Evaluation of the quality of life of patients undergoing septoplasty under local anesthesia: a prospective study

Original Article

Authors

Filipe V. Jacinto
Unidade Local de Saúde (ULS) do Algarve

Diana Ribeiro
Unidade Local de Saúde (ULS) do Algarve

César Anjo
Unidade Local de Saúde (ULS) do Algarve

Luís Freitas
Unidade Local de Saúde (ULS) do Algarve

Ilídio Gonçalves
Unidade Local de Saúde (ULS) do Algarve

Correspondence:
Filipe V. Jacinto
filipe.vicente.jacinto@gmail.com

Article received on April 6, 2025.
Accepted for publication on January 18, 2026.

Abstract

Objectives: To compare the effectiveness of septoplasty performed under local anesthesia versus general anesthesia in the treatment of nasal septum deviation.
Study Design: Prospective observational study.
Material and Methods: Patients diagnosed with nasal septum deviation, who underwent septoplasty under general anesthesia (n=45) or local anesthesia (n=45), completed questionnaires assessing quality of life related to nasal obstruction (NOSE; SNOT-22; visual analog scale (VAS)) before and 3 months after surgery.
Results: Both groups showed significant reductions in postoperative NOSE, SNOT-22, and VAS scores, with no statistically significant differences between septoplasty under local and general anesthesia. The average pain score for septoplasty under local anesthesia was 2.4/10. Satisfaction with the surgery was similar in both groups.
Conclusions: Septoplasty under local anesthesia is an effective and safe alternative to septoplasty under general anesthesia, significantly improving the quality of life of patients with nasal obstruction.

Keywords: septoplasty; local anesthesia; NOSE; SNOT-22; VAS

Introduction

Nasal obstruction, one of the most common symptoms in otolaryngology, affects a wide range of patients and significantly impacts their quality of life[1–4]. One of the main causes of nasal obstruction is a deviated nasal septum, which occurs when the osteocartilaginous wall separating the two nasal cavities is displaced, impairing normal nasal airflow[3]. Septoplasty is a surgical procedure to correct a deviated septum and is the treatment of choice for patients who do not respond to conservative medical management. Usually, this procedure is conducted under general anesthesia (GA),

which guarantees a controlled environment for the surgeon and minimizes patient anxiety and discomfort during the operation. However, performing septoplasty under local anesthesia (LA) has gained popularity in recent years due to several advantages, such as a lower risk of anesthetic complications, faster postoperative recovery, and reduced hospital costs[5–7].

Quality of life questionnaires for nasal obstruction have become increasingly important in evaluating the outcomes of surgical interventions, such as septoplasty[8,9] Notable among these is the NOSE (Nasal Obstruction Symptom Evaluation) questionnaire, developed in 2004 as recommended by the American Academy of Otolaryngology[4]. This questionnaire consists of five items, each scored from 0 to 4. The final score ranges from 0 to 100, categorizing nasal obstruction as mild (0–25), moderate (26–50), or severe (>50). Another validated questionnaire is the SNOT-22 (Sino-Nasal Outcome Test-22), which covers a broader range of sinonasal symptoms and their impact on the patients' quality of life[10]. This questionnaire can be used to evaluate patients undergoing septoplasty[10–12]. Both the NOSE and SNOT-22 questionnaires have been translated and validated for use in the Portuguese population[13].

In 2021, the Algarve Local Health Unit (ULS Algarve) ENT department implemented a protocol for conducting septoplasties under LA in an outpatient surgery setting. This change was intended to improve patient comfort, reduce the risks associated with GA, allow for faster recovery, and shorten the ULS Algarve waiting list. The main objective of this investigation was to evaluate the efficacy of this protocol and compare the outcomes of septoplasties conducted under LA versus GA, focusing on patient satisfaction levels and improvements in their quality of life.

