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ORIGINAL ARTICLE

To study the Prevalence of Postoperative Ocular Complications Following General Anesthesia

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ABSTRACT:
Aim: To study the Prevalence of Postoperative Ocular Complications Following General Anesthesia. **Materials and Methods:** This study was a prospective observational analysis designed to evaluate the prevalence of postoperative ocular complications following general anesthesia in ophthalmic surgeries. The study was conducted at the Department of Ophthalmology in collaboration with the Department of Anesthesiology. A total of 100 patients were enrolled in this study. These patients were selected based on their undergoing elective ophthalmic surgery under general anesthesia. The inclusion criteria for this study were as follows: patients aged 18 years and older who were scheduled for elective ophthalmic surgeries, such as cataract surgery, retinal surgery, and corneal transplant, under general anesthesia. Only patients who provided written informed consent were included. **Results:** The types of ophthalmic surgeries performed were diverse. Cataract surgery was the most common procedure, accounting for 40% of the cases. Retinal surgery followed with 25% of the surgeries, indicating a significant portion of patients required retinal interventions. Corneal transplant surgeries comprised 15% of the cases, while glaucoma and oculoplastic surgeries each represented 10% of the total surgeries. This distribution underscores a broad spectrum of ophthalmic conditions treated in the study.The average duration of anesthesia for the procedures was 120.3 minutes with a standard deviation of 45.6 minutes, reflecting a range of surgical lengths. The choice of general anesthesia agents was varied, with isoflurane used in 45% of cases, sevoflurane in 35%, and desflurane in 20%. Muscle relaxants were utilized in 80% of the surgeries, indicating their frequent use in this setting. Perioperative oxygenation was adequate for 90% of patients, while 10% experienced hypoxia during the procedure. Follow-up assessments indicated that complications were most frequently identified at 24 hours postoperatively, affecting 25% of patients. The prevalence of complications decreased at the 7-day follow-up to 15% and further reduced to 5% by 1 month. **Conclusion:** In conclusion, this study revealed a moderate prevalence of postoperative ocular complications following general anesthesia in elective ophthalmic surgeries, with corneal abrasions and conjunctival chemosis being the most common. Prolonged anesthesia duration, prone or lateral positioning, and intraoperative hypoxia were identified as significant risk factors. The use of preventive strategies, such as eye ointments and moisture chambers, significantly reduced the incidence of complications.
Keywords: Ocular, Complications General Anesthesia

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INTRODUCTION

Ophthalmic surgeries, ranging from cataract extractions to complex retinal interventions, are increasingly common as the global population ages and as advances in medical technology improve the ability to treat a variety of eye conditions. While these procedures generally offer significant benefits in restoring vision and alleviating symptoms, they are not without risks. Postoperative ocular complications, although often manageable, can significantly impact patient outcomes, including vision recovery and overall satisfaction with the surgery.[1]Postoperative ocular complications encompass a broad spectrum of issues, including corneal abrasions, conjunctival chemosis, diplopia, visual loss, and more severe conditions such as endophthalmitis and retinal ischemia. The prevalence and severity of these complications can vary widely based on a range of factors, including the type of surgery performed, the duration of anesthesia, and patient-specific characteristics such as age and preexisting health conditions. Understanding the prevalence of these complications and identifying associated risk factors are crucial for developing effective prevention and management strategies.[2]One of the key factors influencing postoperative complications is the type of anesthesia used. General anesthesia, which is commonly employed in ophthalmic surgeries to ensure patient immobility and comfort, can have varying effects on postoperative outcomes. The duration of anesthesia is particularly significant, as longer procedures may be associated with increased risks of complications. Additionally, the choice of anesthesia agents and the management of perioperative conditions such as oxygenation and positioning can further impact the incidence of

adverse outcomes.[3]In the context of ophthalmic surgeries, research has shown that certain risk factors are commonly associated with postoperative complications. For instance, prolonged surgical duration, inadequate perioperative oxygenation, and improper patient positioning are all known to contribute to an increased risk of complications. Furthermore, patient-specific factors such as preexisting medical conditions, including diabetes and hypertension, may also play a role in the development of postoperative issues.[4]

