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PERIOPERATIVE ANALGESIC PRACTICES AND POSTOPERATIVE PAIN MANAGEMENT IN OPHTHALMIC SURGERIES: A CROSS-SECTIONAL STUDY FROM A TERTIARY CARE HOSPITAL IN PAKISTAN.

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ABSTRACT

BACKGROUND: Effective perioperative and postoperative pain management is essential for ensuring optimal recovery and patient satisfaction in ophthalmic surgery. However, analgesic practices often vary depending on the type of surgery and institutional protocols. **OBJEVCTIVE:** This study aimed to evaluate perioperative therapy, analgesic use, and their associations with different ophthalmic surgical procedures in a tertiary care hospital setting. **METHODS:** A descriptive cross-sectional study was conducted among 231 patients undergoing various ophthalmic surgeries. Data were collected regarding demographic characteristics, ASA physical status, perioperative medications, and postoperative analgesic use. Frequencies, percentages, means, and standard deviations were calculated. Associations between type of surgery and analgesic administration were examined. **RESULTS:** The study population had a mean age of 67 ± 14 years, with 54.1% males. ASA II status was most prevalent (64.5%). Preoperative sedatives were administered to only 45.9% of patients. Atropine (80.1%) and neostigmine (80.5%) were the most common intraoperative agents. Postoperative analgesia was not administered in 45.9% of patients. Diclofenac (26.8%) and metamizole sodium (29.9%) were the most frequently used analgesics. Analgesic use was highest among patients undergoing enucleation (83.3%) and evisceration (80.0%), while cataract surgeries had the lowest (10.0%). A single dose on the first postoperative day was the most common pattern (52.8%). **CONCLUSION:** Analgesic use following ophthalmic surgery is inconsistently applied, with nearly half of patients receiving no pain relief. Invasive procedures showed higher analgesic needs, highlighting the need for standardized, procedure-specific pain management protocols to ensure adequate postoperative care.

KEYWORDS: Ophthalmologic Surgical Procedures; Analgesia; Postoperative Pain; Pain Management; Perioperative Care

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INTRODUCTION

Postoperative pain remains one of the most prevalent yet underrecognized consequences of surgical care[1]. While advances in perioperative medicine have improved patient outcomes in many domains, the management of pain—particularly in specialties perceived to involve minimal tissue trauma—continues to lag behind clinical best practices[2]. Ophthalmic surgery, often categorized as minor or low-risk, includes a range of complex procedures such as enucleation, evisceration, pars plana vitrectomy, and extensive orbital reconstructions[3]. These surgeries can result in significant postoperative pain, yet are frequently approached with minimal analgesic planning[4].

In modern medicine an oversight in postoperative pain control is hardly trivial; it can unsettle electrolyte balance, delay the knitting of tissue, stretch hospitalization past reasonable limits, and on the worst days usher in a confounding chronic-pain presentation[5]. More quietly, when hurt lingers longer than necessary, hope ebbs and the whole rhythm of healing stutters[6]. Alarmed by that toll, groups like the American Society of Anesthesiologists now demand stitched-together plans that mix drugs, check scores hourly, and ride with the patient from the OR to the ward[7]. Even so, a gap that feels more like a canyon persists between those glossy guidelines and the frayed reality of units where every inch of staff and supply is already pulled thin[8].

Against that backdrop a team at Hayatabad Medical Complex-a cornerstone hospital in Peshawar and a training ground for local surgeons-fixed its eye on a more contained question. Over one compact quarter they sifted theater records for patients who had complex ocular work and logged whatever analgesic choices appeared in the notes. The simple hope was to put a long-held hunch to the test: that what happens in the trenches rarely matches the polished targets the handbooks tout, a gap glaring enough to kick-start fresh teaching rounds and rewrite standing orders.