Materials and Methods

Local Anesthesia (LA) protocol:

The LA protocol for septoplasties at ULS Algarve in an outpatient surgery setting can be divided chronologically into three stages: 24 h before surgery, 30 min before surgery, and during surgery. Twenty-four hours before surgery, the patients were instructed to take one 5-mg diazepam tablet at home at bedtime. The following day, approximately 2-3 hours before the procedure, they received one 1000-mg paracetamol tablet with 60-mg codeine. Thirty minutes before surgery in the preoperative room, a topical anesthetic (Xylocaine® 10% spray) is applied to both nostrils using a head mirror and nasal speculum. Subsequently, three cottonoids soaked in 10% cocaine paste are inserted: the first in the posterior portion of the nasal cavity, the second in the middle meatus, and the third in the anterior portion of the nasal cavity. After 30 minutes, the patient is taken to the operating room. Before starting the surgery, 1000 mg of paracetamol and 0.5 mg of midazolam (optional) are administered intravenously. The surgery is conducted with the patient in a supine position, with the head slightly elevated and turned to the right to optimize access to the nasal cavity and guarantee proper hemostasis during the procedure. At the start of the surgery, the cottonoids soaked in 10% cocaine paste are removed from both nostrils. A small piece of Merocel (1.5 × 1 cm) is then placed in the posterior portion of both nasal cavities to prevent blood aspiration into the airway during the septoplasty. To prevent these pieces from being accidentally aspirated, a 2-0 silk suture is tied to the end of each Merocel sponge to anchor them to the surgical drape.

Finally, targeted local infiltration is conducted (using a 22G spinal needle) along the nasal septum with 2% lidocaine and 1:80,000–1:200,000 adrenaline: 4 cc at the caudal edge of the nasal septum, 1 cc in the middle third of the nasal septum, and 1 cc in the inferior turbinate (optional). Injections can be repeated during the surgical procedure if required (maximum 5 cc).

Study design:

Between January 2023 and July 2024, patients with nasal obstruction associated with a deviated septum, with or without

inferior turbinate hypertrophy, scheduled for septoplasty under GA or LA at ULS Algarve (Faro and Portimão units) were invited to participate in this prospective study. All patients who agreed to participate in the study were informed of its purpose and signed the informed consent form.

The proposal for this study was reviewed by the Department of Education, Training, and Research and the Health Ethics Committee (CES) of the Algarve Local Health Unit (ULSALG) and received final approval from its Board of Directors. The inclusion criteria were chronic nasal obstruction, age >18 years, symptoms for at least 3 months, and persistence of symptoms despite 4 weeks of medical treatment. The exclusion criteria included sinonasal cancer, concurrent or previous nasal surgeries, chronic rhinosinusitis, septal perforation, sarcoidosis, granulomatosis, uncontrolled asthma, pregnancy, or illiteracy. All the study participants completed, either online or in person, a battery of quality-of-life questionnaires regarding nasal obstruction (NOSE, SNOT-22, and the Visual Analog Scale [VAS]). These were administered 1 week before surgery (preoperative visit) and 3 months after surgical treatment (postoperative visit). Additionally, 3 months after the surgery, they were asked about their level of satisfaction with the results and whether they had any regrets about the procedure. The degree of satisfaction with the surgical results (improvement in nasal obstruction) was measured on a numerical scale of 0 (very dissatisfied) to 10 (very satisfied). Regret about undergoing septoplasty was evaluated by asking, "Would you have this surgery again?" Yes or No. Patients who underwent septoplasty under LA rated their procedural pain on a numerical scale from 0 (no pain) to 10 (worst possible pain). Postoperative complications from septoplasties conducted under GA and LA were recorded during a 3-month follow-up period.

All patients underwent septoplasty using the Cottle technique[14], with or without bilateral inferior turbinoplasty using radiofrequency (Celon®; 14 W power). The septoplasties were performed by various surgeons with different levels of experience, but using a standardized approach for both groups (LA and GA). To ensure technical uniformity, all patients underwent the same surgical protocol, which included the bilateral placement of Doyle Silastic splints and consistent transseptal suturing by all the surgeons involved. IBM SPSS Statistics 19.0® was used for statistical analysis, and GraphPad Prism 7® was used to create the graphs. Statistical significance was defined as a p-value <0.05.

