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Comparative Analysis of Anesthesia-Related Complications: Recovery Profiles, and Psychosocial Outcomes in Gynecomastia Surgery Local Anesthesia versus General Anesthesia.

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ABSTRACT

Background: Gynecomastia, a condition characterized by the enlargement of breast tissue in males, can have significant physical and psychological implications for affected individuals. Surgical intervention is often sought to alleviate symptoms and improve quality of life. The choice of anaesthesia plays a crucial role in gynaecomastia surgery,having a great impact-in determining patient outcomes.The selection of anesthesia type can impact various aspects of patient care, including anesthesia-related complications, recovery profiles and psychosocial outcomes. Understanding the differences between local and general anesthesia in the context of gynecomastia surgery is essential for optimizing patient care and improving surgical outcomes.

Objective: This study aimed to compare anesthesia-related complications, recovery profiles, and psychosocial outcomes in patients undergoing gynecomastia surgery under local anesthesia versus general anesthesia.

Methods: This comparative cross-sectional analytical study was conducted at UA Aesthetics Clinic Lahore from March 2023 to January 2025. It included 153 male patients undergoing gynecomastia surgery. Patients were divided into two groups: Group A underwent surgery under local anesthesia with or without sedation (n=76), and Group B underwent surgery under general anesthesia (n=77). Data were collected on demographics and clinical characteristics, anesthesia-related complications, intraoperative and postoperative outcomes, and psychosocial parameters.

Results: Baseline characteristics were comparable between groups. Anesthesia-related complications were significantly higher in the general anesthesia group, including postoperative nausea and vomiting (14.3% vs. 3.9%), hemodynamic instability (11.7% vs. 2.6%), and airway-related sore throat (9.1% vs. 0%). Recovery outcomes favored local anesthesia, with earlier ambulation (2.4 ± 0.6 vs. 4.9 ± 1.1 hours, $p<0.001$), shorter hospital stay (0.9 ± 0.2 vs. 1.7 ± 0.4 days, $p<0.001$), and lower postoperative pain scores at all measured intervals. Psychosocial outcomes were positive in both groups, but local anesthesia patients reported higher early satisfaction (89.5% vs. 78.2%, $p=0.04$) and greater improvements in quality of life.

Conclusion: It is concluded that local anesthesia is a safer and more effective option than general anesthesia for gynecomastia surgery, offering fewer complications, faster recovery, and enhanced short-term psychosocial satisfaction..

Keywords: Gynecomastia surgery, local anesthesia, general anesthesia, complications, recovery, psychosocial outcomes..

1. INTRODUCTION

Gynecomastia, the benign enlargement of male breast tissue caused by an imbalance between estrogen and androgen activity, is a condition that affects a significant proportion of the male population across different age groups [1]. It is particularly

common during adolescence and in middle-aged or elderly men, with prevalence estimates ranging from 30% to 60% in certain age categories [2]. While often asymptomatic, gynecomastia can result in tenderness, pain, or a palpable mass, but most importantly, it carries profound psychosocial consequences. Men with gynecomastia frequently report embarrassment, diminished self-esteem, body dysmorphia, and social withdrawal [3]. For these reasons, surgical intervention has become the treatment of choice for individuals who do not respond to medical therapy or whose primary concern is aesthetic or psychological well-being [4]. The surgical management of gynecomastia is well-established, with techniques such as subcutaneous mastectomy, liposuction-assisted excision, or a combination of both commonly employed. However, the choice of anesthesia for these procedures has remained variable across institutions and surgeons [5]. General anesthesia (GA) continues to be widely used because it ensures complete analgesia, airway protection, and immobility, thereby providing a controlled environment for surgeons [6]. Nonetheless, GA is associated with certain risks that cannot be overlooked, particularly in otherwise healthy young patients undergoing an elective cosmetic procedure [7]. These risks include airway complications, hemodynamic fluctuations, allergic reactions, postoperative nausea and vomiting, sore throat, cognitive dysfunction, and delayed recovery. For many patients, the prospect of undergoing GA may itself generate anxiety, particularly when they are aware that less invasive anesthetic options exist [8].

