of Postoperative Discomfort After Strabismus Surgery Under General Anesthesia in Children: A Prospective Observational Study

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Purpose: Strabismus surgery is most commonly performed on children under general anesthesia. However, few studies have focused on the postoperative discomfort in children after strabismus surgery. This study aimed to evaluate postoperative discomfort and the associated risk factors in children who underwent strabismus surgery under general anesthesia.

Patients and Methods: A single-center prospective observational study including 300 children who underwent strabismus surgery after general anesthesia was conducted. Patients' characteristics, preoperative anxiety, surgical and anesthesia data, discomfort within 24 hours after postanesthesia care unit were recorded. The primary outcome was the incidence of postoperative discomfort.

Results: Approximately 51.33% of the children complained of at least one of the following types of postoperative discomfort: postoperative nausea and vomiting (PONV) (23.00%), headache (4.33%), dizziness (20.33%) and emergence agitation (EA) (5.33%). Multivariate analysis indicated that history of motion sickness (P<0.001, odds ratio [OR]=3.72), and surgery in the dominant eye (P=0.010, OR=2.00) were independent predictors of postoperative discomfort; age was an independent predictor of EA (P<0.001, OR=0.36); prism diopter≥40 was an independent predictor of headache (P=0.005, OR=5.53); age (P=0.020, OR=1.12) and history of motion sickness (P=0.001, OR=2.80) were independent predictors of dizziness; history of motion sickness (P=0.001, OR=2.63) and surgery of inferior oblique anterior transposition (IOAT) (P=0.004, OR=3.10) were independent predictors of PONV.

Conclusion: The most frequent postoperative symptoms in children after undergoing strabismus surgery under general anesthesia are PONV, dizziness, EA, and headache. Younger age, larger angle of strabismus, history of motion sickness, surgery on the dominant eye, and surgery of IOAT may be additional risk factors for postoperative discomfort.

Keywords: strabismus surgery, discomfort, postoperative nausea, vomiting, general anesthesia

Introduction

Strabismus is defined as any deviation of the binocular alignment that can be the cause or the effect of poor binocularity.[1] The definitive treatment for most cases of primary and secondary strabismus is extraocular muscle (EOM) surgery, particularly when the strabismus has been stable for several months.[2] Strabismus surgery is commonly performed on children.[3–5] For children, the management of pain and compliance during the operation requires general anesthesia. General anesthesia can fully relax and expose the EOMs and the maximum squint angle, which is widely used in strabismus surgery. Discomfort after general anesthesia is defined as "sensation other than pain" and includes nausea, vomiting, headache, and dizziness.[6,7] To date, postoperative discomfort after strabismus surgery in adults has been

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studied. Huang et al[7] reported that 94.76% of adult patients experienced mild discomfort after ambulatory strabismus surgery under general anesthesia; independent predictors of postoperative discomfort included female sex, inferior rectus surgery, mild anxiety, and inferior oblique surgery.

Many previous studies have assessed postoperative nausea and vomiting (PONV), emergence agitation (EA), as well as their risk factors, in the pediatric population. The following are well-known risk factors of PONV: history of PONV or motion sickness, strabismus surgery, anesthesia for more than 45 minutes, age>5 years, opioid use.[8–11] PONV risk scores have been applied to reduce the rate of PONV and can be used to inform and guide therapy. At present, PONV risk scores available in clinical practice include the Apfel simplified risk score,[12] post-discharge nausea and vomiting risk score,[13] Koivuranta risk score,[14] and Eberhart risk score.[8] Emergence agitation is one of the most common discomfort in children under general anesthesia and may be associated with a higher incidence of self-injury and recovery interference, as well as increased medical costs.[15–17] Dexmedetomidine, a selective α2-adrenoceptor agonist, has been reported to significantly reduce EA incidence in children after sevoflurane anesthesia.[18] The evaluation of preoperative anxiety may be valuable in identifying children who are at risk of developing postoperative agitation. Several studies have indicated that higher levels of preoperative anxiety are associated with an increased incidence of EA.[19,20] In addition, the residual effect of anesthetics and inadequate hydration have been observed to be related to postoperative dizziness.[21] However, few studies have focused on postoperative discomfort and risk factors in children after strabismus surgery. Children have a limited ability to express discomfort, which makes it difficult to provide discomfort management. To provide a theoretical basis for developing a more targeted intervention plan to improve postoperative discomfort in children with strabismus, our study aimed to evaluate postoperative discomfort and its risk factors in 300 children who underwent strabismus surgery within 24 hours after general anesthesia.

