



# Septoplasty and Bilateral Inferior Turbinate Surgery under Local Anesthesia with Deep Sedation versus General Anesthesia, A Retrospective Randomized Comparative Control Study

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## Abstract

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**AIM:** The main target of this study was to investigate the safety and efficacy and the benefits of the use of local anesthesia during septal and bilateral turbinate surgery.

**METHODS:** This prospective, randomized control study was conducted on 140 patients between the ages of 17 and 65, though the period from march 2021 to November 2022, who were booked for septal and bilateral turbinate surgery who were randomly allocated into two groups study group (1) involving 35 patients (42 males and 28 females with mean age  $34.3 \pm 11.9$  years old) who were received local anesthesia with deep sedation and control group (2) involving 35 patients (52 males and 18 females with mean age  $33.3 \pm 11.4$ ) who were received general anesthesia from march 2021 to November 2022.

**RESULTS:** Local anesthesia with sedation group showed a significantly less Total operation time ( $33.3 \pm 2.62$  min), real surgical time ( $23.64 \pm 2.70$  min), intraoperative blood loss ( $33.9 \pm 2.3$  mL), hospital stay duration ( $7.1 \pm 0.7$ ), post-operative pain (8.6%), post-operative nasal packing (8.6%), patient satisfaction ( $9.3 \pm 0.7$ ), and total hospital cost ( $17.14 \pm 1.25$  \$), with no significant deference regarding to nausea and vomiting (5.7%), Compared to the other control group.

**CONCLUSION:** Septoplasty with bilateral turbinate surgery under local anesthesia with deep sedation is easy, safe, reliable, and costless that to be done under general anesthesia.

## Introduction

Nasal obstruction with difficult breathing is a very common condition caused by septal deviation and hypertrophy of the inferior turbinate which can be managed simply with correction of septal deviation and inferior turbinate surgery which can be done either with local anesthesia with sedation (LAS) or general anesthesia (GA). The ideal method for anesthesia should be noninvasive, short, cost, and comfortable for both patient and surgeon. Many kinds of literature had discussed the different types of anesthesia [1]. The GA method is superior to giving adequate body control during the procedure, to secure a safe airway with no need for the patient's cooperation. Moreover, GA is more helpful for those patients who have any phobia of the operation because they will be fully unconscious during the procedure. On the other hand, LAS may also have the advantages of being shorter in duration due to short induction without endotracheal intubation with easier and shorter recovery providing shorter stay inside the operation room with less cost of operating supplies and performing more surgeries in the same

day with reducing the total cost [2], [3]. Although, the study of such methods in literature is inadequate and usually depends on subjective variables while their advantages regarding the short post-operative hospital stay, less bleeding, nausea, vomiting pain, patient satisfaction, and less cost of these techniques are much more attractive for all otolaryngology, patients, and governments [4].

Is septoplasty with bilateral inferior turbinate surgery under local anesthesia with deep sedation more efficient, time saving and lesser cost than general anesthesia or not? this is our target in this study.

## Patients and Methods

The present study was conducted on 140 patients through the period from March 2021 to November 2022 aged from 17 to 65 years old who were admitted to the department of otolaryngology –head-and-neck surgery Taiba hospital, Kuwait planned for

septoplasty and bilateral inferior turbinate surgery as 1-day surgery to determine the efficacy and the benefits of local anesthesia with deep sedation and compare it with the use of general anesthesia for the treatment of nasal obstruction and difficult breathing excluding any patients complaining of hypertension, heart diseases, diabetes, epilepsy, pulmonary diseases, blood disorders. All patients had obstructing deviated bony and cartilaginous nasal septum with bilateral inferior turbinate hypertrophy Figure 1 which were diagnosed by pre-operative clinical assessment, nasal endoscopy and CT scan, which were done on all patients and any case with sinuses disease or sinonasal polyps had also been excluded. A written informed consent was taken from each patient after an explanation of the nature of the surgery and the expected complications and one more anesthesia consent was taken according to the preference of the patient either to do the procedure under general anesthesia (GA) or local anesthesia with sedation (LAS). All patients were been laboratory checked for CBC, coagulation profile, random blood sugar, and hemoglobin level according to our pre-operative hospital policy.