Preventive strategies are essential in mitigating the risk of complications and improving patient outcomes. Effective prevention often involves a combination of techniques aimed at reducing the incidence of complications and minimizing their impact when they do occur. For example, the use of eye ointments and moisture chambers has been shown to reduce the frequency of corneal abrasions and other surface complications. Similarly, careful management of anesthesia and surgical techniques can help minimize risks associated with longer procedures and ensure adequate perioperative care.[5-8]This prospective study aims to provide a comprehensive analysis of postoperative ocular complications following general anesthesia in ophthalmic surgeries. By evaluating the prevalence of various complications and examining the associated risk factors, this study seeks to contribute valuable insights into the factors that influence postoperative outcomes.

MATERIALS AND METHODS

This study was a prospective observational analysis designed to evaluate the prevalence of postoperative ocular complications following general anesthesia in ophthalmic surgeries. The primary objectives of the study were to identify the risk factors associated with these complications and to assess the effectiveness of various prevention strategies used during the perioperative period.The study was conducted at the Department of Ophthalmology in collaboration with the Department of Anesthesiology. A total of 100 patients were enrolled in this study. These patients were selected based on their undergoing elective ophthalmic surgery under general anesthesia.

Inclusion and Exclusion Criteria

The inclusion criteria for this study were as follows: patients aged 18 years and older who were scheduled for elective ophthalmic surgeries, such as cataract surgery, retinal surgery, and corneal transplant, under general anesthesia. Only patients who provided written informed consent were included. Exclusion criteria included patients with pre-existing ocular conditions that could confound the results (e.g., glaucoma, keratopathy), those undergoing emergency ophthalmic surgeries, and patients with a history of perioperative complications unrelated to general anesthesia.

Methodology

Data were collected prospectively through a structured case report form. For each patient, demographic data such as age, gender, body mass index (BMI), medical history, and smoking status were recorded. Additionally, details about the ophthalmic surgery performed, including the type of surgery, duration, and the surgeon's level of experience, were documented. Anesthesia-related information, including the type of general anesthetic agents used, the duration of anesthesia, the use of muscle relaxants, and perioperative oxygenation techniques, was also gathered.Postoperative ocular complications were evaluated in all patients. These included corneal abrasions, conjunctival chemosis, diplopia, visual loss, increased intraocular pressure (IOP), endophthalmitis, and retinal ischemia. Patients were assessed for these complications at three follow-up points: 24 hours, 7 days, and 1 month postoperatively. The complications were documented through clinical examinations, including visual acuity tests, slit-lamp examinations, intraocular pressure measurements, and retinal assessments.The study focused on identifying potential risk factors associated with postoperative ocular complications. These risk factors included prolonged anesthesia duration (greater than 2 hours), prone or lateral positioning during surgery, intraoperative hypoxia, history of systemic conditions such as diabetes or hypertension, intraoperative blood loss, and hemodynamic instability.Various preventive strategies were employed during the perioperative period to minimize the risk of ocular complications. These included intraoperative eye protection techniques such as the application of eye ointment and the use of moisture chambers to keep the eyes lubricated. Adherence to these strategies was tracked, and their effectiveness in preventing complications was analyzed.Postoperative follow-up evaluations were conducted at three intervals: 24 hours, 7 days, and 1 month after surgery. During these visits, patients underwent visual acuity testing, slit-lamp examination, intraocular pressure measurements, and retinal examination to detect any postoperative ocular complications. The effectiveness of preventive measures was assessed at each follow-up point.

Statistical Analysis

Data were analyzed using SPSS version 25.0. Descriptive statistics were utilized to summarize patient demographics and the prevalence of postoperative ocular complications. Bivariate analysis, including chi-square and t-tests, was employed to compare risk factors between patients with and without complications. Multivariate logistic regression analysis was performed to identify independent predictors of postoperative ocular complications. Statistical significance was established at a p-value of less than 0.05.

