Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/g93ftc82

A COMPARATIVE STUDY OF MELATONIN AND PREGABALIN ON PREOPERATIVE ANXIETY AND PAIN IN SECOND EYE CATARACT SURGERY

Dr. Kagitapu OmSaiPriya[1], Dr. Sangeetha T*[2]

[1]Junior Resident, Department of Ophthalmology, Sri Devaraj Urs Medical College, Kolar, Karnataka, India.
[2]*Professor and HOD, Department of Ophthalmology, Sri Devaraj Urs Medical College, Kolar, Karnataka, India.

Corresponding author: Dr. Sangeetha T, Professor and HOD, Department of Ophthalmology, SDUAHER, Kolar
Email ID: sangeethat@sduaher.ac.in

Abstract

Background: Cataract surgery is one of the most commonly performed ophthalmic procedures and is typically conducted under local anaesthesia. Although it is considered safe and painless, many patients report varying levels of anxiety before surgery and experience intraoperative discomfort. Anxiety can influence pain perception, cooperation, hemodynamic stability and overall surgical experience. We aimed to evaluate and compare the effect of melatonin and pregabalin on preoperative anxiety and Intraoperative and postoperative pain in patients undergoing second eye cataract surgery.
Methodology: A hospital based two group comparative study conducted on 62 cases who underwent cataract surgery in the Department of Ophthalmology, R. L. Jalappa Hospital and Research, Kolar for a period of 3 months after obtaining ethical clearance from the Institutional Ethics Committee. (SDUAHER/R&D/CEC/SDUMC-PG/363/NF/-2025-26) Written informed consent was obtained from all participants.
Results: In group A, 16(25.8%) cases were females and 15(24.2%) cases were males. In group B, 16(25.8%) cases were males and 15(24.2%) cases were females. On applying, Z test, there was a statistically significant difference found between mean VAS Score at various duration among both groups. Post operatively, in group A 2 cases had moderate anxiety while in group B, 10 cases had moderate anxiety.
Conclusion: Melatonin showed superior anxiolytic efficacy compared to pregabalin, as evidenced by significantly lower STAI-S scores at 60 minutes, intraoperatively, and postoperatively. Additionally, although both groups demonstrated reduction in pain scores, melatonin was associated with better VAS score trends at different time intervals..

Keywords: Cataract Surgery, Melatonin, Pain, Preoperative anxiety, Pregabalin.

Introduction

Cataract surgery is one of the most commonly performed ophthalmic procedures conducted under topical or local anaesthesia. Although it is considered safe and painless, many patients report varying levels of anxiety which can influence pain perception, cooperation, hemodynamic stability and overall

surgical experience, especially patients undergoing second-eye surgery even though the surgical technique and anaesthesia remain the same. [1,2]

Melatonin an endogenous neurohormone and Pregabalin a structural analogue of gamma-aminobutyric acid both have demonstrated perioperative anxiolytic and analgesic properties with a better safety profile. [3,4] This has led to interest in their use as a peri operative adjuvant. [5]

Very few studies have specifically evaluated the effect of melatonin in second eye cataract surgery and hence there is a need for targeted research in this subgroup. [6,7] Although several studies have demonstrated the effectiveness of pregabalin, there is a paucity of literature specifically evaluating its role in second eye cataract surgery. [8,9] This study is therefore undertaken to evaluate the effect of preoperative melatonin versus pregabalin on anxiety and pain in patients undergoing second eye cataract surgery.

Methodology:

A hospital based two group comparative study was conducted on 62 cases who underwent cataract surgery in the Department of Ophthalmology, R. L. Jalappa Hospital and Research, Kolar for a period of 3 months, after obtaining ethical clearance from the Institutional Ethics Committee (SDUAHER/R&D/CEC/SDUMC-PG/363/NF/-2025-26) and written informed consent from all participants. A total of 62 patients were equally divided into two groups. Group A - 31 Cases (Melatonin), Group B - 31 cases (Pregabalin).