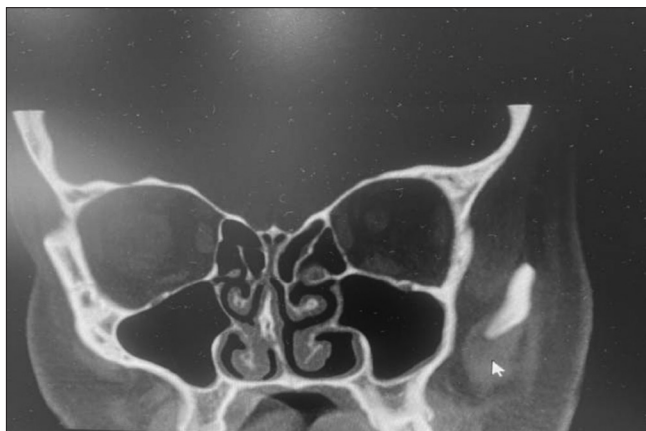


Figure 1: Bony and cartilaginous septal deviation without any sinus diseases

They were randomly divided into two equal groups, the 1<sup>st</sup> one is the study group and the 2<sup>nd</sup> is control group as mentioned below. All patients were been operated on with the same surgeon (RA) and same anesthesiologist (GA) aiming to reduce the research bias.

The study group included 70 patients who received local anesthesia with deep sedation in the form of Midazolam (IV), Propofol (IV), and Fentanyl (IV) the doze of each was adjusted according to the weight of the patient with more according to Ramsey sedation scale.

The control group included 70 patients who had received general anesthesia in the form of Fentanyl, Propofol, Rocuronium, and Midazolam IV. Endotracheal intubation was done on all patients in this group.

The surgical procedure was started with local infiltration with Lidocaine HCL 2% with Epinephrine

1:100,000 (3 mL) to both sides of the septum for all patients of the study group and 3 mL of diluted adrenaline 1:100,000 in both septal sides of the control group patients then septal operation with correction of septal deviation, septal spur and caudal septal dislocation and suturing of the incision and one more trans septal continuous suture to reduce the dead space and prevent later on septal hematoma were done then bilateral inferior turbinate out-fraction and lateralization with Ellman Surgitron cauterization to reduce their size. Silastic sheets were fixed inside each nasal cavity to prevent post-operative synechia.

Total operation time was calculated in minutes using a stopwatch with the rotating nurse as the total time that the patient stayed inside the operation room, real surgical operation time was calculated with the same method starting with the time of local injection till the end of the surgery then the patients were shifted from recovery room to the ward according to the release for anesthesia doctor. To calculate the intraoperative blood loss one hundred millilitres of saline was put in a bowl and used for intermittent suction, all gauze used for homeostasis was weighed before and after the operation with suction for the blood of both nostrils all through the operation was collected in the suction bottle and then at the end of operation suction of all remaining saline in the bowl then we added the volume of the gauze absorbed blood to the suction bottle fluid with subtracting the 100 mL of bowl saline. Recording of post-operative nausea, vomiting, and pain during the patient's hospital stay in the ward by the anesthesia doctor. All patients were asked by their surgeon during their 1-week follow-up visit about their satisfaction and their advice to other patients to do the surgical procedure with the same technique and a score was given from 1 to 10. The hospital stay for each patient was calculated in hours. The total cost of the operation was calculated in USD (\$) and recorded by the anesthesia doctor including the medications, surgical supplies, stay inside the operating room, and the hospital stay. Ethical committee approval was obtained from the research review committee of Taiba Hospital for the research protocol and consent.

### Statistical method

Surgical result was conducted and analyzed using, SPSSV 24 (Chicago IL, SPSS Inc®). quantitative data were expressed as (mean  $\pm$  SD). Qualitative data were expressed as frequency and percentage. Mean (average): the central value of a discrete set of numbers, specifically the sum of values divided by the number of values. Standard deviation (SD): is the measure of dispersion of a set of values. A low SD indicates that the values tend to be close to the mean of the set, while a high SD indicate that the values are spread out over a wider range.