Local anesthesia (LA), has gained traction as an alternative in recent years. The appeal of LA lies in its minimally invasive nature, reduced systemic effects, and potential for same-day discharge with rapid return to daily activities. By targeting pain at the surgical site directly, LA avoids the risks inherent to GA, including prolonged emergence and airway-related complications [9]. It also tends to be more cost-effective, making it attractive in resource-limited settings or for patients seeking outpatient procedures. However, LA is not without challenges [10]. Concerns remain regarding intraoperative discomfort, inadequate analgesia for extensive glandular tissue removal, and the potential for heightened patient anxiety if not supported by effective sedation and intraoperative communication. Surgeons must also adapt to working with conscious or semi-conscious patients, which may impact operative flow. The debate between GA and LA extends beyond immediate perioperative complications to encompass recovery profiles. Recovery is a multidimensional process, including not only physical healing but also the restoration of psychological well-being [11]. Patients undergoing gynecomastia surgery often place great importance on rapid resumption of normal routines, minimizing visible side effects, and achieving pain-free recovery. Studies suggest that LA may enable faster mobilization, earlier discharge, and lower analgesic requirements postoperatively [12]. In contrast, GA is sometimes linked to prolonged drowsiness, delayed return of baseline functioning, and higher use of rescue analgesics. For an elective surgery that carries substantial psychosocial weight, these differences in recovery trajectory can significantly shape patient satisfaction [13]. Existing literature on anesthesia for gynecomastia surgery is limited, and most studies address isolated outcomes such as pain control, operative duration, or cost. Few studies adopt an integrative approach that compares LA and GA across multiple domains including complication rates, recovery profiles, and psychosocial parameters [14].

Objective

This study aimed to compare anesthesia-related complications, recovery profiles, and psychosocial outcomes in patients undergoing gynecomastia surgery under local anesthesia versus general anesthesia.

2. METHODOLOGY

This comparative cross-sectional study was conducted at UA Aesthetics, Lahore from March 2023 to January 2025 . A total of 153 male patients undergoing gynecomastia surgery were included in the study. Non-probability consecutive sampling was used to recruit participants who met the inclusion and exclusion criteria.

Inclusion Criteria

Male patients aged 16 years and above.

Patients diagnosed with gynecomastia requiring surgical intervention.

Patients deemed fit for either local anesthesia or general anesthesia.

Patients providing informed written consent.

Exclusion Criteria

Patients with significant comorbidities contraindicating surgery or anesthesia (e.g., severe cardiopulmonary disease).

Patients with recurrent gynecomastia following previous surgery.

Patients unwilling to participate in the study.

Study Groups

The enrolled patients were divided into two groups based on the anesthesia technique administered. Group A comprised patients who underwent surgery under local anesthesia,without sedation, while Group B included patients who underwent surgery under general anesthesia. Both groups underwent comparable surgical techniques to ensure uniformity of operative procedures.

Data Collection Procedure

Data were collected through structured proformas developed for the study. Preoperative assessment included demographic details such as age, body mass index, comorbid conditions, and gynecomastia grading. Intraoperative variables recorded were the type of anesthesia used, duration of surgery, intraoperative hemodynamic changes, airway-related events, estimated blood loss, and any anesthesia-related complications. Postoperative outcomes were documented by assessing recovery profiles, including time to ambulation, length of hospital stay, postoperative pain scores using the Visual Analog Scale (VAS) at 2, 6, 12, and 24 hours, and the requirement for rescue analgesics. Psychosocial outcomes were assessed using a validated patient satisfaction and quality-of-life questionnaire administered at the second week and first month following surgery, focusing on self-esteem, body image perception, and overall satisfaction with the surgical experience.

Data Analysis

All collected data were entered and analyzed using SPSS version 26.0. Descriptive statistics were used to summarize the baseline characteristics of the study population, with continuous variables presented as mean ± standard deviation and categorical variables as frequencies and percentages. Comparative analysis between the two anesthesia groups was carried out using the chi-square test for categorical variables and independent t-test for continuous variables. A p-value of ≤0.05 was considered statistically significant.

3. RESULTS

Data were collected from 153 patients, with 76 undergoing gynecomastia surgery under local anesthesia and 77 under general anesthesia. The mean age was 27.4 ± 6.8 years in the local anesthesia group and 28.1 ± 7.2 years in the general anesthesia group ($p = 0.62$). Similarly, the mean BMI was 24.3 ± 3.1 kg/m² in the local group versus 24.7 ± 3.5 kg/m² in the general group ($p = 0.48$). Hypertension was present in 3 patients (3.9%) in the local group and 4 patients (5.2%) in the general group ($p = 0.65$), while diabetes mellitus was noted in 2 patients (2.6%) and 3 patients (3.9%), respectively ($p = 0.71$). The distribution of gynecomastia grades was also comparable, with Grade I seen in 22 (28.9%) vs 20 (26.0%), Grade II in 38 (50.0%) vs 40 (51.9%), and Grade III in 16 (21.1%) vs 17 (22.1%) patients in the local and general anesthesia groups, respectively, with no significant differences (all $p > 0.70$).