Results

This prospective study included 90 patients diagnosed with a deviated nasal septum who underwent septoplasty, with or without bilateral inferior turbinoplasty, under GA (n=45) or LA (n=45) at the ENT Department of the Faro and Portimão units of the Algarve Local Health Unit (ULS) between 2023 and 2024. Among the 45 patients who underwent septoplasty under GA, 28 were men (62%) and 17 were women (38%), with a mean age of 43.4 ± 12.8 years. Among the 45 patients who underwent septoplasty under LA, 22 were men (49%) and 23 were women (51%), with a mean age of 46.0 ± 15.8 years (Table 1, Table 2). The mean NOSE, SNOT-22, and VAS scores were collected pre-septoplasty (1 week preoperative) and post-septoplasty (3 months postoperative) for all patients undergoing septoplasty under GA or LA. Following septoplasty under GA, there was a significant reduction in the mean NOSE scores by 75% (71.4 vs. 18.0; p<0.0001), mean SNOT-22 scores by 68% (49.2 vs. 15.5; p<0.0001), and mean VAS scores by 75% (7.6 vs. 1.9; p<0.0001; Figure 1). Following septoplasty under LA, there was a significant reduction in the mean NOSE scores by 67% (72.4 vs. 23.6; p<0.0001), mean SNOT-22 scores by 63% (56.4 vs. 21.0; p<0.0001), and mean VAS scores by 69% (7.5 vs. 2.3; p<0.0001 ; Figure 2). When we compared the effectiveness of septoplasty under GA vs. septoplasty under LA, we observed that the reduction in the mean NOSE (53.4 vs. 48.9),

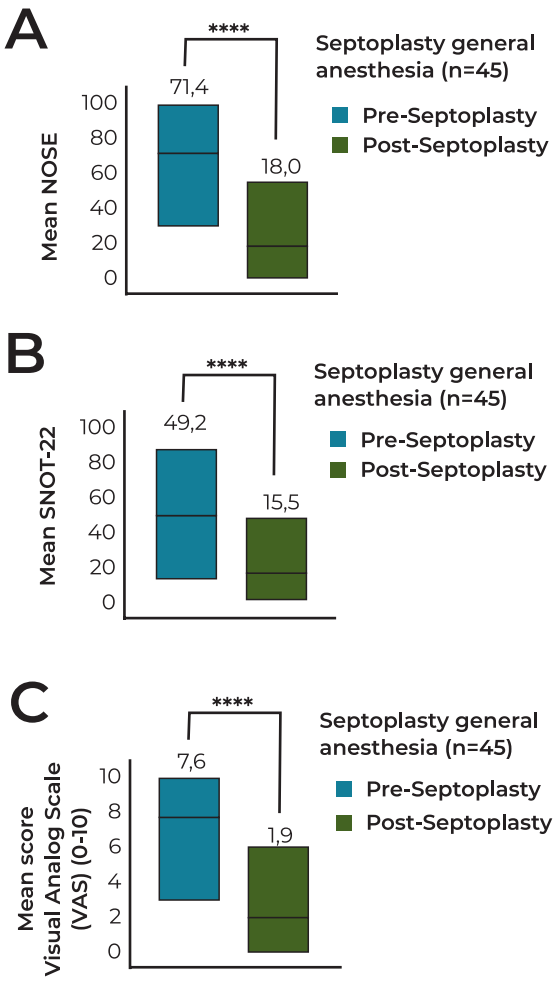
Table 1
Sex distribution of patients who underwent septoplasty, with or without bilateral inferior turbinoplasty, under general or local anesthesia, at the ENT department of ULS Algarve between 2023 and 2024.

Septoplasty under general anesthesia (GA)		
Sex	**n**	**%**
Men	28	62
Women	17	38
Total	**45**	**100**
Septoplasty under local anesthesia (LA)		
Sex	**n**	**%**
Men	22	49
Women	23	51
Total	**45**	**100**

Table 2
Mean age of patients undergoing septoplasty, with or without bilateral inferior turbinoplasty, under general or local anesthesia, at the ENT department of ULS Algarve between 2023 and 2024.