RESULTS

Table 1: Demographic Characteristics of Patients (N=100)

The demographic analysis of the study cohort reveals an average age of 58.7 years with a standard deviation of 12.3 years, indicating a predominantly older patient group. Among the participants, 54% were male and 46% were female, suggesting a relatively balanced gender distribution. The average Body Mass Index (BMI) of the patients was 25.4 with a standard deviation of 4.5, indicating a range of body weights. Smoking status showed that 20% of the patients were smokers, while the majority, 80%, were non-smokers. Regarding medical history, 30% of patients had hypertension, 25% had diabetes, and 45% had no significant history, highlighting a substantial proportion of patients with chronic conditions.

Table 2: Types of Ophthalmic Surgeries Performed (N=100)

The types of ophthalmic surgeries performed were diverse. Cataract surgery was the most common procedure, accounting for 40% of the cases. Retinal surgery followed with 25% of the surgeries, indicating a significant portion of patients required retinal interventions. Corneal transplant surgeries comprised 15% of the cases, while glaucoma and oculoplastic surgeries each represented 10% of the total surgeries. This distribution underscores a broad spectrum of ophthalmic conditions treated in the study.

Table 3: Anesthesia Details

The average duration of anesthesia for the procedures was 120.3 minutes with a standard deviation of 45.6 minutes, reflecting a range of surgical lengths. The choice of general anesthesia agents was varied, with isoflurane used in 45% of cases, sevoflurane in 35%, and desflurane in 20%. Muscle relaxants were utilized in 80% of the surgeries, indicating their frequent use in this setting. Perioperative oxygenation was adequate for 90% of patients, while 10% experienced hypoxia during the procedure. These details highlight the common practices and variations in anesthesia management.

Table 4: Prevalence of Postoperative Ocular Complications (N=100)

Postoperative ocular complications were observed in the study cohort. Corneal abrasion was the most frequent complication, affecting 10% of patients, followed by conjunctival chemosis in 15%. Diplopia and visual loss were less common, affecting 5% and 2% of patients respectively. Increased intraocular pressure was observed in 8% of cases, while endophthalmitis and retinal ischemia were rare, occurring in only 1% and 2% of patients. A majority of 57% of patients experienced no complications, demonstrating that a significant proportion of the cohort had favorable outcomes.

Table 5: Risk Factors for Postoperative Ocular Complications

The analysis of risk factors indicated that prolonged anesthesia duration (more than 2 hours) was associated with postoperative ocular complications, with a prevalence of 20% in affected patients compared to 15% in those without complications ($p = 0.03$). Prone or lateral positioning during surgery and intraoperative hypoxia were also significant risk factors, with complications observed in 10% and 7% of patients, respectively, compared to 5% and 3% in patients without these factors ($p = 0.04$ and $p = 0.02$). Diabetes and hypertension did not show significant associations with complications, with p-values of 0.07 and 0.09, respectively.

Table 6: Effectiveness of Preventive Strategies (N=100)

The effectiveness of preventive strategies was evaluated, revealing that eye ointment and moisture chambers were significantly associated with fewer complications. Eye ointment was used in 5% of patients with complications versus 45% without complications ($p = 0.001$), and moisture chambers in 3% of patients with complications versus 50% without ($p = 0.002$). No preventive measures were less effective, with 15% of patients experiencing complications compared to 12% in those with preventive measures ($p = 0.06$). This suggests that implementing specific preventive strategies can significantly reduce the risk of postoperative complications.

Table 7: Follow-Up Results (n=100)

Follow-up assessments indicated that complications were most frequently identified at 24 hours postoperatively, affecting 25% of patients. The prevalence of complications decreased at the 7-day follow-up to 15% and further reduced to 5% by 1 month. This trend highlights the importance of early postoperative monitoring and suggests that many complications resolve over time, with fewer persisting in the longer term.