METHODS

This observational crosssectional study was carried out at Hayatabad Medical Complex in Peshawar-one of the citylargest tertiary referral hospitals.. Institutional ethics reviewers issued their clearance within 24 hours, and each patient file was stripped of personal identifiers in line with the hospitals strict information-protection protocols. Analysis ultimately encompassed 231 adults aged 18 and older, all of whom received a so-called complex ophthalmic procedure during the window from January 2023 through March 2024 [(9)]. The sample size was calculated to estimate the proportion of patients receiving postoperative analgesia with a 10% margin of error (95% CI), assuming a baseline rate of 54.1%. This yielded a minimum of 96 patients. To enable subgroup comparisons across 8 surgical types, the target was increased to ~240 patients (30 per subgroup). The final cohort (N=231) achieved both goals, ensuring precise descriptive estimates and exploratory subgroup analyses. Surgeons classified a case as complex if it involved pars plana vitrectomy, enucleation, evisceration, or extensive ocular reconstruction; cataract extraction under general anesthesia also met the threshold because of expected tissue handling and the likelihood of moderate to severe postoperative pain.

Minor interventions performed under local anesthesia were deliberately excluded from the cohort to limit variability in pain and recovery profiles.

Relevant clinical data were extracted from patient medical records. These included demographic variables (age and sex), American Society of Anesthesiologists (ASA) physical status classification, type and duration of the surgical procedure, type and dosage of anesthesia administered, and all preoperative and postoperative analgesic interventions. Specific attention was given to the documentation of pain intensity, the frequency and dosage of analgesics, the use of multimodal analgesia, and the presence of any non-pharmacological pain management strategies.

In addition, institutional practices were reviewed to assess adherence to pain management guidelines. This included whether pain was assessed as a routine vital sign, whether postoperative pain intensity was recorded, whether patients were transferred to a monitored recovery area, and whether structured education on pain management was provided to ophthalmology staff. Data were entered into a secure electronic database and analyzed using SPSS version 26.0. Descriptive statistics were computed, and comparative analyses were conducted using chi-square and independent t-tests where appropriate. Statistical significance was defined as a p-value of less than 0.05.

RESULTS

In the current study, a total of 231 participants were included. The gender distribution revealed that men constituted a slightly higher proportion of the study population, accounting for 125 individuals (54.1%), while women made up 106 individuals (45.9%) (Table 1). The mean age of the participants was 67 years with a standard deviation of ±14, indicating a predominantly older adult cohort.

Regarding the American Society of Anesthesiologists (ASA) physical status classification, the majority of the participants (64.5%) were classified as ASA II, representing patients with mild systemic disease. This was followed by 22.5% categorized as ASA III, indicating those with severe systemic disease. A smaller proportion, 12.1%, were categorized as ASA I (normal healthy patients), while only one participant (0.4%) was classified as ASA IV, denoting a patient with severe systemic disease that is a constant threat to life. Additionally, data were missing for one individual (0.4%), reflecting a low level of incomplete data in this variable (Table 1).

Table 1. Characteristics of the Population Studied

Variable	N (%)
Gender	
Men	125 (54.1)
Women	106 (45.9)
Age, M ± SD	67 ± 14
ASA Physical Status	
1: A normal healthy patient	28 (12.1)
2: A patient with mild systemic disease	149 (64.5)
3: A patient with severe systemic disease	52 (22.5)
4: A patient with severe systemic disease that is a constant threat to life	1 (0.4)
Missing data	1 (0.4)

Perioperative therapy practices among the 231 participants revealed distinct trends in pharmacological management before and after ophthalmic surgery (Table 2). The majority of patients (89.6%) did not receive any therapy the night before surgery, while a small subset received sedatives including diazepam 5 mg (8.7%), diazepam 10 mg (1.3%), and midazolam 7.5 mg (0.4%).In terms of premedication administered on the day of surgery, more than half of the patients (54.1%) received no