Materials and Methods

Study Design

A prospective observational study was undertaken and 300 children were recruited from an ophthalmic center. The study was conducted according to the guidelines of the Declaration of Helsinki. This study protocol was reviewed and approved by the Ethics Committee of the ophthalmic center (2022KYPJ212). Written informed consent was obtained from the participants' parent/legal guardian in the study.

Patient Enrollment

Using the method of convenient sampling, consecutive pediatric patients were recruited from an ophthalmic center from December 2022 to February 2023. The inclusion criteria were (1) listed for strabismus surgery under general anesthesia, (2) aged 3–14 years. The exclusion criteria were as follows: (1) combined with other ophthalmic surgeries, (2) mental illness, (3) inability to communicate (including sensory impairment), and (4) declined to participate. All surgeries were performed by 3 senior strabismus surgeons. Logistic regression analysis was adopted in this study, and the sample size should be 5–10 times of the number of independent variables. This study estimated 26 influencing factors and calculated a sample size of 150–299 cases considering 15% non-response rate. Recruitment ended when more than 299 samples were included in the final analysis.

Anesthetic Procedure

General anesthesia is used in strabismus surgery to circumvent anatomical modifications caused by periocular injection. And pediatric patients are less tolerant of surgery and may be more mobile during surgery.[22] Therefore, pediatric strabismus surgery was performed under general anesthesia, rather than local anesthesia in this study.

All patients received intravenous injection of propofol (1.5–2.5 mg/kg) and fentanyl (1–2 μg/kg), combined with a muscle relaxant (cisatracurium, 0.1–0.2 mg/kg), for anesthesia induction and underwent placement of a laryngeal mask airway. Non-steroidal anti-inflammatory and analgesic drugs (flurbiprofen axetil, 1 mg/kg, intravenous [IV]) or nalbuphine (0.1 mg/kg, IV) were used to prevent postoperative pain. Dexamethasone (0.1 mg/kg, IV) combined with a 5-HT3 receptor antagonist (palonosetron, 0.005 mg/kg, or dolasetron, 0.35 mg/kg) was administered intravenously during

induction of anesthesia to prevent PONV. Penehyclidine (0.01 mg/kg, IV) was used to reduce respiratory secretions. Intraoperative anesthesia was maintained using total intravenous anesthesia (propofol + remifentanil) or inhalation anesthesia (sevoflurane). Mechanical ventilation was performed through the laryngeal mask airway; tidal volume was 8–10 mL/kg, respiratory rate was 15–20 bpm, and intraoperative end-tidal CO2 was maintained at 35–45 mmHg.

Data Collection

All data were obtained by two trained investigators. On the day before the operation, face-to-face interviews with patients and their parents or legal guardians were conducted to collect patient sociodemographic and clinical characteristics, and the degree of preoperative anxiety. And 27 factors were ultimately investigated in this study.

The sociodemographic data sheet included questions on age, sex, body mass index (BMI). The clinical characteristics including chronic diseases, history of ophthalmic surgery, anesthesia, analgesics and sedative, PONV and motion sickness, sleep duration on the night before surgery, sleep quality (classified into five categories: excellent, good, moderate, poor, very poor), fasting time, angle of strabismus, maintenance of general anesthesia (intravenous / inhalation), analgesic use during the operation (Flurbiprofen axetil / Nalbuphine / Flurbiprofen axetil +Nalbuphine), duration of Phase I and Phase II recovery, surgery on the dominant eye, number of operative EOMs, surgery duration, operative EOMs, surgery of inferior oblique anterior transposition, bilateral or unilateral eye surgery, were obtained from the patient's medical records.