Septoplasty under general anesthesia (GA)	
Mean Age (years)	**Standard Deviation**
43,4	12,8
Septoplasty under local anesthesia (LA)	
Mean Age (years)	**Standard Deviation**
46,0	15,8

Figure 1
Results of questionnaires assessing quality of life related to nasal obstruction: A) NOSE, B) SNOT-22, C) Visual Analog Scale (VAS), before and after undergoing septoplasty under general anesthesia at the ENT department of ULS Algarve between 2023 and 2024.
(****: p<0.0001, paired Student's t-test)



SNOT-22 (33.6 vs. 35.4), and VAS (5.8 vs. 5.2) scores after surgery was very similar with no statistically significant differences (Figure 3).

No postoperative complications were reported in 87% of patients who underwent septoplasty under GA (n=39; Table 3). The reported postoperative complications included nasal bleeding (n=3), hyposmia (n=2), skin reaction (n=1), septal perforation (n=1), and headache (n=1), with no infectious complications recorded (Table 3). Among the patients who underwent septoplasty under LA (n=39), 87% reported no postoperative complications (Table 3). Postoperative nasal bleeding was the most common post-surgical complication in patients who underwent septoplasty under LA (n=4). Vomiting/nausea (n=3) and skin reaction (n=1), although less frequent, were also complications reported by patients undergoing septoplasty under LA (Table 3).

All patients who underwent septoplasty under LA rated the pain associated with the surgical procedure by marking the corresponding value on a numerical scale from 0 (no pain) to 10 (worst possible pain). The mean pain associated with septoplasty under LA was 2.4/10 ± 2.0, with 89% of patients reporting a pain score below 5/10 (Figure 4). The patients rated their satisfaction with the surgical procedure on a numerical scale from 0 (very dissatisfied) to 10

Figure 2
Results of questionnaires assessing quality of life related to nasal obstruction: A) NOSE, B) SNOT-22, C) Visual Analog Scale (VAS), before and after undergoing septoplasty under local anesthesia at the ENT department of ULS Algarve between 2023 and 2024.
(****: p<0.0001, paired Student's t-test)

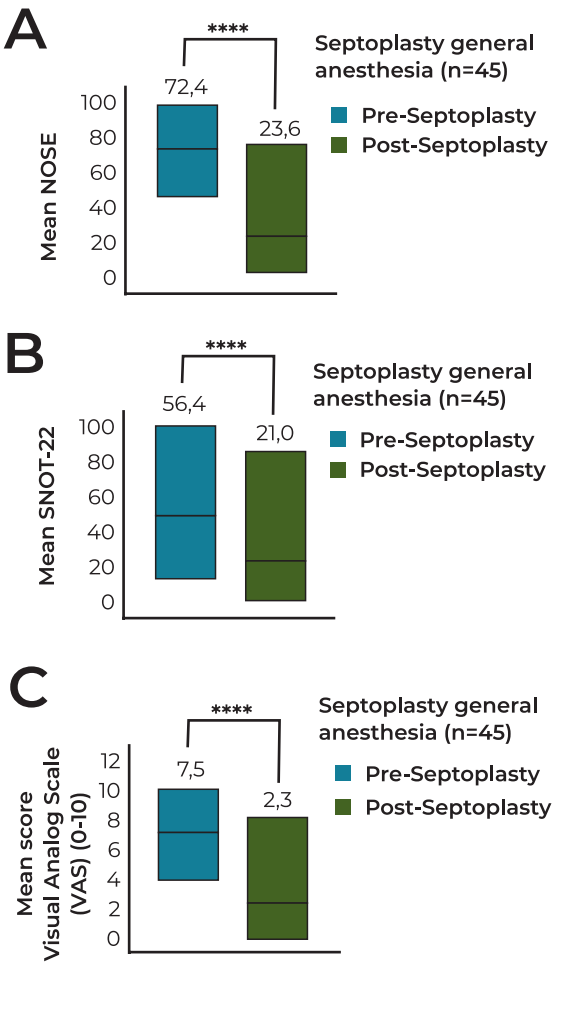
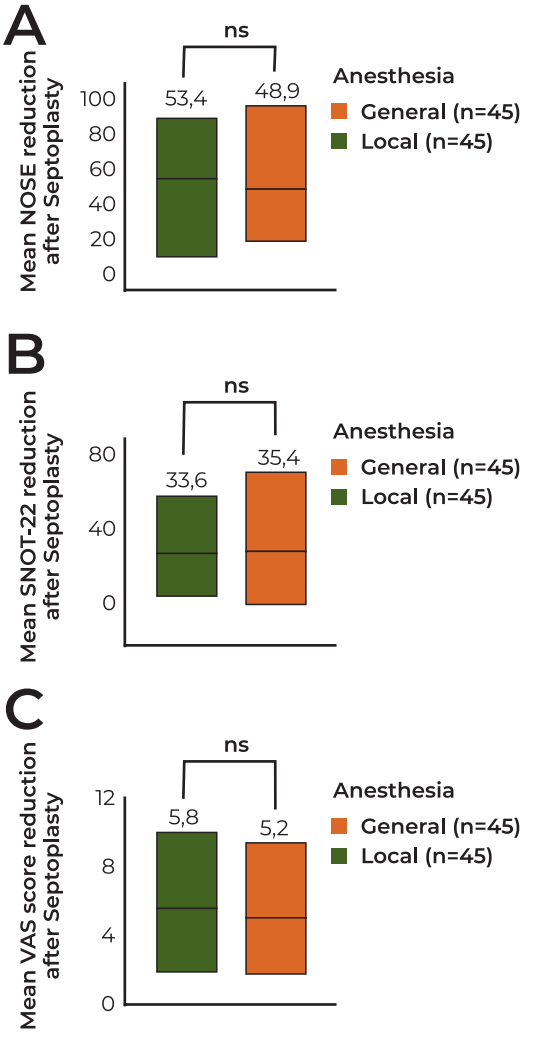