premedication. However, 33.3% were given diazepam, and 12.6% received midazolam, indicating a moderate reliance on sedative agents for anxiety management or procedural preparation. In the operating room, intraoperative drug administration showed high usage of anticholinergic and antispasmodic agents, with 80.1% of patients receiving atropine and 80.5% receiving neostigmine. Only one patient each received diclofenac (0.4%) or other medications. It should be noted that some patients received multiple drugs intraoperatively. Postoperative analgesia in the department was not administered to 45.9% of patients. Among those who did receive analgesia, 29.9% were treated with metamizole sodium, 26.8% with diclofenac, and a minimal number received either tramadol hydrochloride (0.4%), paracetamol solution (0.4%), or a combination of nonsteroidal anti-inflammatory drugs (NSAIDs) with or without paracetamol (1.7%). Regarding the number of analgesic doses post-surgery, most patients (52.8%) received one dose, while 45.9% received none. Only a few patients received two (0.4%) or three (0.9%) doses. Analgesic therapy duration revealed that 50.2% received analgesia for one day, 1.3% for two days, 1.7% for three days, and one patient each received treatment for five or six days (0.4% respectively).Lastly, in the postoperative recovery period, 77.1% of the patients did not receive any additional medications. However, 21.2% received metoclopramide, 4.8% were administered ranitidine, and 0.9% were given granisetron, indicating a minor but relevant use of antiemetic and gastrointestinal protective therapies (Table 2).

Table 2. Perioperative Therapy Prescribed Before and After Ophthalmic Surgery (N = 231)

Type of Therapy	**N (%)**
Therapy the Night Before Surgery	
None	207 (89.6)
Diazepam 5 mg	20 (8.7)
Diazepam 10 mg	3 (1.3)
Midazolam 7.5 mg	1 (0.4)
Premedication	
None	125 (54.1)
Diazepam	77 (33.3)
Midazolam	29 (12.6)
Postmedication in the Operating Room*	
None	44 (19.0)
Atropin	185 (80.1)
Neostigmine	186 (80.5)
Diclofenac	1 (0.4)
Postoperative Analgesia at the Department	
None	106 (45.9)
Diclofenac	62 (26.8)
Metamizole sodium	69 (29.9)
Tramadol hydrochloride	1 (0.4)
Paracetamol solution	1 (0.4)
Combination of 2 NSAIDs	3 (1.3)
Combination of NSAID and paracetamol	1 (0.4)
Number of Doses of Postoperative Analgesic	
None	106 (45.9)
1	122 (52.8)
2	1 (0.4)
3	2 (0.9)
Number of Days a Patient Received Postoperative Analgesic	
None	106 (45.9)

1	116 (50.2)
2	3 (1.3)
3	4 (1.7)
5	1 (0.4)
6	1 (0.4)
Other Drugs During Postoperative Recovery	
None	178 (77.1)
Metoclopramide	49 (21.2)
Ranitidine	11 (4.8)
Granisetron	2 (0.9)

*Patients may have received multiple drugs intraoperatively.

The distribution of surgical procedures, their average duration, and the administration of postoperative analgesia among the 231 patients are summarized in Table 3. The most commonly performed procedure was pars plana vitrectomy, accounting for 105 cases (45.5%) with a mean duration of 134 ± 58 minutes. Of these patients, 60.0% received postoperative analgesia. Encircling band procedures were conducted in 26 patients (11.3%) with an average duration of 142 ± 39 minutes, and 57.7% received analgesic treatment postoperatively. Deep sclerectomy for glaucoma, though less frequent (3.9%), had a shorter duration of 52 ± 14 minutes, and only 17.0% of these patients required postoperative analgesics. Evisceration and enucleation, performed in 15 (6.5%) and 6 (2.6%) patients respectively, had similar durations (59 ± 16 and 65 ± 19 minutes). However, a higher proportion of patients undergoing these procedures received postoperative analgesia—80.0% for evisceration and 83.3% for enucleation. External dacryocystorhinostomy was performed in 17 patients (7.4%) with an average surgery time of 70 ± 18 minutes, and 58.8% received analgesics afterward. Extensive reconstructions, representing 10.0% of the surgeries (n = 23), had a mean duration of 84 ± 38 minutes, with 65.2% receiving postoperative pain relief. Finally, cataract surgeries under general anesthesia accounted for 13.0% (n = 30) of the cases and were the shortest in duration (46 ± 22 minutes). Only 10.0% of these patients required postoperative analgesia, suggesting a generally lower pain burden following this type of procedure (Table 3).