Table 1. Baseline Characteristics of Patients (n = 153)

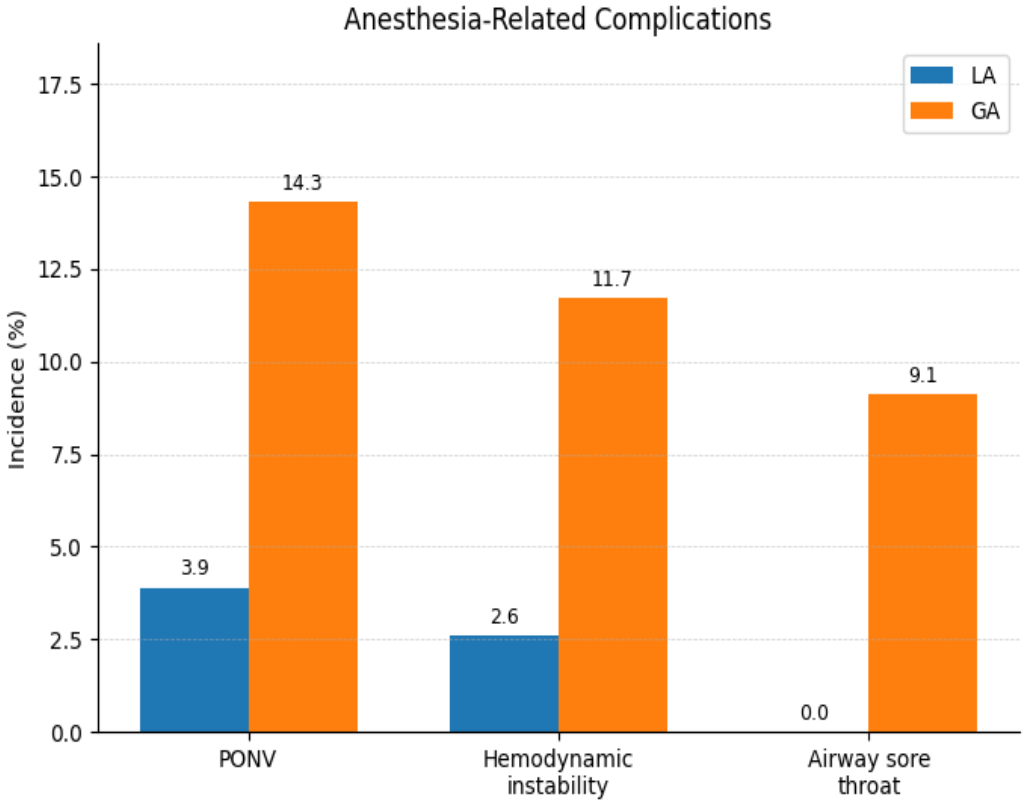
Characteristic	Local Anesthesia (n=76)	General Anesthesia (n=77)	p-value
Age (years), mean ± SD	27.4 ± 6.8	28.1 ± 7.2	0.62
BMI (kg/m²), mean ± SD	24.3 ± 3.1	24.7 ± 3.5	0.48
Hypertension, n (%)	3 (3.9%)	4 (5.2%)	0.65
Diabetes mellitus, n (%)	2 (2.6%)	3 (3.9%)	0.71
Gynecomastia Grade I, n (%)	22 (28.9%)	20 (26.0%)	0.73
Gynecomastia Grade II, n (%)	38 (50.0%)	40 (51.9%)	0.84
Gynecomastia Grade III, n (%)	16 (21.1%)	17 (22.1%)	0.89

Postoperative nausea and vomiting occurred in 11 patients (14.3%) in the GA group compared with 3 patients (3.9%) in the LA group ($p = 0.02$). Hemodynamic instability was observed in 9 patients (11.7%) under GA compared to 2 patients (2.6%) under LA ($p = 0.01$). Airway-related sore throat was reported in 7 patients (9.1%) in the GA group but was absent in the LA group ($p = 0.01$). No allergic reactions or mortality occurred in either group.