The following tests were done:

**Mann Whitney U-test (MW)**

When comparing between 2 means (for abnormal distributed data).

**Chi-square test**

Was used when comparing between non parametric data.

**Probability (p-value)**

$p < 0.05$  was considered significant,  $p < 0.01$  was considered highly significant while  $p > 0.05$  was insignificant.

**Results****Base line data**

The base line data of all 140 patients divided equally in to two groups 70 patients in each group, including (42) male 60% and (28) 40% female with mean age ( $34.3 \pm 11.9$  years) in the study group and (52) 74.3% males and (18) 25.7% female with mean age ( $33.3 \pm 11.4$  years) in the control group ( $p = 0.72$ ,  $p = 0.617$ ) did not show any statistical difference among the two groups regarding to the age and sex of the patient as shown in (Table 1). The body mass index was ( $28.5 \pm 4.67$ ) for the study group and ( $27.8 \pm 3.46$ ) with insignificant  $p = 0.59$ .

**Table 1: Comparison between studied groups as regard demographic data**

Demographic data	Group I (n = 70)	Group II (n = 70)	Stat. test	p-value
Age (years)				
Mean	34.3	33.3	MW = 2330	0.617 NS
± SD	11.9	11.4		
Sex				
Male	42 60%	52 74.3%	$X^2 = 3.2$	0.072 NS
Female	28 40%	18 25.7%		

MW: Mann Whitney U-test.  $X^2$ : Chi-square test. NS:  $p > 0.05$  is considered non-significant.

**Total operation time**

The total operation time was ( $33.43 \pm 2.62$ ) and ( $60.82 \pm 2.79$ ) for the study group and the control group, respectively. It was highly significantly less in the study group than the control group with ( $p < 0.001$ ) (Table 2).

**Real surgical time**

There was a significant shorter real operation time in the study group than the control group with significant  $p < 0.03$ . The real surgical time was ( $32.64 \pm 2.70$ ) min for the control group and ( $34.09 \pm 2.87$ ) min for the control group as shown in Table 2.

**Table 2: Comparison between studied groups as regard operative data**

Operative data	Group I (n = 70)	Group II (n = 70)	MW	p-value
Surgical time (min)				
Mean	32.64	34.09	0.0	$< 0.03$ HS
±SD	2.7	2.87		
Total operative time (min)				
Mean	33.3	60.8	0.0	$< 0.001$ HS
±SD	2.6	2.8		
Total blood loss (mL)				
Mean	33.9	42.7	178	$< 0.001$ HS
±SD	2.3	4.1		

MW: Mann Whitney U-test. HS:  $p < 0.001$  is considered highly significant.

**Total blood loss**

the mean amount of intra operative blood loss was ( $33.9 \pm 2.3$ ) mL for the study and was ( $42.7 \pm 4.1$ ) mL for the control group with a highly significant difference  $p < 0.001$  being shorter in the study group than the control group Table 2.

**Post-operative pain**

There was a significant difference when comparing the post operative pain between the 2 groups being 6 of 70 patients (8.6%) and 18 of 70 patients (25.7%) in the study group and control group respectively  $p < 0.007$  being less in the study group Table 3.

**Table 3: Comparison between studied groups as regard post-operative assessment**

Post-operative data	Group I (n = 70)	Group II (n = 70)	Chi-square	p-value
Post-operative pain				
No	64 91.4%	52 74.3%	7.2	0.007 S
Yes	6 8.6%	18 25.7%		
Post-operative nausea and vomiting				
No	66 94.3%	60 85.7%	2.85	0.091 NS
Yes	4 5.7%	10 14.3%		
Post-operative nasal pack				
No	64 91.4%	54 77.1%	5.3	0.02 S
Yes	6 8.6%	16 22.9%		

$X^2$ : Chi-square test. NS:  $p > 0.05$  is considered non-significant. S:  $p < 0.05$  is considered significant.

**Post-operative nausea and vomiting**

Post-operative nausea and vomiting were not significantly different in both control group 4 of 70 patients (5.7%) than the study group 10 of 70 patients (14.3%) with  $p < 0.091$  Table 3.