The degree of preoperative anxiety was evaluated using the Chinese version of the modified Yale Preoperative Anxiety Scale (CmYPAS). The CmYPAS is a reliable observational behavioral scale that is applied to assess preoperative anxiety in children aged 2–12 years.[23] This scale consists of five dimensions: activity, occurrence, emotional expression, obvious alertness, and dependence on parents. The CmYPAS score ranges from 23.33–100 points. The higher the score, the higher the degree of pre-operative anxiety. The cut-off score of "no, mild anxiety" and "moderate and severe anxiety" was 42.78.

Discomfort, surgical, and anesthesia data were recorded the day following the operation. In the present study, the types of discomfort included PONV, headache, dizziness and EA within 24 hours after post-anesthesia care unit (PACU). EA was evaluated by the Pediatric Anesthesia Emergence Delirium (PAED) scale. The PAED scale consists of five behaviors, each of which is rated on a five-level scale of zero to four. A score greater than 10 is indicative of an emergence delirium diagnosis that warrants intervention.[24]

Statistical Analysis

Statistical descriptions are expressed as the mean ± standard deviation or median (interquartile range) for non-normally distributed variables or the frequency and proportion for categorical variables. An independent sample *t*-test was used to compare continuous variables with a normal distribution, and the Mann–Whitney *U*-test was used to analyze data that were not normally distributed. Categorical variables between the groups were tested using the chi-square test or Fisher's exact test. Factors associated with discomfort were analyzed using a logistic regression model. Statistical significance was set at $P<0.05$. All data were analyzed using SPSS software (version 25.0, Chicago, IL, USA).

Results

Participants

There were 350 eligible participants, out of which 309 were included in the study, and 300 completed the analysis (Figure 1). The participants ranged from 3 to 14 years, with an average age of (8.11±3.13) years. There were 155 males and 145 females. The median CmYPAS score was 30.94±11.53. Eleven percent of the participants experienced moderate severe preoperative anxiety. The children's basic characteristics are presented in Table 1.

Single-Factor Analysis and Multifactor Analysis of Postoperative Discomfort

Approximately 51.33% of the children experienced at least one of the following types of discomfort: PONV (23.00%), headache (4.33%), dizziness (20.33%) and EA (5.33%). Among the potential factors investigated in the univariate analysis, five factors were associated with postoperative discomfort ($P<0.05$): history of motion sickness, number of

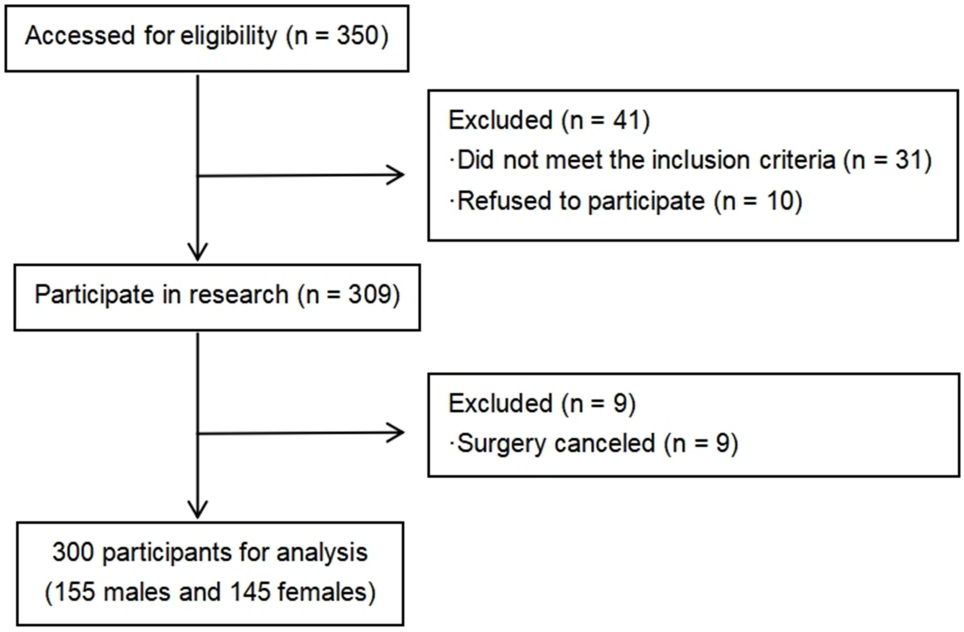

Figure 1 Flowchart of the study.