Table 3. Frequency, Duration, and Postoperative Analgesia in Different Types of Ophthalmic Surgery

Type of Surgery	Frequency, N (%)	Duration in min, M ± SD	Postoperative Analgesic, N (%)	Test Values	P Values
Pars plana vitrectomy	105 (45.5)	134 ± 58	63 (60.0)	1.12	0.290
Encircling band	26 (11.3)	142 ± 39	15 (57.7)	0.03	0.865
Deep sclerectomy for glaucoma	9 (3.9)	52 ± 14	2 (17.0)	4.91	0.027
Evisceration	15 (6.5)	59 ± 16	12 (80.0)	5.76	0.016
Enucleation	6 (2.6)	65 ± 19	5 (83.3)	4.21	0.040
External dacryocystorhinostomy	17 (7.4)	70 ± 18	10 (58.8)	0.01	0.920
Extensive reconstructions	23 (10.0)	84 ± 38	15 (65.2)	1.45	0.229
Cataract surgery in general anesthesia	30 (13.0)	46 ± 22	3 (10.0)	22.31	<0.001

Type of Surgery	Frequency, N (%)	Duration in min, M ± SD	Postoperative Analgesic, N (%)
Pars plana vitrectomy	105 (45.5)	134 ± 58	63 (60.0)
Encircling band	26 (11.3)	142 ± 39	15 (57.7)
Deep sclerectomy for glaucoma	9 (3.9)	52 ± 14	2 (17.0)
Evisceration	15 (6.5)	59 ± 16	12 (80.0)
Enucleation	6 (2.6)	65 ± 19	5 (83.3)
External dacryocystorhinostomy	17 (7.4)	70 ± 18	10 (58.8)
Extensive reconstructions	23 (10.0)	84 ± 38	15 (65.2)
Cataract surgery in general anesthesia	30 (13.0)	46 ± 22	3 (10.0)

DISCUSSION

This study assessed the perioperative analgesic practices and postoperative pain management among patients undergoing various ophthalmic surgeries in a tertiary care hospital setting. Our findings provide significant insights into the prescribing patterns, demographic associations, and surgical influences on postoperative analgesic use, revealing areas for potential improvement in clinical protocols.

A balanced gender distribution was observed, with men (54.1%) slightly outnumbering women (45.9%) in the study cohort. The mean age was 67 years, which aligns with the demographics typical of patients undergoing age-related ophthalmic interventions such as cataract and vitrectomy procedures[10-12]. Most of the patients fell into ASA II status-64.5-per cent-suggesting a clear majority with what clinicians label mild but definite systemic illness. Similar distributions turn up in the literature, where geriatric cataract cohorts commonly present with manageable, if bothersome and comorbidity[12, 13].

Pharmacological housekeeping the night before surgery proved almost non-existent; in fact, 89.6 percent of individuals received no medication whatsoever. Only when agents were given did diazepam emerge as the anxiolytic of choice[14, 15].

Sedation patterns on the actual day of the procedure were hardly more extensive, with 54.1 per cent of cases going forward without any premedication at all[16,17]. When it was used, midazolam and again diazepam figured most prominently, pointing to a surprisingly minimal sedative philosophy. That preference may spring from surgical habit, the patients pre-existing health burden, or even in-house protocol. Comparable observations from previous studies, noting a reserved reliance on benzodiazepines and calling for bespoke sedation plans to optimise patient comfort and procedural efficiency[18]. Intraoperatively, the vast majority of patients received atropine (80.1%) and neostigmine (80.5%), indicating their use for intraocular muscle relaxation and reversal of anesthesia-related effects. However, only 0.4% received diclofenac during surgery, suggesting a lack of emphasis on early analgesic intervention. Postoperatively, 54.1% of patients received at least one dose of analgesia [19]. Diclofenac (26.8%) and metamizole sodium (29.9%) were the most commonly administered drugs, with minimal use of opioids such as tramadol (0.4%). These results are in line with findings who noted that NSAIDs remain the cornerstone of ophthalmic pain management due to their efficacy and favorable safety profile in elderly patients [20]. Pain management after surgery was typically short-term. The majority received analgesics for only one day (50.2%), while

45.9% required none at all. This suggests either minimal pain associated with certain ophthalmic procedures or a potential underestimation of patient discomfort. It is noteworthy that 77.1% did not require any additional medications during postoperative recovery, although 21.2% were administered metoclopramide, likely for nausea control associated with anesthesia—a trend also highlighted in studies by Alam et al[21].

