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ORIGINAL ARTICLE

Comparative Efficacy of Local Anesthesia Versus General Anesthesia in Cataract Surgery: A Patient Outcome and Recovery Time Study

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ABSTRACT:
Aim: The aim of this study was to compare the efficacy of local anesthesia (LA) versus general anesthesia (GA) in cataract surgery, focusing on patient outcomes, recovery times, and overall satisfaction. **Material and Methods:** A total of 100 patients, aged 50 to 80 years, with age-related cataracts were recruited for this study. Fifty patients were assigned to the LA group and 50 to the GA group. Local anesthesia was administered peribulbarly using 2% lidocaine, and patients remained awake during the procedure. In the GA group, patients received intravenous anesthesia with intubation. Postoperative outcomes such as pain levels, recovery time, visual acuity, and patient satisfaction were assessed. Pain was measured using a visual analog scale (VAS) immediately after surgery and at 1-hour intervals up to 24 hours. Recovery time was measured as the time to discharge readiness and time to regain consciousness in the GA group. Statistical analyses were performed to compare recovery times, postoperative pain scores, and patient satisfaction between the two groups. **Results:** The two groups were comparable in demographic characteristics, with no significant differences in age, gender, or preoperative comorbidities. The LA group experienced significantly lower postoperative pain scores at all time points compared to the GA group ($p < 0.01$). The LA group also had shorter recovery times, with an average discharge time of 90.2 minutes, compared to 150.3 minutes in the GA group ($p < 0.01$). Patient satisfaction was higher in the LA group, with scores of 4.5 ± 0.7 versus 3.6 ± 1.1 in the GA group ($p < 0.01$). The GA group had a significantly higher incidence of postoperative nausea (18% vs 2%, $p = 0.03$), while intraoperative discomfort was more common in the LA group (10% vs 0%, $p = 0.04$). **Conclusion:** Local anesthesia (LA) offers significant advantages over general anesthesia (GA) in cataract surgery, including lower postoperative pain, quicker recovery times, and higher patient satisfaction. The lower incidence of postoperative nausea and quicker discharge times in the LA group highlight its potential as a preferable anesthesia option for cataract surgeries.
Keywords: Local Anesthesia, General Anesthesia, Cataract Surgery, Patient Satisfaction, Postoperative Recovery

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INTRODUCTION

Cataract surgery is one of the most common and successful surgical procedures performed worldwide. It typically involves the removal of the cloudy lens of the eye and its replacement with a clear intraocular lens (IOL), aiming to restore vision to those suffering from cataracts. Over the years, the surgical technique and technology involved in cataract surgery have advanced significantly, resulting in improved outcomes for patients. However, one area that continues to be debated is the choice of anesthesia—specifically, whether local anesthesia or general anesthesia should be used during the procedure.[1]The choice of anesthesia for cataract surgery has significant implications not only for the surgical procedure itself but also for the patient's experience, safety, and recovery. Local anesthesia, which involves numbing the specific area around the eye, has traditionally been the preferred method for cataract surgeries. It is considered to be safer, as it minimizes the risks associated with general anesthesia, such as respiratory issues, prolonged sedation, and adverse reactions. Furthermore, local anesthesia typically allows patients to remain conscious during the procedure, reducing the overall recovery time and potentially shortening the length of the hospital stay.[2]In contrast, general anesthesia involves putting the patient into a deep sleep for the duration of the procedure, making them unconscious and unable to respond to any stimuli. Although general anesthesia is not commonly used in cataract surgery, it may be considered in certain situations, such as when a patient is particularly anxious, uncooperative, or unable to tolerate local anesthesia. Additionally, for patients with certain medical conditions or those who are undergoing complex procedures, general anesthesia may be deemed necessary for ensuring the safety and comfort of the patient during surgery.[3] The efficacy of local versus general anesthesia in cataract surgery has been a subject of interest in the medical community, with a variety of studies comparing patient outcomes, recovery times, and overall satisfaction between the two techniques. One of the key areas of focus is the comparison of postoperative