operative EOMs, surgery on the dominant eye, surgery duration, and surgery of the inferior oblique anterior transposition (IOAT). History of motion sickness (P<0.001, odds ratio [OR]=3.72), and surgery in the dominant eye (P=0.010, OR=2.00) were included in the multivariable model.

Single-Factor Analysis and Multifactor Analysis of PONV

During the first 24 hours after PACU, 28 (9.33%) and 41 (13.67%) of the children suffered from nausea and vomiting, respectively. Among the 41 patients with vomiting, 16 (39.02%), 25 (60.98%), 31 (75.61%), 35 (85.37%), and 41 (100.00%) vomited within 2, 4, 6, 12, and 24 hours after PACU. Univariate analysis showed that a history of PONV, motion sickness, number of operative EOMs, surgery duration, surgery on inferior oblique, surgery of IOAT, and bilateral eye surgery were associated with PONV (P<0.05) (Table 2). The two factors included in the multivariate analysis were history of motion sickness (P=0.001, OR=2.63), and surgery of IOAT (P=0.004, OR=3.10) (Table 2).

Table 1 Demographics and Characteristics of the Participants (n = 300)

Variable	Statistics
Sex, male/female, n	155/145
Age, years, mean ± SD	8.11±3.13
BMI, kg/m^2, mean ± SD	17.20±3.28
Chronic disease, n (%)	4 (1.33)
History of ophthalmic surgery, n (%)	20 (6.67)
History of anesthesia, n (%)	63 (21.00)
History of analgesics and sedative, n (%)	79 (26.33)
History of PONV, n (%)	3 (1.00)
History of motion sickness, n (%)	78 (26.00)
Sleep duration on the night before surgery, hour, mean ± SD	8.14±1.08

(*Continued*)

Table 1 (Continued).

Variable	Statistics
Parents' self-rated sleep quality of children	
Excellent	113 (37.67)
Good	161 (53.67)
Moderate	18 (6.00)
Poor	8 (2.66)
Very poor	0 (0.00)
CmYPAS score, mean ± SD	30.94±11.53
Fasting time, hour, mean ± SD	11.79±2.63
PD≥50, n (%)	46 (15.33)
Maintenance of general anesthesia, intravenous/inhalation, n	234/66
Analgesic use during the operation, n (%)	
Flurbiprofen axetil	17 (5.67)
Nalbuphine	261 (87.00)
Flurbiprofen axetil +Nalbuphine	22 (7.33)
Duration of phase I recovery, min, median (IQR)	37.00 (29.00–48.00)
Duration of phase II recovery, min, median (IQR)	23.00 (12.00–43.00)
Surgery on the dominant eye, n (%)	105 (37.50)
Number of operative EOMs, mean ± SD	2.24±0.90
Surgery duration, min, median (IQR)	23.00 (17.00–29.00)
Surgery on superior oblique, n (%)	5 (1.67)
Surgery on inferior oblique, n (%)	69 (23.00)
Surgery on superior rectus, n (%)	6 (2.00)
Surgery on inferior rectus, n (%)	1 (0.33)
Surgery of inferior oblique anterior transposition, n (%)	34 (11.33)
Surgery on the eye, bilateral/unilateral, n	77/223

Abbreviations: BMI, body mass index; CmYPAS, Chinese version of the modified Yale Preoperative Anxiety Scale; EOMs, extraocular muscles; IQR, interquartile range; PD, prism diopter; PONV, postoperative nausea and vomiting; SD, standard deviation.