**Nasal packing**

There was a significant difference when comparing the insertion of nasal pack to avoid post operative bleeding between the 2 groups, it was 8.6% in the group 1 and 22.9% in the group 2 with significant  $p < 0.02$  (Table 3).

**Hospital stays**

When comparing the hospital stay calculated in hours between the two groups, there was a highly significant difference between the study group

(7.11 ± 0.67) hours and the control group (11.68 ± 1.18) hours  $p < 0.001$ ) Table 4.

**Table 4: Comparison between studied groups as regard patients satisfaction, surgical coast and hospital stay**

Parameters	Group I (n = 70)	Group II (n = 70)	MW	p-value
Patients satisfaction				
Mean	9.3	7.0	114	<0.001 HS
±SD	0.7	0.8		
Surgical coast				
Mean	17.1	50.3	0.0	<0.001 HS
±SD	1.3	3.4		
Hospital stays (day)				
Mean	7.1	11.7	0.0	<0.001 HS
±SD	0.7	1.2		

MW: Mann Whitney U-test. HS:  $p < 0.001$  is considered highly significant.

### Total operation cost

The mean operation cost was (17.14 ± 1.25) US Dollars in the study group and (50.43 ± 3.35) US Dollars in the control group. The operation cost was high significantly less in the study group than the control group with  $p < 0.001$  (Table 4).

### Patient satisfaction and advice to other patient to do same technique

There was a highly significant difference ( $p < 0.001$ ) when comparing the patient satisfaction and advice to other patient to do same technique for the same procedure being (9.28 ± 0.67) in the study group and (7.0 ± 0.8) in the control group when patient was asked to give score from 1 to 10 about his satisfaction (Table 4).

## Discussion

Nasal obstruction with difficult breathing is a very common condition caused by septal deviation and hypertrophy of the inferior turbinate which can be managed simply as 1 day surgery with surgical correction of septal deviation and inferior turbinate. The total cost and the patient satisfaction remain the corner stone for any procedure to be chosen to be done so the present study was conducted to prove which type of anesthesia either local anesthesia with sedation (LAS) or general anesthesia (GA), would be considered superior to the other. At the same time, it should be non-invasive, short, cheap, and comfortable for both of patient and surgeon at the same time [2]. While which type of anesthesia is better than the other was still challenging and depended on subjective variations [1], [5].

In the present study, LAS is considered an appropriate technique with shorter total operation time, real surgical time, less intraoperative bleeding, with less need for anesthetic supplements. On the other hand, it lacks in securing the airway from aspiration,

which can be managed by inserting nasal back on both sides posteriorly with good hemostasis to prevent the trickling of the blood to the nasopharynx and also lack of being depending on patient cooperation which may be challenging in some conditions especially in nasal surgery and sometimes the sudden unexpected movement of the patient or complaining of pain during the procedure may make the job of the surgeon more difficult which might be managed by continuous monitoring of the patient by anesthesia doctor. In the present study, LAS expressed a significant reduction in most parameters, the intraoperative blood loss, total operation time, real surgical time, post-operative pain, total hospital stays, and total hospital cost.

LAS group and GA group, respectively, showed (33.9 ± 2.30 mL and 42.7 ± 4.10) mL with less mean intraoperative blood loss, (33.43 ± 2.62 and 60.82 ± 2.79) less mean total surgical time, (32.64 ± 2.70 and 34.09 ± 2.87) less mean real surgical time, (5.7% and 14.3%) insignificant mean post-operative nausea and vomiting, (8.6% and 25.7%) less mean post-operative pain, (7.11 ± 0.67 and 11.68 ± 1.18 in hours) less hospital stay hours, (17.14 ± 1.25 \$ and 50.34 ± 3.35 \$) less mean hospital cost all showed a significant reduction for all group of patients in LAS group than those in the GA group except in the post-operative nausea and vomiting showed insignificant difference in between the two groups and this might be due to the use of antiemetic drugs during the procedure for all the two group patients, that result was agreed by Daskaya *et al.*, who proved the same significant reduction in group 1 than group 2 showing (19.83 ± 21.34 and 31.96 ± 23.13) for the intraoperative blood loss, (35.13 ± 8.34 and 56.10 ± 9.44) for total operation time, (26.23 ± 7.48 and 31.23 ± 8.02) for the surgical operation time, (2.06 ± 1.22 and 3.66 ± 1.09) for post-operative nausea and vomiting, (3.26 ± 1.14 and 3.60 ± 1.06) for post-operative pain, (86% and 66% for patient satisfaction, (15.36 ± 9.49 and 31.43 ± 13.25) for patient hospital stay, (16.29 ± 11.88 and 44.35 ± 10.81) for total hospital stay in their study done on 60 patients divided into two groups equally in 2014 [4]. Some authors conducted 4.5 and 4.6 times higher post-operative nausea and vomiting rate with longer hospital stay in GA than LAS [5], while others conducted less post-operative nausea and vomiting with shorter hospital stay when LAS was used for the procedure than GA [6], [7].