At the Preoperative visit, the Visual analogue scale (VAS) ranged between 0 and 10 (0= no pain, 10= worst pain imaginable) was explained to patients and assessed. Melatonin 3mg or Pregabalin 75mg were given 60-90 minutes before surgery. State trait anxiety inventory scale – subscale method (STAI-S) ranged between 20 and 80 Low Anxiety (20-37), moderate anxiety (38-44), high anxiety (45-80) were explained to the patients and assessed using a questionnaire. Sedation scores were assessed during performance of the block assessed using the 4 -point scale. [10] 0 = movement of head, arm and trunk, 1= slight movement of arms, 2= slight change in face, 3= complete calmness. Anxiety scores were recorded before premedication (T1), 60 min after premedication (T2), during the intraoperative period (T3) and post operatively before shifting from the recovery room (T4). Pain score was also recorded 60 min after premedication (T2), intraoperative period (T3) and post operatively before shifting from the recovery room (T4).

Data entry & Analysis: Data were entered into Microsoft Excel and analysed by using SPSS version 22 (IBM, USA). Categorical variables were presented as frequencies and percentages and analysed by using chi square test. Continuous variables were expressed as mean with standard deviation and analysed by using Z test.

Results: Out of the total participants, in group A, 16(25.8%) cases were females, and 15(24.2%) cases were males. In group B, 16(25.8%) cases were males, and 15(24.2%) cases were females. [Figure 1]

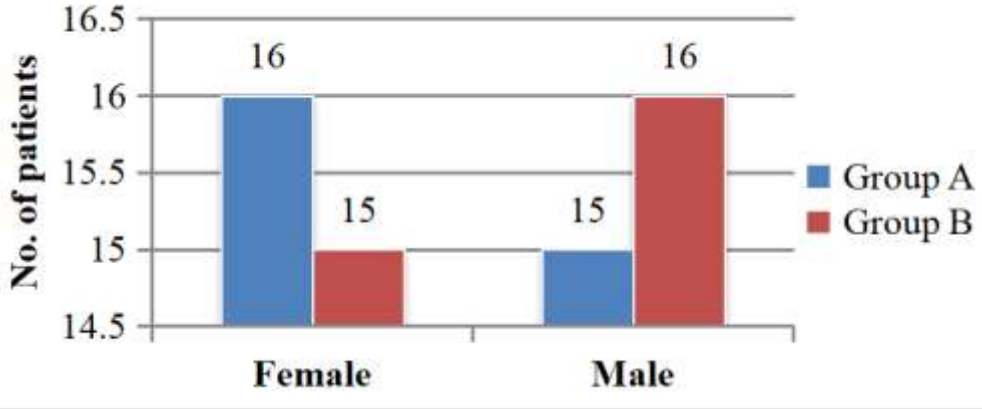


Table 1. Mean age and Sedation score among cases

Variables	Group A (n=31)	Group B (n=31)	P value

Mean age (in years)	68.7 + 4.5	69.1 + 5.1	0.774
Mean sedation score	1.96 + 0.1	1.93 + 0.3	0.561

On applying, Z test, there was no statistically significant difference found between mean age and mean sedation score among both groups. [Table 1]

Table 2. Vital Parameters among cases

On applying, Z test, there was no statically significant difference found between mean systolic blood pressure, mean Diastolic blood pressure and mean pulse rate at various duration among both groups. [Table 2]

Vital Parameters		Group A (n=31)	Group B (n=31)	P value
Systolic blood pressure	Preoperative	124.1 ± 6.7	121.1 ± 6.3	0.126
	60 min after administration	122.1 ± 7.1	120.1 ± 6.3	0.245
	Intraoperative	120.7 ± 6.5	119.1 ± 5.1	0.285
	Postoperative	121.9 ± 5.3	120.3 ± 6.3	0.284
Diastolic blood pressure	Preoperative	75.1 + 5.08	75.1 ± 5.08	1
	60 min after administration	75.1 ± 5.8	74.8 ± 5.08	0.803
	Intraoperative	76.1 + 5.2	76.1 + 5.2	1
	Postoperative	76.2 ± 4.9	74.8 + 3.1	0.45
Pulse rate	Preoperative	74.7 ± 6.1	73.9 + 5.7	0.758
	60 min after administration	76.1 ± 2.3	76.1 ± 1.8	0.949
	Intraoperative	76.1 ± 2.2	75.4 ± 3.3	0.270
	Postoperative	75.8 ± 2.2	76.3 ± 2.4	0.491