Single-Factor Analysis and Multifactor Analysis of Postoperative Headache and Dizziness

The univariate analysis indicated that prism diopter (PD) ≥40 was associated with headache (P<0.05). Based on the multivariate analysis, PD≥40 was an independent predictor of headache (P=0.005, OR=5.53). Univariate analysis also showed that age, and history of motion sickness were associated with dizziness (P<0.05). And the two factors included in the multivariate analysis were age (P=0.020, OR=1.12), and history of motion sickness (P=0.001, OR=2.80) (Table 3).

Table 2 Univariable and Multivariable Logistic Regression Analysis of Detecting Potential Factors of PONV (n=300)

	PONV (n=69)	Non-PONV (n=231)	Univariable Analysis		Multivariable Model	
			χ^2/t/z	P	OR (95% CI)	P
History of PONV, n (%)	3/69 (4.35)	0/231 (0.00)	/	0.012		
History of motion sickness, n (%)	29/69 (42.03)	49/231 (21.21)	11.966	0.001	2.63 (1.46–4.76)	0.001
Surgery on the dominant eye, n (%)	29/69 (42.03)	76/231 (32.90)	1.946	0.163		
Number of operative EOMs, mean ± SD	2.55±0.98	2.15±0.85	−3.292	0.001		
Surgery duration, min, median (IQR)	21.00 (20.00–31.00)	23.00 (17.00–29.00)	−2.549	0.011		
Surgery on inferior oblique, n (%)	23/69 (33.33)	46/231 (19.91)	5.403	0.020		
Surgery of inferior oblique anterior transposition, n (%)	15/69 (21.74)	19/231 (8.23)	9.656	0.002	3.10 (1.45–6.64)	0.004
Bilateral eye surgery, n (%)	24/69 (34.78)	53/231 (22.94)	3.903	0.048		

Abbreviations: CI, confidence interval; EOMs, extraocular muscles; IQR, interquartile range; OR, odds ratio; PONV, postoperative nausea and vomiting; SD, standard deviation.

Table 3 Univariable and Multivariable Logistic Regression Analysis of Detecting Potential Factors of Dizziness (n=300)

	Dizziness (n=61)	Non-Dizziness (n=239)	Univariable Analysis		Multivariable Model	
			χ^2/t/z	P	OR (95% CI)	P
Age, years, mean ± SD	8.92±3.00	7.90±3.14	−2.284	0.023	1.12 (1.02–1.24)	0.020
History of anesthesia, n (%)	9/61 (14.75)	54/239 (22.59)	1.801	0.180		
History of motion sickness, n (%)	27/61 (44.26)	51/239 (21.34)	13.273	<0.001	2.80 (1.53–5.12)	0.001
Duration of phase I recovery, min, median (IQR)	35.00 (25.00–45.00)	37.00 (29.00–49.00)	−1.463	0.143		
Surgery on the dominant eye, n (%)	26/61 (42.62)	79/239 (33.05)	1.956	0.162		
Surgery of inferior oblique anterior transposition, n (%)	11/61 (18.03)	23/239 (9.62)	3.420	0.064		

Abbreviations: CI, confidence interval; OR, odds ratio; SD, standard deviation.

Single-Factor Analysis and Multifactor Analysis of EA

The results of univariate analysis showed that eight factors were associated with EA (P<0.05): age, BMI, parents' self-rated sleep quality of children, CmYPAS score, prism diopter (PD)≥50, surgery on inferior oblique, surgery of IOAT, and bilateral eye surgery (Table 4). Based on multivariate analysis, age was an independent predictor of EA (P<0.001, OR=0.36) (Table 4).

Table 4 Univariable and Multivariable Logistic Regression Analysis of Potential Factors of Emergence Agitation (n=300)

	EA (n=16)	Non-EA (n=284)	Univariable Analysis		Multivariable Model	
			χ^2/t/z	P	OR (95% CI)	P
Age, years, mean ± SD	3.56±1.15	8.36±3.009	−14.158	<0.001	0.36 (0.23–0.56)	<0.001
BMI, kg/m^2, mean ± SD	15.68±1.62	17.28±3.33	−3.572	0.002		
History of anesthesia, n (%)	0/16 (0.00)	63/284 (22.18)	3.255	0.071		

(*Continued*)

Table 4 (Continued).