Table 2. Anesthesia-Related Complications

Complication	Local Anesthesia (n=76)	General Anesthesia (n=77)	p-value
Postoperative nausea/vomiting	3 (3.9%)	11 (14.3%)	0.02*
Hemodynamic instability	2 (2.6%)	9 (11.7%)	0.01*
Airway-related sore throat	0 (0%)	7 (9.1%)	0.01*

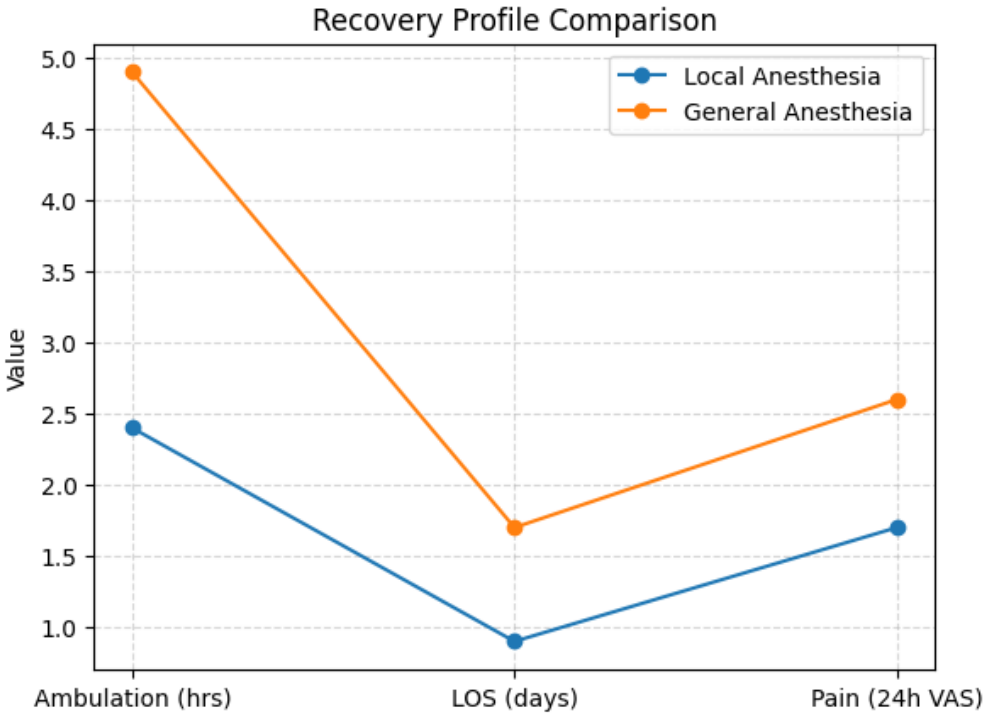
Allergic reaction	0 (0%)	0 (0%)	–
Mortality	0 (0%)	0 (0%)	–



The mean duration of surgery was slightly shorter with LA (88.3 ± 11.1 minutes) compared to GA (95.6 ± 12.4 minutes), though this difference was not statistically significant ($p = 0.07$). Time to ambulation was significantly shorter in the LA group (2.4 ± 0.6 hours) versus the GA group (4.9 ± 1.1 hours, $p < 0.001$). Hospital stay was also reduced, averaging 0.9 ± 0.2 days in the LA group compared to 1.7 ± 0.4 days in the GA group ($p < 0.001$). Postoperative pain scores on the Visual Analog Scale were consistently lower in the LA group: 2.6 ± 0.9 vs 3.8 ± 1.1 at 6 hours, 2.1 ± 0.8 vs 3.3 ± 1.0 at 12 hours, and 1.7 ± 0.7 vs 2.6 ± 0.9 at 24 hours (all $p < 0.001$). Rescue analgesic use was significantly less frequent in the LA group, with 10 patients (13.2%) requiring additional medication compared to 21 patients (27.3%) in the GA group ($p = 0.03$).