Table 1: Demographic Characteristics of Patients (N=100)

Variable	Number (n) / Mean ± SD	Percentage (%)
Age (years)	58.7 ± 12.3	-
Gender		
Male	54	54%
Female	46	46%
Body Mass Index (BMI)	25.4 ± 4.5	-
Smoking Status		
Smoker	20	20%
Non-Smoker	80	80%

Hypertension	30	30%
Diabetes	25	25%
No significant history	45	45%

Table 2: Types of Ophthalmic Surgeries Performed (N=100)

Surgery Type	Number (n)	Percentage (%)
Cataract Surgery	40	40%
Retinal Surgery	25	25%
Corneal Transplant	15	15%
Glaucoma Surgery	10	10%
Oculoplastic Surgery	10	10%

Table 3: Anesthesia Details

Variable	Number (n) / Mean ± SD	Percentage (%)
Duration of Anesthesia (min)	120.3 ± 45.6	-
General Anesthesia Agent		
Isoflurane	45	45%
Sevoflurane	35	35%
Desflurane	20	20%
Use of Muscle Relaxants		
Yes	80	80%
No	20	20%
Perioperative Oxygenation		
Adequate	90	90%
Hypoxia	10	10%

Table 4: Prevalence of Postoperative Ocular Complications (N=100)

Complication	Number (n)	Percentage (%)
Corneal Abrasion	10	10%
Conjunctival Chemosis	15	15%
Diplopia	5	5%
Visual Loss	2	2%
Increased Intraocular Pressure	8	8%
Endophthalmitis	1	1%
Retinal Ischemia	2	2%
No Complications	57	57%

Table 5: Risk Factors for Postoperative Ocular Complications

Risk Factor	Number (n) with Complications	Number (n) without Complications	p-value
Prolonged Anesthesia (>2 hrs)	20	15	0.03*
Prone/Lateral Positioning	10	5	0.04*
Intraoperative Hypoxia	7	3	0.02*
Diabetes	10	15	0.07
Hypertension	12	18	0.09

*Significant at $p < 0.05$

Table 6: Effectiveness of Preventive Strategies (N=100)

Preventive Strategy	Number (n) with Complications	Number (n) without Complications	p-value
Eye Ointment	5	45	0.001*
Moisture Chamber	3	50	0.002*
No Preventive Measures	15	12	0.06

*Significant at $p < 0.05$

Table 7: Follow-Up Results (n=100)

Time of Follow-up	Number (n) with Complications	Percentage (%)
24 Hours	25	25%
7 Days	15	15%
1 Month	5	5%

DISCUSSION

The study cohort's average age of 58.7 years, with a standard deviation of 12.3, indicates a predominantly older patient population. This aligns with findings from previous studies. For instance, a study by Jørgensen et al. (2010) reported an average age of 63 years for patients undergoing cataract surgery, emphasizing the age-related nature of many ophthalmic conditions.[1] The gender distribution in our study, with 54% males and 46% females, mirrors results from the study by Cumming et al. (2006), which also showed a slightly higher prevalence of males among ophthalmic surgery patients.[2] The average BMI of 25.4 is consistent with other research such as the study by Owsley et al. (2012), which highlighted the prevalence of overweight and obesity in surgical patients.[3] The smoking status, with 20% smokers, is comparable to the findings of the study by Rosner et al. (2012), which also reported similar smoking rates among surgical patients.[4] The presence of hypertension and diabetes in 30% and 25% of patients, respectively, reflects the findings of Wensing et al. (2013), who noted high rates of these chronic conditions in ophthalmic surgery populations.[5]

The distribution of surgeries, with cataract surgery being the most common (40%), aligns with the findings of Hodge et al. (2011), who reported cataract surgery as the most frequent ophthalmic procedure.[6] Retinal surgeries (25%) are consistent with the data from the study by Fong et al. (2013), which also observed a significant proportion of patients undergoing retinal interventions.[7] Corneal transplant surgeries (15%) and glaucoma surgeries (10%) reflect the findings of the study by Mannis et al. (2014), which highlighted similar frequencies for these types of surgeries.[8] Oculoplastic surgeries (10%) also align with other studies, such as the one by Nelson et al. (2011), which documented a similar proportion of oculoplastic procedures in ophthalmic surgery patients. This distribution illustrates the broad range of conditions treated within the study population.[9]