Table 3. VAS Score among cases

On applying, Z test, there was a statically significant difference found between mean VAS Score at various duration among both groups. [Table 3]

Duration	Group A (n=31)	Group B (n=31)	P value
Preoperative	1.8 + 1.5	1.07 + 0.9	0.011
60 minute	1.58+ 1.1	1.9 + 0.8	0.030
Intraoperative	1.06 + 0.9	0.92 + 0.5	0.041
Postoperative	0.3 + 0.1	0.12 + 0.3	0.0167

Table 4. Comparison of STAI-S among both groups

STAI	Group A (n=31)	Group B (n=31)	P value

Preoperative	Low	17	6	0.012
	Moderate	6	8	
	High anxiety	8	17	
60 minute	Low anxiety	28	19	0.008
	Moderate anxiety	3	2	
	High anxiety	0	0	
Intraoperative	Low anxiety	27	20	0.038
	Moderate anxiety	4	11	
	High anxiety	0	0	
Postoperative	Low anxiety	29	21	0.010
	Moderate anxiety	2	10	
	High anxiety	0	0	

On applying chi square test, there was an association found between STAI score and type of drug given among both groups. After surgery, in group A, after postoperative 2 cases had felt moderate anxiety while in group B, 10 cases had felt moderate anxiety. [Table 4]

Discussion:

Benzodiazepines, opioids, and dexmedetomidine are the drugs used to ease stress and anxiety before cataract surgery.[11] Although benzodiazepines reduce anxiety, they may also restrict the length of rapid eye movement sleep and affect psychomotor function.[12] Cognitive function may be affected by these drugs, which is desired after having cataract surgery. Consequently, there is a need for a medication that reduces pain and anxiety without impairing cognitive function. Melatonin has anti-inflammatory, antioxidant, sedative, and analgesic effects. Oral melatonin dosages of 3–10 mg have been used to treat circadian rhythm problems.[13]

Preoperative melatonin (3 mg) demonstrated significant anxiolytic effects in patients undergoing second-eye cataract surgery compared with pregabalin (75 mg), as reflected by lower State-Trait Anxiety Inventory scores at multiple perioperative time points. Additionally, melatonin showed desirable trends in pain scores, though both agents maintained stable hemodynamic parameters without major adverse effects.

These findings are consistent with prior research on melatonin's anxiolytic efficacy in cataract procedures. Khezri et al. reported that sublingual melatonin 3 mg significantly reduced verbal anxiety scores at premedication, intraoperative, and postoperative periods in patients undergoing cataract surgery under topical anaesthesia, and provided improved operative conditions compared with placebo ($P < 0.05$).[10] Similarly, Ismail et al found that oral melatonin significantly decreased anxiety scores and verbal pain scores, reduced intraocular pressure, and improved surgical conditions compared with placebo in cataract patients, supporting its utility as a adjunct medication before procedure. [14] A more recent randomized study by Sane et al. demonstrated that 3 mg sublingual melatonin significantly lowered anxiety and pain scores and reduced intraocular pressure during cataract surgery compared with placebo, reinforcing melatonin's anxiolytic and analgesic potential. [15]

When compared to standard anxiolytic agents, evidence from broader surgical populations suggests melatonin may possess similar efficacy with a beneficial safety profile. A Cochrane review concluded that melatonin probably reduces preoperative anxiety compared with placebo, and may have effects

comparable with benzodiazepines like midazolam in anxiety reduction without the profound sedation associated with benzodiazepines.[16] In a clinical trial comparing melatonin to midazolam in cataract patients under general anaesthesia, melatonin significantly reduced anxiety while offering a potentially safer profile, although direct comparison with pregabalin was not evaluated in that study.[17]

Overall, the present study's results align with existing literature that supports melatonin's role as an effective adjunct medication for reducing perioperative anxiety in cataract surgery, offering comparable or superior anxiolytic benefits to other agents, and with minimal adverse effects.