	EA (n=16)	Non-EA (n=284)	Univariable Analysis		Multivariable Model	
			χ^2/t/z	P	OR (95% CI)	P
Parents' self-rated sleep quality of children			14.702	0.002		
Excellent	11 (68.75)	102 (35.92)				
Good	2 (12.5)	159 (55.99)				
Moderate	3 (18.75)	15 (5.28)				
Poor	0 (0.00)	8 (2.81)				
Very poor	0 (0.00)	0 (0.00)				
CmYPAS score, mean ± SD	45.31±19.32	30.13±10.41	3.117	0.007		
PD≥50, n (%)	6/16 (37.50)	40/284 (14.08)	4.720	0.030		
Maintenance of general anesthesia, intravenous/inhalation, n	16/0	218/66	3.509	0.061		
Number of operative EOMs, mean ± SD	2.69±1.08	2.22±0.88	1.709	0.107		
Surgery on inferior oblique, n (%)	8/16 (50.00)	61/284 (21.48)	5.440	0.020		
Surgery of inferior oblique anterior transposition, n (%)	5/16 (31.25)	29/284 (10.21)	4.742	0.029		
Bilateral eye surgery, n (%)	8/16 (50.00)	69/284 (24.30)	/	0.035		

Abbreviations: BMI, body mass index; CI, confidence interval; CmYPAS, Chinese version of the modified Yale preoperative anxiety scale; EA, emergence agitation; OR, odds ratio; PD, prism diopter; SD, standard deviation.

Discussion

Pediatric strabismus surgery can be performed under local anesthesia. Injection of local anesthetic into the intraconal orbital compartment may cause fluctuations in intraocular pressure.[25] In addition, relevant studies have indicated that the postoperative discomfort after local anesthesia included PONV, postoperative pain, EA,[25,26] which is similar to the discomfort under general anesthesia. However, since these discomforts are primarily related to anesthesia,[27] the degree of postoperative discomfort may be more severe under general anesthesia than under local anesthesia.

Strabismus surgery in children has been associated with a higher risk of PONV than other surgical procedures.[28,29] The proposed mechanisms include the stimulation of the oculo-emetic reflex during traction on the extra-ocular muscles and alterations in visual perception postoperatively. There were 69 children (23.00%) who had PONV in this study, while previous studies have reported incidence rates ranging from 18 to 68.2%.[30–32] We found that more than half of the children vomited within 4 hours after PACU. Previous studies have indicated that emesis after strabismus surgery tend to occur after 2–8 hours, rather than immediately postoperatively. At present, there is no PONV risk score or scale for patients with strabismus surgery. Some studies have reported independent risk factors of PONV in adult patients with strabismus. Li et al showed that the duration of surgery was an independent risk factor for PONV, with a cut-off point of 29.5 minutes, sensitivity of 1.00, and specificity of 0.64.[33] In addition, Huang et al reported that female sex, inferior rectus surgery, and inferior oblique surgery were independent risk factors for adult postoperative vomiting.[7] Similar to previous studies, we found that a history of motion sickness and IOAT were risk factors for PONV in children who underwent strabismus surgery. A history of motion sickness has been identified as a risk factor for pediatric PONV in a previously established guideline.[9] Furthermore, different surgical procedures for the EOM have also been associated with PONV.[34] Lerman[35] demonstrated that the probability of PONV increased as the operative EOM increased. Therefore, the inferior oblique muscle, which is less accessible during surgery, may be more likely to lead to PONV. In our study, we found that the risk factor, IOAT, was not just the inferior oblique muscle, but it was specific to the surgical procedure of inferior oblique muscle. IOAT is an effective procedure for weakening inferior oblique overaction coexisting with dissociated vertical deviation,[36] which is technically more challenging than other inferior oblique-

weakening procedures.[37] The mechanisms underlying IOAT and PONV remain unclear. Further studies need to be conducted to confirm the potential mechanisms between the inferior oblique and PONV.