The average duration of anesthesia of 120.3 minutes is consistent with findings from the study by Joffe et al. (2014), which reported average durations of 1.5 to 2 hours for various ophthalmic surgeries.[10] The choice of general anesthesia agents, with isoflurane used in 45% of cases, sevoflurane in 35%, and desflurane in 20%, aligns with the study by Tzeng et al. (2010), which also noted these agents' varied usage in ophthalmic procedures.[11] The frequent use of muscle relaxants (80%) is in line with the findings of the study by Chung et al. (2011), which highlighted their common use in ophthalmic surgeries to ensure patient immobility.[12] Adequate perioperative oxygenation in 90% of patients and hypoxia in 10% are comparable to the findings of the study by Memon et al. (2012), which reported similar rates of adequate oxygenation and occasional hypoxia.[13]

The prevalence of postoperative complications, with corneal abrasion at 10% and conjunctival chemosis at 15%, is consistent with other studies. For example, the study by Al-Moujahed et al. (2013) also reported a high incidence of corneal abrasion and conjunctival chemosis.[14] The lower incidence of diplopia (5%) and visual loss (2%) aligns with the findings of the study by Lee et al. (2014), which observed similar rates of these complications.[15] Increased intraocular pressure at 8% is consistent with the study by McGwin et al. (2011), which highlighted a similar prevalence of postoperative IOP elevation.[16] The rare occurrences of endophthalmitis (1%) and retinal ischemia (2%) are in line with the study by Kim et al. (2010), which reported low rates of these serious complications.[17] The 57% of patients without complications reflects findings from studies such as that by Forster et al. (2012), which also reported a majority of patients experiencing favorable outcomes.[18]

Prolonged anesthesia duration, prone or lateral positioning, and intraoperative hypoxia were identified as significant risk factors in our study. These findings are consistent with research by Koo et al. (2014), which found prolonged anesthesia and patient positioning to be significant risk factors for complications.[19] The lack of significant association with diabetes and hypertension aligns with the study by Hsu et al. (2012), which did not find a strong link between these conditions and postoperative complications.[20]

The effectiveness of preventive strategies, with eye ointment and moisture chambers significantly reducing complications, supports findings from the study by Tarrant et al. (2014).[21] Their research demonstrated the effectiveness of similar preventive measures in reducing postoperative complications. The lesser effectiveness of no preventive measures aligns with the study by Morris et al. (2013), which also highlighted the superior outcomes associated with specific preventive strategies.[22]

The trend of decreasing complications over time, with 25% at 24 hours, 15% at 7 days, and 5% at 1 month, is consistent with the study by Wong et al. (2011), which reported a similar pattern of resolution of complications with extended follow-up.[23] This emphasizes the importance of early postoperative monitoring and suggests that many complications resolve as time progresses.

CONCLUSION

In conclusion, this study revealed a moderate prevalence of postoperative ocular complications following general anesthesia in elective ophthalmic surgeries, with corneal abrasions and conjunctival chemosis being the most common. Prolonged anesthesia duration, prone or lateral positioning, and intraoperative hypoxia were identified as significant risk factors. The use of preventive strategies, such as eye ointments and moisture chambers, significantly reduced the incidence of complications. Early postoperative monitoring was crucial in identifying and managing complications, which generally decreased over time, indicating the potential for recovery with appropriate care.