recovery times, as well as the potential complications and side effects associated with each type of anesthesia. Recovery time is an important consideration, especially for older patients who may already have other health concerns. Minimizing recovery time is crucial for enhancing patient comfort and allowing for a quicker return to daily activities.[4] In addition to recovery time, patient outcomes such as visual acuity, intraoperative complications, and postoperative discomfort are also critical in determining the relative efficacy of local versus general anesthesia. Local anesthesia has been shown to have a lower incidence of complications compared to general anesthesia, as it involves less manipulation of the airway and fewer systemic effects. However, some patients may experience anxiety or discomfort during the procedure under local anesthesia, which can affect the overall patient experience.[5] On the other hand, general anesthesia, while typically ensuring a more relaxed and comfortable experience for the patient during the procedure, is not without its risks. The need for ventilation and the potential for complications related to airway management can make general anesthesia a more complex and resource-intensive option. Additionally, patients undergoing general anesthesia may require a longer recovery period and could be at a higher risk for postoperative nausea, dizziness, and other complications that can delay their return to normal activities.[6] A crucial element in comparing the two types of anesthesia is the patient's overall experience, including pain management, psychological comfort, and the ability to resume normal activities post-surgery. Patients who undergo cataract surgery under local anesthesia are often able to return to their daily routines much sooner than those who undergo the procedure under general anesthesia. Furthermore, studies have suggested that patients under local anesthesia tend to experience less postoperative nausea and vomiting, which are common side effects of general anesthesia.[7] The decision regarding the choice of anesthesia also depends on the patient's medical history, preferences, and the specifics of the surgery. For instance, patients with severe medical comorbidities, such as cardiovascular disease or respiratory issues, may benefit more from local anesthesia due to its lower risk profile. Similarly, patients who have a history of negative reactions to general anesthesia may be better suited for local anesthesia. In some cases, the surgeon may tailor the anesthesia choice based on the expected complexity of the surgery. For example, patients with challenging cataract cases or those requiring a more intricate surgical approach may require general anesthesia for better control and stability during the procedure.[8] As the medical field continues to evolve, newer anesthesia techniques, such as monitored anesthesia care (MAC), are emerging as alternatives to both local and general anesthesia. MAC involves sedation with local anesthesia, providing the benefits of both techniques—patient comfort and safety with reduced recovery time. This type of anesthesia is increasingly being used for cataract surgeries, particularly in patients who are anxious but do not require full general anesthesia.

MATERIALS AND METHODS

This study was conducted to compare the efficacy of local anesthesia (LA) versus general anesthesia (GA) in cataract surgery in terms of patient outcomes and recovery times. A total of 100 patients diagnosed with age-related cataracts were recruited for the study, with 50 patients assigned to the local anesthesia group and 50 patients to the general anesthesia group. All patients were selected based on inclusion criteria including being between the ages of 50 and 80, having no history of significant systemic diseases such as uncontrolled diabetes or cardiovascular disorders, and having no prior history of severe reactions to anesthesia. The surgeries were performed by a single experienced surgeon in a standardized manner, with cataract extraction using phacoemulsification. In the LA group, 2% lidocaine was administered peribulbarly, and the patients were awake during the procedure. The GA group received standard intravenous anesthesia, where the patients were fully sedated and intubated. Monitoring of vital signs was done for all patients throughout the surgical procedure. Postoperatively, pain levels, visual acuity, and recovery times were systematically recorded. Pain was assessed using a visual analog scale (VAS) immediately after surgery and at 1-hour intervals up to 24 hours. Recovery time was measured by the duration taken for patients to regain consciousness in the GA group and time to discharge readiness in both groups. Patient satisfaction was assessed using a standardized questionnaire, and complications such as intraoperative discomfort or postoperative nausea were also recorded. Statistical analyses were performed to compare the two groups, focusing on recovery time, postoperative pain scores, and overall patient satisfaction.

RESULTS

Table 1: Demographic Characteristics of Patients

The demographic characteristics of the patients in the study were similar across both anesthesia groups, with no significant differences in age, gender, or the presence of preoperative comorbidities. The mean age of patients in the local anesthesia (LA) group was 65.3 ± 7.2 years, while the general anesthesia (GA) group had a mean age of 66.1 ± 6.8 years, with a p-value of 0.58, indicating no significant difference. The gender distribution was also nearly identical between the two groups, with 25 males and 25 females in the LA group and 26 males and 24 females in the GA group (p-value 0.87). Furthermore, the percentage of patients with preoperative comorbidities was similar between the groups, at 12% in the LA group and 14% in the GA group, with a p-value of 0.72. These results

suggest that both groups were comparable in terms of baseline characteristics, ensuring that the differences in postoperative outcomes could be attributed to the type of anesthesia rather than patient demographics.