Figure 3
Comparing the effectiveness of septoplasty under general vs. local anesthesia. Reduction of mean A) NOSE, B) SNOT-22, and C) Visual Analog Scale (VAS) scores following septoplasty under general (n=45) vs. local (n=45) anesthesia.
(ns: not significant, unpaired Student's t-test)



(very satisfied). Patient satisfaction scores (0-10) were 8.3 ± 2.1 for septoplasty under GA and 8.1 ± 2.5 for septoplasty under LA (Figure 5). A statistical analysis of the patient satisfaction levels following surgery under GA vs. LA revealed no significant differences between the two groups (Figure 5). Finally, considering the improvement in their nasal obstruction, patients were asked whether they would undergo the surgical procedure again (Yes vs. No). Similar proportions of patients in the GA and LA groups stated they would do so (91% vs. 82%, respectively; Table 4).

Discussion

This prospective study evaluated the quality of life for patients undergoing septoplasty under LA compared to those undergoing septoplasty under GA, showing promising results for the LA approach. An analysis of the NOSE, SNOT-22, and VAS scores showed significant improvements in both LA and GA groups after surgery. This observation aligns with previous studies demonstrating that septoplasty effectively improves the quality of life related to nasal obstruction[12,15] . The mean reduction of

Table 3
Post-surgical complications of patients undergoing septoplasty under general or local anesthesia at the ENT department of ULS Algarve between 2023 and 2024.

Septoplasty under general anesthesia	
Hemorrhage	3
Hyposmia	2
Septal perforation	1
Headache	1
Skin reaction	1
Total	**8**
Septoplasty under local anesthesia	
Hemorrhage	4
Vomiting and Nausea	3
Allergy to Doyles	1
Total	**8**

Figure 4
Pain associated with the surgical procedure (septoplasty) when performed under local anesthesia (n=45). 0 – 10 scale: 0 (no pain) to 10 (worst possible pain).