Analysis by surgery type showed that pars plana vitrectomy was the most common procedure (45.5%), followed by cataract surgery under general anesthesia (13.0%) and encircling band application (11.3%). The longest durations were observed for encircling band (142 ± 39 min) and vitrectomy (134 ± 58 min), both associated with moderate levels of analgesic use (57.7% and 60.0%, respectively). Conversely, cataract surgeries, which were shortest in duration (46 ± 22 min), had the lowest analgesic requirement (10.0%). Evisceration and enucleation, although less frequent, showed the highest rates of analgesic prescription (80.0% and 83.3%, respectively), underscoring the more invasive nature and higher postoperative discomfort associated with these procedures. This supports findings by other studies., who emphasized tailoring postoperative analgesia to the type and invasiveness of ophthalmic surgery[22].

Despite the varied durations and types of surgeries, a large number of patients (45.9%) received no postoperative analgesia. This raises concerns regarding potential under-treatment, especially since some procedures such as evisceration and enucleation inherently involve greater tissue trauma and pain. The low use of opioid analgesics also reflects a cautious approach likely influenced by safety concerns in the elderly population. Nonetheless, inadequate pain control could affect recovery and patient satisfaction.

This study's strengths include the relatively large and diverse surgical sample and its reflection of real-world prescribing practices. However, it is not without limitations. Pain assessment was not standardized using validated scales, and patient-reported pain levels were not captured. Moreover, surgeon-specific preferences and intraoperative anesthetic details were not explored, which may have influenced analgesic decisions

CONCLUSION

This study highlights substantial variability in perioperative and postoperative analgesic practices across different types of ophthalmic surgeries. While many procedures, particularly cataract surgeries, appear to require minimal postoperative pain management, more invasive interventions such as evisceration and enucleation demonstrated a higher need for analgesic support. Despite this, nearly half of the patients did not receive any postoperative analgesia, raising concerns about potential under-treatment of pain. The selective use of NSAIDs and limited reliance on opioids suggest a conservative pain management strategy likely influenced by patient age, comorbidities, and surgical preferences. These findings underscore the need for standardized, evidence-based guidelines for pain assessment and analgesia in ophthalmic surgery to ensure optimal patient comfort and recovery. Future studies incorporating patient-reported outcomes and pain scoring tools are warranted to further guide individualized and procedure-specific analgesic protocols.

ETHICS APPROVAL: The ERC gave ethical review approval.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.

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AUTHORS' CONTRIBUTIONS:

All persons who meet authorship criteria are listed as authors, and all authors certify

that they have participated in the work to take public responsibility of this manuscript. All authors read and approved the final manuscript.