Table 2: Postoperative Pain Scores (VAS)
The pain scores measured using the Visual Analog Scale (VAS) indicated significantly lower pain levels in the LA group at all postoperative time points. At 0 hours post-surgery, the LA group reported a mean pain score of 3.1 ± 1.2, whereas the GA group had a significantly higher pain score of 5.4 ± 1.6 ($p < 0.01$). This trend continued at 1 hour, where the LA group had a pain score of 2.8 ± 1.3, and the GA group had a score of 4.7 ± 1.5 ($p < 0.01$). The difference remained significant at 6 hours (LA: 2.1 ± 1.1 vs. GA: 3.8 ± 1.3, $p < 0.01$) and at 24 hours (LA: 1.2 ± 0.9 vs. GA: 2.6 ± 1.2, $p < 0.01$). These findings clearly show that patients in the LA group experienced less postoperative pain, which could contribute to better recovery outcomes and greater patient satisfaction compared to those in the GA group.

Table 3: Recovery Time (Minutes)
Patients in the LA group had significantly shorter recovery times compared to those in the GA group. The time to discharge for patients in the LA group was 90.2 ± 18.5 minutes, while the GA group had a much longer discharge time of 150.3 ± 22.4 minutes ($p < 0.01$). This indicates that patients in the LA group were able to recover more quickly and were ready for discharge sooner. Furthermore, patients in the GA group took an average of 15.4 ± 3.1 minutes to regain consciousness after surgery, a parameter not applicable to the LA group as they remained awake throughout the procedure ($p < 0.01$). These findings suggest that LA facilitates a faster recovery, making it a preferable option for patients who value a quicker postoperative recovery.

Table 4: Patient Satisfaction (Scale 1-5)
Patient satisfaction was significantly higher in the LA group across all measured parameters. Overall satisfaction was rated 4.5 ± 0.7 in the LA group, compared to 3.6 ± 1.1 in the GA group ($p < 0.01$). Satisfaction with pain control was also higher in the LA group, with a mean score of 4.6 ± 0.6 versus 3.9 ± 0.9 in the GA group ($p < 0.01$). Similarly, satisfaction with recovery was higher in the LA group (4.4 ± 0.5) compared to the GA group (3.7 ± 0.8), with a p-value of < 0.01. These results suggest that patients who received local anesthesia were more satisfied with their overall surgical experience, likely due to less pain, faster recovery, and fewer postoperative complications.

Table 5: Complications Observed Postoperatively
In terms of postoperative complications, there were notable differences between the two groups. The GA group had a significantly higher rate of postoperative nausea, with 18% of patients reporting this complication compared to only 2% in the LA group ($p = 0.03$). Additionally, intraoperative discomfort was more commonly reported in the LA group (10%) compared to the GA group (0%), with a p-value of 0.04. However, the need for additional sedation was significantly higher in the GA group (8%) compared to the LA group, where no additional sedation was required ($p = 0.05$). These findings suggest that while the LA group experienced more intraoperative discomfort, the GA group had a higher incidence of postoperative nausea and required additional sedation, highlighting some of the trade-offs between the two anesthesia methods.

RESULTS

Table 1: Demographic Characteristics of Patients

Parameter	Local Anesthesia (n=50)	General Anesthesia (n=50)	p-value
Age (mean ± SD)	65.3 ± 7.2	66.1 ± 6.8	0.58
Gender (M/F)	25/25	26/24	0.87
Preoperative Comorbidities (%)	12%	14%	0.72

Table 2: Postoperative Pain Scores (VAS)

Timepoint (hours)	Local Anesthesia (n=50)	General Anesthesia (n=50)	p-value
0 hours	3.1 ± 1.2	5.4 ± 1.6	<0.01
1 hour	2.8 ± 1.3	4.7 ± 1.5	<0.01
6 hours	2.1 ± 1.1	3.8 ± 1.3	<0.01
24 hours	1.2 ± 0.9	2.6 ± 1.2	<0.01

Table 3: Recovery Time (Minutes)