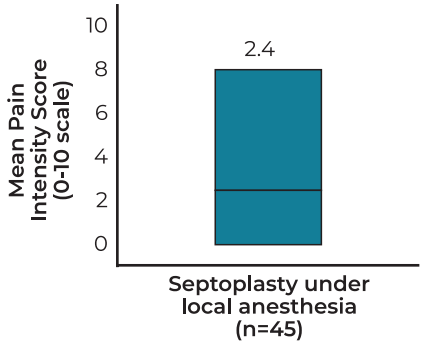
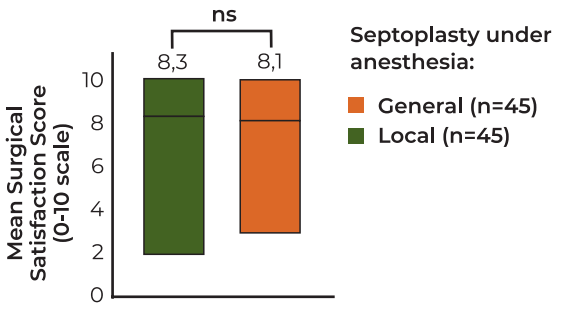


Table 4
Responses from patients who underwent septoplasty, with or without bilateral inferior turbinoplasty, under general or local anesthesia, when asked if they would undergo this surgery again (Yes vs. No).

Would you undergo this surgery again?		
Septoplasty under general anesthesia	**n**	**%**
YES	41	91
NO	4	9
Septoplasty under local anesthesia	**n**	**%**
YES	37	82
NO	8	18

Figure 5
Comparison of patient satisfaction levels between surgical procedures performed under general anesthesia (n=45) vs. local anesthesia (n=45). 0 – 10 scale: 0 (very dissatisfied) to 10 (very satisfied)
(ns: not significant, unpaired Student's t-test)



67% in the NOSE score and 63% in the SNOT-22 for the LA group is particularly notable, indicating a substantial improvement in nasal symptoms and overall quality of life for these patients. No statistically significant differences were found between the LA and GA groups in the mean reduction of NOSE, SNOT-22, and VAS scores following septoplasty. This result indicates that septoplasty under LA can be as effective as septoplasty under GA in terms of improving the quality of life. This outcome is supported by recent studies demonstrating the feasibility and effectiveness of septoplasty under LA[5,6,16].

The postoperative complication rates were low in both groups, with 87% of patients reporting no complications. This favorable safety profile is consistent with the literature on septoplasty. Although LA is considered a safe technique, there are potential complications. The most frequently reported complications in the literature include intraoperative pain, discomfort, or anxiety related to being awake, intra- or postoperative bleeding, adverse reactions to local anesthetics (including systemic toxicity), vasovagal episodes, and nausea and vomiting. Herein, postoperative nasal bleeding was the most common complication in the local anesthesia group. Nausea, vomiting, and a skin reaction suggesting local hypersensitivity were

also reported. Although infrequent, these complications were well-documented and are consistent with previous reports in other published series[17,18] .

A significant aspect of this study was the analysis of pain associated with the procedure under LA. The mean reported pain score was 2.4/10, with 89% of patients reporting scores below 5/10, indicating the technique was well-tolerated. These data are particularly significant because patients undergoing surgery under LA are often concerned about how much pain they will feel. Furthermore, the correlation between intraoperative pain and final satisfaction showed coefficients very close to zero and no statistical significance ($p>0.05$), indicating that intraoperative discomfort did not affect the overall satisfaction with septoplasty results.

The high level of patient satisfaction (8.1/10 for LA and 8.3/10 for GA) and willingness of most to undergo the procedure again (82% for LA and 91% for GA) are key indicators of the acceptability and perceived effectiveness of septoplasty, regardless of the type of anesthesia used. These results are consistent with prior studies reporting high levels of patient satisfaction following septoplasty[2,15,17,18]. The lack of significant differences in the satisfaction levels between the LA and GA groups is particularly noteworthy. This indicates that from the patient's perspective, septoplasty under LA can be as satisfying as septoplasty under GA, with the added benefits of shorter recovery times and reduced risks associated with GA.