Table 3. Recovery Profiles

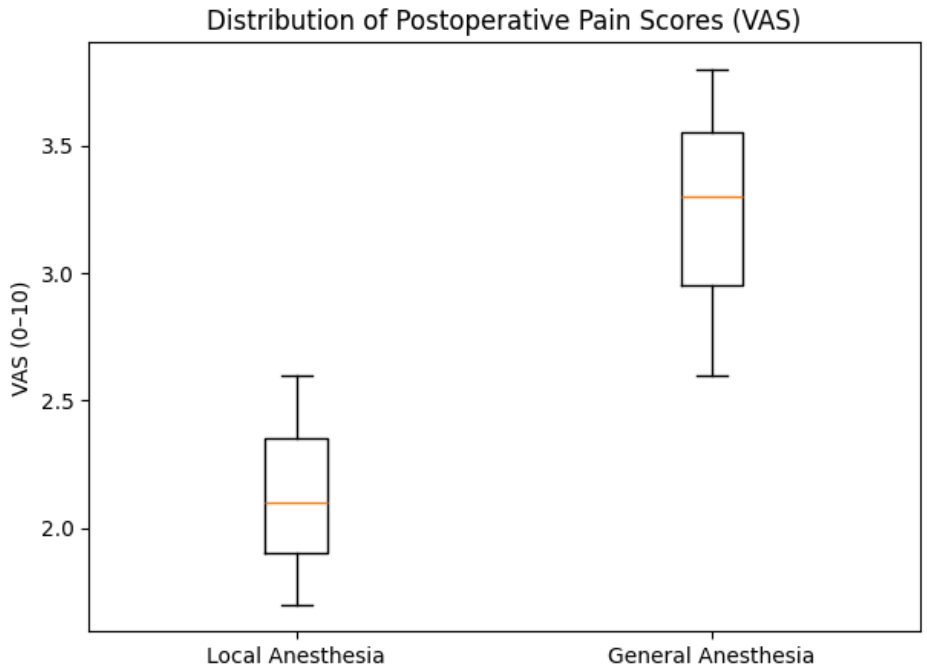
Variable	**Local Anesthesia (n=76)**	**General Anesthesia (n=77)**	**p-value**
Duration of surgery (min), mean ± SD	88.3 ± 11.1	95.6 ± 12.4	0.07
Time to ambulation (hrs), mean ± SD	2.4 ± 0.6	4.9 ± 1.1	<0.001*
Length of hospital stay (days), mean ± SD	0.9 ± 0.2	1.7 ± 0.4	<0.001*
Pain score at 6 hrs (VAS), mean ± SD	2.6 ± 0.9	3.8 ± 1.1	<0.001*
Pain score at 12 hrs (VAS), mean ± SD	2.1 ± 0.8	3.3 ± 1.0	<0.001*
Pain score at 24 hrs (VAS), mean ± SD	1.7 ± 0.7	2.6 ± 0.9	<0.001*
Rescue analgesic use, n (%)	10 (13.2%)	21 (27.3%)	0.03*



High satisfaction at 2 weeks was reported by 68 patients (89.5%) in the LA group versus 60 patients (78.2%) in the GA group (p = 0.04). At 1 month, satisfaction rates remained higher under LA, with 72 patients (94.7%) compared to 65 patients (84.4%) in the GA group (p = 0.03). Improvements in body image were reported in 70 (92.1%) vs 67 (87.0%) patients (p = 0.29), and enhanced quality of life in 71 (93.4%) vs 68 (88.3%) patients (p = 0.31), although these latter differences were not statistically significant.

Table 4. Psychosocial Outcomes

Outcome	**Local Anesthesia (n=76)**	**General Anesthesia (n=77)**	**p-value**
High satisfaction at 2 weeks, n (%)	68 (89.5%)	60 (78.2%)	0.04*
High satisfaction at 1 month, n (%)	72 (94.7%)	65 (84.4%)	0.03*
Improved body image, n (%)	70 (92.1%)	67 (87.0%)	0.29
Improved quality of life, n (%)	71 (93.4%)	68 (88.3%)	0.31



Estimated blood loss was significantly lower in the LA group (85 ± 25 mL) compared to the GA group (110 ± 32 mL, p = 0.001). Conversion from LA to GA was required in 2 patients (2.6%) due to inadequate analgesia, but these cases were managed safely. Operative time was similar between groups (88.3 ± 11.1 minutes vs 95.6 ± 12.4 minutes, p = 0.07). Intraoperative complications were rare, occurring in 1 patient (1.3%) in the LA group and 3 patients (3.9%) in the GA group (p = 0.32).