Conclusion: Melatonin showed superior anxiolytic efficacy compared to pregabalin, as evidenced by significantly lower STAI-S scores at 60 minutes, intraoperatively, and postoperatively. A greater proportion of patients in the melatonin group experienced low anxiety levels throughout the perioperative period. Additionally, although both groups demonstrated reduction in pain scores, melatonin was associated with more better VAS score trends at different time intervals.

Therefore, preoperative melatonin appears to be a safe, effective, inexpensive, and easily administrable alternative to pregabalin for reducing perioperative anxiety and pain in second-eye cataract surgery. Its potential safety profile and minimal side effects make it particularly suitable for day-care ophthalmic procedures. Further large-scale randomized controlled trials are recommended to validate these findings and strengthen evidence for routine clinical use.

References:

1. Yang MMH, Hartley RL, Leung AA, et al. Preoperative anxiety and postoperative pain: a systematic review and meta-analysis. Can J Anaesth. 2020;67(7):826-842.
2. Tan CSH, Fam HB, Heng WJ, Lee HM, Saw SM, Au Eong KG. Higher intraoperative pain during second eye cataract surgery. J Cataract Refract Surg. 2011;37(3):526-531.
3. Ghai B, Grover VK, Khera A, et al. Pregabalin in acute postoperative pain: a meta-analysis. J Clin Anesth. 2011;23(6):489-497.
4. Zhang J, Ho KY, Wang Y. Efficacy of pregabalin in acute postoperative pain: a meta-analysis. Br J Anaesth. 2011;106(4):454-462.
5. Sane S, et al. Oral melatonin premedication for cataract surgery. Saudi J Anaesth. 2021;15(1):23-29.
6. Zhang Y, Wang H, Xia Y, et al. Increased pain perception during second-eye cataract surgery: a systematic review and meta-analysis. J Cataract Refract Surg. 2021;47(3):352-360.
7. Ong C, Evans JR, Allan BD. Perioperative interventions for preventing pain during cataract surgery under topical anesthesia. Cochrane Database Syst Rev. 2015;(1):CD010318.
8. Elrashidy A. Perioperative anxiolytic and analgesic effects of pregabalin in patients undergoing ophthalmic surgery. Anesth Essays Res. 2019;13(2):245-250.
9. Ursea R, Feng MT, Kim T. Increased pain perception during second eye cataract surgery. J Cataract Refract Surg. 2011;37(6):1009-1014.
10. Khezri MB, Merate H. The effects of melatonin on anxiety and pain scores of patients, intraocular pressure, and operating conditions during cataract surgery under topical anesthesia. Indian J Ophthalmol. 2013;61:319-324.
11. Alzaben KR, Alqahtani AS, Alotaibi AA, et al. Sedation practices and safety during cataract surgery under local anesthesia: a prospective evaluation. J Cataract Refract Surg. 2021;47(9):1185-1191.
12. Mihic SJ, Harris RA. Hypnotics and sedatives. In: Bruton LL, Chabner BA, Knollman BC, editors. Goodman and Gilman's the Pharmacological Basis of Therapeutics. 12th ed. New York: McGraw Hill Companies; 2011. pp. 456–80.
13. Park JH, Lee SH, Kim YJ, et al. Comparison of sedation protocols for cataract surgery under topical anesthesia. Clin Ophthalmol. 2022;16:2145-2153.
14. Kurdi MS, Muthukalai SP. Melatonin in perioperative medicine: current perspective. Saudi J Anaesth. 2020;14(3):369-377.

15. Sane S, Bhalerao PM, Naphade RW, et al. Effect of sublingual melatonin on intraocular pressure, anxiety, and pain in cataract surgery: a randomized controlled trial. Indian J Ophthalmol. 2022;70(11):4012-4017.
16. Andersen LP, Gögenur I, Rosenberg J, Reiter RJ. The safety of melatonin in humans. Clin Drug Investig.2016;36(3):169-175.
17. Jokela R, Ahonen J, Tallgren M, Haanpää M, Korttila K. A randomized controlled trial of perioperative administration of pregabalin for pain after laparoscopic hysterectomy. Pain. 2008;134(1-2):106-112.