One important factor to consider is the selection of patients for LA vs. GA, which was not based on the complexity or morphology of the septal deviation. For several years, our center has faced a persistent shortage of operating room availability for procedures requiring GA. This is due to the limited availability of anesthesiologists for elective procedures, which has resulted in longer wait times for septoplasties under GA. When informed of this difference, some patients opted for LA so they could undergo surgery sooner. For others, this decision also reflected concerns about the risks associated with GA. Therefore, the groups were formed based on a combination of internal departmental organization and patient preference, without using anatomical or surgical complexity as the selection criteria. We acknowledge that the lack of prior randomization and stratification is a potential source of bias. Additionally, evaluating the relationship between the complexity of the deviation and the study outcomes—intraoperative pain, procedure tolerance, and satisfaction levels—could provide relevant information and is an avenue for future research. This study has some additional drawbacks. While the sample size was sufficient to detect significant differences, a larger sample would have increased the statistical power. The 3-month follow-up period only allows for an evaluation of short-term results and is insufficient to infer the long-term effects of septoplasty under LA versus septoplasty under GA. Future studies could benefit from longer follow-up periods to evaluate the durability of results and patient satisfaction over time. Additionally, cost-effectiveness analyses comparing both approaches would be valuable for supporting clinical and health policy decisions.

In conclusion, this study shows that septoplasty under LA is a viable and effective alternative to GA, offering significant improvements in the quality of life with a favorable safety profile and high patient satisfaction. These results have significant clinical implications, indicating that septoplasty under LA can be considered to be a first-line treatment for nasal septum deviation. This approach could reduce the costs and risks associated with GA without compromising the clinical outcomes or patient satisfaction.

Conclusions

Septoplasty performed under LA, following the protocol implemented by the ENT department at ULS Algarve, significantly improved the quality of life for patients with nasal obstruction. The protocol proved to be

safe, was associated with minimal pain, and resulted in high levels of patient satisfaction. The findings indicate that septoplasty under LA is as effective as septoplasty performed under GA, offering a viable and potentially more convenient alternative for the treatment of nasal septum deviation.

Conflicts of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

Data Confidentiality

The authors declare having followed the protocols in use at their working center regarding patients' data publication.

Protection of humans and animals

The authors declare that the procedures were followed according to the regulations established by the Clinical Research and Ethics Committee and to the 2013 Helsinki Declaration of the World Medical Association.

Privacy policy, informed consent and Ethics Committee Authorization

The authors declare that they have written consent for the use of photographs of patients in this article.

Funding Sources

This work did not receive any contribution, funding or scholarship.

Availability of scientific data

There are no datasets available, publicly related to this work.

Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

During the preparation of this manuscript, the generative artificial intelligence tool ChatGPT (OpenAI) was used exclusively for linguistic editing and to improve the fluency and clarity of the text, without any involvement in the study design, data collection, statistical analysis, interpretation of results, or scientific conclusions. Following the use of this tool, the entire content was thoroughly reviewed, validated, and edited by the authors, who assume full responsibility for the accuracy, integrity, and originality of the scientific content of this publication.