In the present study, 20.33% of patients complained of dizziness during the first 24 hours after surgery. In contrast, Huang et al reported that 28.57% of adult patients felt dizziness. Previous studies explained that dizziness may be due to the residual effect of anesthetics, inadequate hydration, and surgical outcome.[21,38] The results of the multivariate analysis in this study showed that age and history of motion sickness were significantly associated with dizziness. Few studies have evaluated motion sickness in patients who underwent surgery under general anesthesia. Our data indicate that a history of motion sickness may be a critical independent predictor of dizziness symptoms in children.

While a number of previous studies have focused on EA in children in PACU, our study found that 5.33% of children aged 2–5 years experienced EA after they were transferred to the ward. Consistent with previous studies,[39–41] we found that age was a significant predictor of EA in children. The incidence of EA in strabismus surgery is still high, not only due to the anesthesia course mainly consisting of sevoflurane and the fear of dressing coverage but also because of the distressing preoperative period.[42]

Various potential risk factors for postoperative discomfort were also identified in the present study. Notably, we found that surgery in the dominant eye and surgery of IOAT were predictors of postoperative discomfort. Therefore, these factors may facilitate symptom management by ophthalmologists and nurses. Moreover, we observed that vomiting tended to occur within 4–6 hours after PACU, indicating that child caretakers may be more attentive within this time frame. Altogether, appropriate preventive measures should be taken promptly to relieve the postoperative discomfort to patients.

This study had some limitations. First, these postoperative discomfort symptoms are mainly due to the combination of anesthesia and strabismus surgery,[26] patients may have one or several symptoms at the same time. The mechanism between these symptoms is unclear, and the interplay between these symptoms is undoubtedly a complex one.[43] To date, the optimal combination of postoperative discomfort prevention strategies remains unknown, and further exploration of the mechanism between these symptoms is needed in the future. Second, this was a cross-sectional study that was conducted in a single center. Larger cohort studies are required to confirm the risk factors for postoperative discomfort in children after strabismus surgery under general anesthesia. Third, the surgeries were performed by different senior strabismus surgeons and the differences among surgeons were not analyzed in this study. Last, while a history of PONV and a family history of PONV are proven risk factors for pediatric PONV, only a few children in our study had these risks. Therefore, a history of PONV was not included in the regression model. Similarly, bilateral strabismus surgery, the number of surgical EOMs were not included in the multivariable model ultimately. These two factors seem to be associated with postoperative discomfort after pediatric strabismus surgery under general anesthesia in clinical practice, which also need to be taken seriously. Future multicenter studies with larger sample sizes are required to confirm the results of the present study.

Conclusion

The most common postoperative discomfort experienced by children after strabismus surgery (under general anesthesia) are PONV, dizziness, EA, and headache in this cohort study. A history of motion sickness and IOAT were the defining risk factors for PONV. Age and a history of motion sickness may be independent risk factors for postoperative dizziness. The independent risk factors for EA and headache were a younger age and larger strabismus angle, respectively. Prospective identification of the factors associated with postoperative discomfort should provide a theoretical basis for developing a more targeted intervention plan to improve postoperative discomfort in patients undergoing general anesthesia and surgery for strabismus.

Abbreviations

BMI, body mass index; CmYPAS, Chinese version of the modified Yale preoperative anxiety scale; EOMs, extraocular muscles; IOAT, inferior oblique anterior transposition; PACU, post-anesthesia care unit; PAED, pediatric anesthesia emergence delirium; PD, prism diopter; PONV, postoperative nausea and vomiting.

Data Sharing Statement

The data are available from the corresponding author on reasonable request.

Ethics Approval

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of the Zhongshan Ophthalmic Center, Sun Yat-sen University, approval number [2022KYPJ212]. Consent to participate Informed consent was obtained from all individual participants' parent/legal guardian included in the study.

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Disclosure

The authors report no conflicts of interest in this work.

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