As concluded by the literature, that post-operative pain, and vomiting may initiate agitation and tension of the patient causing more post-operative bleeding and decrease patient satisfaction about the surgery this study concluded a significant reduction in post-operative pain score in the patient group of LAS than the other group of GA [7].

Patient satisfaction and advice to other patients to proceed with the same manner was highly significant ( $p = 0.046$ ) reached (9.28 ± 0.67) in the group of LAS, which was better than those in the group of GA (8.93

$\pm 0.77$ ), which was proved by some authors, who concluded 86% satisfied patients with LAS and 66% satisfied patients about the procedure with GA. And those satisfied patients with LAS would recommend the same procedure with the same method of operation to other patients [8].

On the other hand, some authors [9] did not find any significant difference regarding to post operative pain and patient satisfaction between LA and GA in cases of nasal fracture reduction procedure so that they recommended to do such procedure to be done under LA being a shorter operation time.

The current study showed a significant reduction in the total operation time and the real surgical time as a result of less intraoperative blood loss in the LAS group and longer time consumed during preparation for general anesthesia with endotracheal intubation and post-operative extubation and recovery of the patients in the control group which may conflict the faster turnover of the patient from the operating theatre and lowering the cost of the operating room, which was proven in the same time with many literatures [4].

The present study showed significantly shorter hospital stay in the LAS group than the GA group, which in turn would reduce the total cost of hospital stay and the total procedure cost allowing to do more number of cases and also reducing the chance of nosocomial infection, which was conducted on the same time with many authors in their study concluded to perform all septoplasty operation under local anesthesia with sedation to reduce the operation time and hospital stay also it would reduce post-operative pain and improve the patient satisfaction [10]. Moreover, because all the time all surgeons searching to do any procedures easy with saving time and money of the patients and the hospital with preservation of the efficacy of the procedure, the present study concluded a significant reduction of the hospital cost to be ( $17.14 \pm 1.25$  \$) in the LAS group compared to that in the control group ( $50.34 \pm 3.35$ ), on the same time some literatures, showed 63% reduction in the health care expenditures when using local anesthesia instead of using general anesthesia for septoplasty operation in their study [4]. While other authors proved saving hospital charges when using local anesthesia for the reduction of fractured nasal bone instead of general anesthesia [11]. Furthermore, other literatures, concluded about 1,160.33\$ saving of the hospital charge if using local anesthesia for pediatric otolaryngological procedures than if using general anesthesia [12].

## Conclusion

Septoplasty and inferior turbinate surgery which were considered one of the most common

otolaryngology procedures should be done as 1 day surgery under local anesthesia which is cost less, more time saving, more efficient, bloodless and comfortable to the patients on the other hand there was some limitation in the if doing septoplasty with inferior turbinates surgery under local anesthesia with deep sedation as may lack in the securing the air way from aspiration which can be managed by inserting nasal back on both sides posteriorly with good hemostasis to prevent trickling of the blood to nasopharynx and also lack of being depending on patient cooperation which may be challenging in nasal surgery because sometimes sudden unexpected movement of the patient or complaining of pain during the procedure may make the job of the surgeon more difficult which might be managed by continuous monitoring of the patient by anesthesia doctor.

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