Referências Bibliográficas

1. Gandomi B, Bayat A, Kazemei T. Outcomes of septoplasty in young adults: the nasal obstruction septoplasty effectiveness study. Am J Otolaryngol. 2010 May-Jun;31(3):189-92. doi: 10.1016/j.amjoto.2009.02.023
2. Konstantinidis I, Triaridis S, Triaridis A, Karagiannidis K, Kontzoglou G. Long term results following nasal septal surgery. Focus on patients' satisfaction. Auris Nasus Larynx. 2005 Dec;32(4):369-74. doi: 10.1016/j.anl.2005.05.011.
3. Rhee JS, Book DT, Burzynski M, Smith TL. Quality of life assessment in nasal airway obstruction. Laryngoscope. 2003 Jul;113(7):1118-22. doi: 10.1097/00005537-200307000-00004.
4. Stewart MG, Smith TL, Weaver EM, Witsell DL, Yueh B, Hannley MT. et al. Outcomes after nasal septoplasty: results from the Nasal Obstruction Septoplasty Effectiveness (NOSE) study. Otolaryngol Head Neck Surg. 2004 Mar;130(3):283-90. doi: 10.1016/j.otohns.2003.12.004.
5. Dogan R, Erbek S, Gonencer HH, Erbek HS, Isbilen C, Arslan G. Comparison of local anaesthesia with dexmedetomidine sedation and general anaesthesia during septoplasty. Eur J Anaesthesiol. 2010 Nov;27(11):960-964. doi: 10.1097/EJA.0b013e32833a45c4.
6. Daşkaya H, Yazıcı H, Doğan S, Can IH. Septoplasty: under general or sedation anesthesia. Which is more efficacious? Eur Arch Otorhinolaryngol. 2014 Sep;271(9):2433-6. doi: 10.1007/s00405-013-2865-6.
7. Hytönen M, Blomgren K, Lilja M, Mäkitie AA. How we do it: septoplasties under local anaesthetic are suitable for short stay surgery; the clinical outcomes. Clin Otolaryngol. 2006 Feb;31(1):64-8. doi: 10.1111/j.1749-4486.2006.01139.x.
8. Resende L, Carmo CD, Mocellin L, Pasinato R, Mocellin M. Disease-specific quality of life after septoplasty and bilateral inferior turbinate outfracture in patients with nasal obstruction. Braz J Otorhinolaryngol. 2018 Sep-Oct;84(5):591-598. doi: 10.1016/j.bjorl.2017.07.001.
9. Hopkins C, Gillett S, Slack R, Lund VJ, Browne JP. Psychometric validity of the 22-item Sinonasal Outcome Test. Clin Otolaryngol. 2009 Oct;34(5):447-54. doi: 10.1111/j.1749-4486.2009.01995.x.
10. Pannu KK, Chadha S, Kaur IP. Evaluation of benefits of nasal septal surgery on nasal symptoms and general health. Indian J Otolaryngol Head Neck Surg. 2009 Mar;61(1):59-65. doi: 10.1007/s12070-009-0036-2.
11. Medeiros N, Aguiar C, Pina P, Lima NB, Larangeiro J, Condé A. Disease-specific Vs non-specific questionnaires on septoplasty outcomes. Iran J Otorhinolaryngol. 2022 May;34(122):163-170. doi: 10.22038/IJORL.2022.59117.3076.
12. Behnke J, Dundervill C, Bulbul M, Armeni M, Ramadan HH, Makary CA. Using the sino-nasal outcome test (SNOT-22) to study outcome of treatment of nasal obstruction. Am J Otolaryngol. 2023 Jul-Aug;44(4):103879. doi: 10.1016/j.amjoto.2023.103879.

13. de Vilhena D, Duarte D, Lopes G. Sino-Nasal Outcome Test-22: translation, cultural adaptation and validation in Portugal. Clin Otolaryngol. 2016 Feb;41(1):21-4. doi: 10.1111/coa.12465.
14. Cottle MH, Loring RM, Fischer GG, Gaynon IE. The maxilla-premaxilla approach to extensive nasal septum surgery. AMA Arch Otolaryngol. 1958 Sep;68(3):301-13. doi: 10.1001/archotol.1958.00730020311003.
15. Carrie S, O'Hara J, Fouweather T, Homer T, Rousseau N, Rooshenas L. et al. Clinical effectiveness of septoplasty versus medical management for nasal airways obstruction: multicentre, open label, randomised controlled trial. BMJ. 2023 Oct 18:383:e075445. doi: 10.1136/bmj-2023-075445.
16. Obradovic B. Septoplasty under local anesthesia. J Craniofac Surg. 2019 Mar/Apr;30(2):e142-e143. doi: 10.1097/SCS.0000000000005071.
17. Bugten V, Nilsen AH, Thorstensen WM, Moxness MH, Amundsen MF, Nordgård S. Quality of life and symptoms before and after nasal septoplasty compared with healthy individuals. BMC Ear Nose Throat Disord. 2016 Oct 28:16:13. doi: 10.1186/s12901-016-0031-7.
18. Nilsen AH, Helvik AS, Thorstensen WM, Bugten V. A comparison of symptoms and quality of life before and after nasal septoplasty and radiofrequency therapy of the inferior turbinate. BMC Ear Nose Throat Disord. 2018 Jan 26:18:2. doi: 10.1186/s12901-017-0050-z.