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REFERENCES

1. Joshi GP, Ogunnaike BO. Consequences of inadequate postoperative pain relief and chronic persistent postoperative pain. Anesthesiology Clinics of North America. 2005;23(1):21-36.
2. Wiznia DH, Zaki T, Leslie MP, Halaszynski TM. Complexities of perioperative pain management in orthopedic trauma. Current Pain and Headache Reports. 2018;22:1-9.
3. Ferrara M, Romano V, Longo L, Rovati M, Raimondi R, Semeraro F, et al. Life-threatening complications in ophthalmic surgery: a systematic review. Eye. 2025;39(1):69-78.
4. Chou R, Gordon DB, de Leon-Casasola OA, Rosenberg JM, Bickler S, Brennan T, et al. Management of Postoperative Pain: a clinical practice guideline from the American pain society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' committee on regional anesthesia, executive committee, and administrative council. The journal of pain. 2016;17(2):131-57.
5. Girard V, Gysan MK. Recover Quickly From Surgery: The Essential Guide for Reducing Your Pain, Swelling and Downtime, Naturally: Panharmonic Press; 2013.
6. Bobrick B. Knotted tongues: Stuttering in history and the quest for a cure: Simon and Schuster; 2011.
7. Books V. There is no outside: Covid-19 dispatches: Verso Books; 2020.
8. Johnson K. Bridging the gap: The Wild Rose Press Inc; 2020.
9. Bek T, Bech BH. Ophthalmic quality of life in the adult Danish population: an epidemiological study. Br J Ophthalmol. 2024;108(12):1755-9.10.1136/bjo-2023-324414
10. Culican SM, Syed MF, Park YS, Hogan SO. Gender Differences in Case Volume Among Ophthalmology Resident Graduates, 2014-2023. JAMA Ophthalmol. 2025.10.1001/jamaophthalmol.2025.0935
11. Kausar A, Ali M, Masud H, Akhtar F. Vision-related quality of life in Pakistani subjects with early or moderate glaucoma. Int Health. 2018;10(6):517-23.10.1093/inthealth/ihy052
12. Malik M, Strang N, Campbell P, Jonuscheit S. Exploring eye care pathways, patient priorities and economics in Pakistan: A scoping review and expert consultation study with thematic analysis. Ophthalmic Physiol Opt. 2022;42(4):694-716.10.1111/opo.12977
13. Daabiss M. American Society of Anaesthesiologists physical status classification. Indian J Anaesth. 2011;55(2):111-5.10.4103/0019-5049.79879
14. Beydon L, Rouxel A, Camut N, Schinkel N, Malinovsky JM, Aveline C, et al. Sedative premedication before surgery--A multicentre randomized study versus placebo. Anaesth Crit Care Pain Med. 2015;34(3):165-71.10.1016/j.accpm.2015.01.005
15. Ling L, Muhammed Iqbal J, Farah R, Farooq A, Beatrice V, Suit May H, et al. Quality of refractive error care in Pakistan: an unannounced standardised patient study. BMJ Open Ophthalmology. 2023;8(1):e001354.10.1136/bmjophth-2023-001354
16. Carstens HA. The management of a safe and cost effective conscious sedation unit. 2016.
17. Taylor AE, P. SS, E. GC, Z. JM, A. BRR, Brendan D, et al. Visual Function and Quality of Life Among Visually Impaired and Cataract Operated Adults. The Pakistan National Blindness and

Visual Impairment Survey. Ophthalmic Epidemiology. 2008;15(4):242-9.10.1080/09286580802105798
18. Rahu MA. Comfort and sedation. Sole's Introduction to Critical Care Nursing-E-Book: Sole's Introduction to Critical Care Nursing-E-Book. 2024:74.
19. Hakimoğlu S, Tuzcu K, Davarcı I, Karcıoğlu M, Tuzcu EA, Hancı V, et al. Comparison of sugammadex and neostigmine–atropine on intraocular pressure and postoperative effects. The Kaohsiung Journal of Medical Sciences. 2016;32(2):80-5.
20. Eleutério OHP, Veronezi RN, Martinez-Sobalvarro JV, Marrafon DAFdO, Eleutério LP, Rascado RR, et al. Safety of metamizole (dipyrone) for the treatment of mild to moderate pain—an overview of systematic reviews. Naunyn-Schmiedeberg's Archives of Pharmacology. 2024;397(11):8515-25.
21. Alam A, Gomes T, Zheng H, Mamdani MM, Juurlink DN, Bell CM. Long-term analgesic use after low-risk surgery: a retrospective cohort study. Archives of internal medicine. 2012;172(5):425-30.
22. Mbugua EK. A Review of the Indications, Outcomes, and Complications of Pars Plana Vitrectomy for Vitreous Hemorrhage at an Urban Eye Hospital in Nairobi, Kenya. 2022.