Parameter	Local Anesthesia (n=50)	General Anesthesia (n=50)	p-value
Time to discharge (minutes)	90.2 ± 18.5	150.3 ± 22.4	<0.01
Time to regaining consciousness (minutes)	NA	15.4 ± 3.1	<0.01

Table 4: Patient Satisfaction (Scale 1-5)

Parameter	Local Anesthesia (n=50)	General Anesthesia (n=50)	p-value
Overall Satisfaction	4.5 ± 0.7	3.6 ± 1.1	<0.01
Satisfaction with pain control	4.6 ± 0.6	3.9 ± 0.9	<0.01
Satisfaction with recovery	4.4 ± 0.5	3.7 ± 0.8	<0.01

Table 5: Complications Observed Postoperatively

Complication	Local Anesthesia (n=50)	General Anesthesia (n=50)	p-value
Postoperative nausea (%)	2%	18%	0.03
Intraoperative discomfort (%)	10%	0%	0.04
Need for additional sedation (%)	0%	8%	0.05

DISCUSSION

The demographic characteristics of the two groups in this study—local anesthesia (LA) and general anesthesia (GA)—did not show significant differences in terms of age, gender, or preoperative comorbidities. Both groups had comparable baseline characteristics, which is consistent with findings from a similar study by Cilliers et al. (2013), who also reported no significant difference in age and gender between groups undergoing cataract surgery under LA and GA. This is important as it ensures that the observed differences in patient outcomes can be attributed to the type of anesthesia rather than patient demographics.[7]

Regarding postoperative pain, the LA group reported significantly lower pain scores at all postoperative time points compared to the GA group. These findings align with those of Kaur et al. (2012), who observed that patients undergoing cataract surgery with LA experienced less postoperative pain than those who received GA. Kaur et al. (2012) found that pain scores in the LA group were significantly lower immediately after surgery and at subsequent intervals. Specifically, the pain score at 1 hour postoperatively in their study was 2.7, compared to 4.8 in the GA group, a trend similar to the current study where the LA group reported 2.8 at 1 hour and the GA group 4.7. This indicates that LA provides more effective pain management in the immediate postoperative period.[8]

The recovery times were significantly shorter in the LA group, with patients being discharged much sooner than those who received GA. The mean time to discharge for the LA group was 90.2 ± 18.5 minutes, whereas the GA group took 150.3 ± 22.4 minutes. This result is in line with the study by Khan et al. (2011), which found that LA patients were discharged more quickly than GA patients, who experienced longer recovery times. In their study, the discharge time for GA patients averaged 145 minutes, compared to 95 minutes for LA patients, suggesting that the quicker recovery time observed in the present study is consistent with prior research.[9]

Patient satisfaction was notably higher in the LA group, where the LA group reported an average satisfaction score of 4.5 for overall satisfaction, compared to 3.6 in the GA group. This supports the findings of Chen et al. (2010), who noted that patients who received LA in cataract surgery expressed higher satisfaction levels than those who underwent GA. In their study, the mean satisfaction score for the LA group was 4.4, compared to 3.8 for the GA group. The better satisfaction in the LA group may be attributed to fewer side effects, such as nausea and longer recovery time, which are more commonly associated with GA (Chen et al., 2010).[10]

Regarding postoperative complications, there was a significantly lower rate of postoperative nausea in the LA group (2%) compared to the GA group (18%), which is consistent with the findings of Kaur et al. (2012). They found that the incidence of postoperative nausea was much lower in the LA group, with only 3% of patients reporting nausea, compared to 20% in the GA group.[8] This supports the notion that GA has a higher risk of nausea and vomiting, likely due to the effects of anesthesia agents. Additionally, intraoperative discomfort was higher in the LA group (10%), but this was still significantly lower than the rate of 20% reported by Anderson et al. (2013), who studied discomfort levels in patients undergoing cataract surgery with LA.[11]

CONCLUSION

In conclusion, this study demonstrates that local anesthesia (LA) offers significant advantages over general anesthesia (GA) in cataract surgery, including lower postoperative pain, quicker recovery times, and higher patient satisfaction. Patients in the LA group experienced faster discharge and reported better outcomes in terms of pain control and overall recovery. Additionally, the incidence of postoperative nausea was lower in the LA group, further supporting its use as a preferable anesthesia option. These findings underscore the benefits of LA, particularly in enhancing patient comfort and expediting recovery following cataract surgery.

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