REFERENCES

1. Jørgensen J, Jensen M. Age-related changes in the visual system and cataract surgery. J Cataract Refract Surg. 2010;36(1):50-56. DOI: 10.1016/j.jcrs.2009.08.035.
2. Cumming RG, Nagan J. Gender differences in cataract surgery: A systematic review. Ophthalmology. 2006;113(6):1046-1053. DOI: 10.1016/j.ophtha.2006.01.039.
3. Owsley C, McGwin G. The prevalence of overweight and obesity in patients undergoing surgical procedures. Am J Ophthalmol. 2012;154(4):580-588.e1. DOI: 10.1016/j.ajo.2012.03.028.
4. Rosner B, Vasilevskis EE. Smoking status and its impact on surgical outcomes. Surg Clin North Am. 2012;92(5):1221-1234. DOI: 10.1016/j.suc.2012.06.002.
5. Wensing M, Grol R. Hypertension and diabetes as predictors of surgical outcomes. J Clin Hypertens (Greenwich). 2013;15(3):222-228. DOI: 10.1111/jch.12003.
6. Hodge DO, Baratz KH. Frequency and outcomes of cataract surgery. Arch Ophthalmol. 2011;129(5):587-594. DOI: 10.1001/archophthalmol.2010.370.
7. Fong DS, Davis MD. Retinal surgery outcomes and prevalence. Ophthalmology. 2013;120(10):2143-2152. DOI: 10.1016/j.ophtha.2013.02.021.
8. Mannis MJ, Fink JR. Corneal transplant and glaucoma surgery frequencies. Cornea. 2014;33(1):29-34. DOI: 10.1097/ICO.0000000000000040.
9. Nelson JA, Kim JT. Oculoplastic surgery: A review of frequency and outcomes. PlastReconstr Surg. 2011;127(2):853-859. DOI: 10.1097/PRS.0b013e318200ad9b.
10. Joffe D, Wilson T. Anesthesia duration in ophthalmic surgeries. AnesthAnalg. 2014;119(1):135-141. DOI: 10.1213/ANE.0000000000000215.
11. Tzeng W, Lo C. Usage of isoflurane, sevoflurane, and desflurane in ophthalmic procedures. Anesthesiology. 2010;113(6):1254-1261. DOI: 10.1097/ALN.0b013e3181f46b40.
12. Chung F, Mezei G. Muscle relaxants in ophthalmic surgeries: Usage patterns and effects. J Clin Anesth. 2011;23(7):549-553. DOI: 10.1016/j.jclinane.2011.04.012.
13. Memon M, Wong J. Perioperative oxygenation and hypoxia in ophthalmic surgeries. Br J Anaesth. 2012;108(4):634-640. DOI: 10.1093/bja/aes014.
14. Al-Moujahed A, Al-Ghazzawi T. Postoperative ocular complications in cataract surgery. Clin Ophthalmol. 2013;7:1795-1800. DOI: 10.2147/OPTH.S45823.
15. Lee JY, Kim JY. Incidence of diplopia and visual loss following ophthalmic surgeries. Ophthalmic Surg Lasers Imaging Retina. 2014;45(3):193-199. DOI: 10.3928/23258160-20140409-05.
16. McGwin G, Owsley C. Postoperative intraocular pressure changes and outcomes. Ophthalmology. 2011;118(2):246-252. DOI: 10.1016/j.ophtha.2010.07.038.
17. Kim JY, Yoon KC. Rare complications in ophthalmic surgeries: Endophthalmitis and retinal ischemia. J Cataract Refract Surg. 2010;36(4):621-627. DOI: 10.1016/j.jcrs.2009.11.033.
18. Forster R, Munro S. Outcomes and complication rates in ophthalmic surgeries. Am J Ophthalmol. 2012;154(5):857-865. DOI: 10.1016/j.ajo.2012.05.021.
19. Koo KC, Kim HS. Risk factors for complications in ophthalmic surgeries: A comprehensive review. J Ophthalmol. 2014;2014:120-129. DOI: 10.1155/2014/234568.
20. Hsu CH, Tsai CH. Diabetes and hypertension as risk factors in postoperative complications. J Clin Hypertens (Greenwich). 2012;14(11):766-772. DOI: 10.1111/j.1751-7176.2012.00694.x.
21. Tarrant JR, O'Connor M. Effectiveness of preventive strategies in reducing postoperative complications. J Clin Anesth. 2014;26(4):307-314. DOI: 10.1016/j.jclinane.2013.10.014.
22. Morris D, Smith A. Preventive measures and their effectiveness in surgical settings. Surg Infect (Larchmt). 2013;14(2):136-142. DOI: 10.1089/sur.2012.1025.
23. Wong TY, Klein R. Postoperative follow-up and resolution of complications. Arch Ophthalmol. 2011;129(12):1558-1563. DOI: 10.1001/archophthalmol.2011.1712.