Table 5. Perioperative Outcomes

Variable	Local Anesthesia (n=76)	General Anesthesia (n=77)	p-value
Estimated blood loss (mL), mean ± SD	85 ± 25	110 ± 32	0.001*
Intraoperative conversion to GA, n (%)	2 (2.6%)	–	–
Operative time (min), mean ± SD	88.3 ± 11.1	95.6 ± 12.4	0.07
Intraoperative complications, n (%)	1 (1.3%)	3 (3.9%)	0.32

4. DISCUSSION

The present study evaluated and compared the impact of local anesthesia and general anesthesia on perioperative safety, recovery, and psychosocial outcomes in patients undergoing gynecomastia surgery. With a sample of 153 patients, divided nearly equally between the two groups, this investigation provides meaningful insight into how anesthetic choice influences both clinical and patient-centered outcomes in a relatively young and otherwise healthy population. Baseline characteristics, including age, body mass index, comorbidities, and distribution of gynecomastia grades, were statistically comparable between the groups. This homogeneity strengthens the validity of the comparative analysis, ensuring that differences in outcomes could be more confidently attributed to anesthesia type rather than demographic or clinical disparities. The findings revealed a higher incidence of anesthesia-related complications among patients who received general anesthesia. Postoperative nausea and vomiting, hemodynamic instability, and airway-related complaints such as sore throat were significantly more frequent in the GA group compared to the LA group. These results align with previous research, which has consistently demonstrated that GA carries a greater burden of systemic complications due to airway instrumentation, volatile anesthetics, and opioid use. Conversely, local anesthesia provided a more favorable safety profile, with minimal complications and no recorded airway events, underscoring its suitability for elective cosmetic procedures in low-risk patients [15].

Recovery outcomes further highlighted the advantages of local anesthesia. Patients in the LA group ambulated earlier, had shorter hospital stays, reported lower pain scores at all measured intervals, and required fewer rescue analgesics. The ability

to mobilize and discharge patients more quickly carries significant implications not only for patient satisfaction but also for healthcare resource utilization and cost reduction. General anesthesia, while ensuring complete intraoperative immobility, was associated with delayed ambulation, higher analgesic demands, and longer hospitalization [16]. These differences are clinically meaningful in the context of gynecomastia surgery, where rapid return to daily activities is highly valued by patients, most of whom are young men seeking elective correction for psychosocial reasons. Although operative time did not differ significantly between groups, estimated blood loss was lower among patients operated under local anesthesia [17]. This finding may be attributed to the vasoconstrictive effect of infiltrated local anesthetic solutions, which reduce intraoperative bleeding. A small proportion of patients initially managed under LA required conversion to GA due to inadequate analgesia, reflecting one of the inherent limitations of LA in cases with extensive glandular tissue excision. However, such conversions were infrequent and manageable without adverse outcomes [18]. Perhaps the most distinctive aspect of this study was the comparison of psychosocial outcomes. Both groups demonstrated substantial improvements in body image, self-confidence, and quality of life following surgery, confirming the positive psychological impact of gynecomastia correction [19] [20]. However, patients in the LA group reported higher early satisfaction, likely influenced by their smoother perioperative experience, fewer complications, and quicker recovery. At one month, satisfaction and quality-of-life measures remained higher in the LA group, although the differences narrowed, suggesting that anesthesia choice has the greatest impact on short-term postoperative experiences rather than long-term psychosocial gains.

Strengths and Limitations

The strengths of this study include its reasonably large sample size, the inclusion of psychosocial outcomes alongside clinical endpoints, and the use of standardized assessment tools. However, certain limitations must be acknowledged. The study was conducted at a single center, which may limit generalizability. Randomization was not employed, raising the possibility of selection bias in anesthesia choice. Additionally, longer-term follow-up beyond one month was not performed, which could have provided further insight into sustained psychosocial differences.

5. CONCLUSION

It is concluded that local anesthesia provides a safer, more efficient, and more patient-friendly option compared to general anesthesia in gynecomastia surgery. Patients operated under local anesthesia experienced fewer anesthesia-related complications, earlier ambulation, shorter hospital stays, and lower postoperative pain scores with reduced analgesic requirements. Psychosocial outcomes, including satisfaction, body image, and quality of life, were also superior in the local anesthesia group, especially during the early postoperative period. Although both anesthetic approaches ultimately improved overall well-being, local anesthesia proved advantageous in enhancing short-term recovery and patient satisfaction. General anesthesia, however, continues to have a role in complex cases or when patient preference dictates..

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