

Endoscopic endonasal surgery for sinonasal polyposis: a comparative study between general versus local anesthesia regarding compliance of surgery and patients' acceptance

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Introduction

One of the most common inflammatory mass lesions of the nose are nasal polyps, which affect up to 4% of the population. Endoscopic surgery under local anesthesia may allow for a day-care surgical procedure for the patient; however, extensive procedures, revision surgeries, and uncooperative, and pediatric age group patients will warrant the use of general anesthesia. The aim of this study is to compare the efficacy of local versus general anesthesia for endoscopic surgical treatment of sinonasal polyposis during operation as well as during early and late postoperative periods together with patient's acceptance for surgery.

Patients and methods

A total of 60 patients with sinonasal polyposis were divided randomly into two groups. Group 1 underwent endoscopic nasal surgery under local anesthesia and group 2 underwent endoscopic nasal surgery under general anesthesia.

Results

Most of the patients who were operated under local anesthesia showed good acceptance for surgery, short time of surgery, and less bloody field than those who were operated under general anesthesia (the *P* value was significant regarding bleeding and time during surgery under local anesthesia).

Conclusion

Surgery of sinonasal polyposis under local anesthesia is an effective method for the treatment of nasal polyposis as regards patient acceptance for the surgery, time of surgery with very good surgical field, and less cost procedures.

Keywords:

endoscopic sinus surgery, general anesthesia, local anaesthesia, patient's acceptance

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Introduction

Nasal polyps (NP) are one of the most common inflammatory mass lesions of the nose, affecting up to 4% of the population. They present with nasal obstruction, anosmia, rhinorrhea, postnasal drip, and less commonly facial pain [1].

When functional endoscopic sinus surgery (FESS) was originally introduced, it was thought that patients should preferably be operated under local/topical anesthesia with combined sedation. In this manner, the patients would be able to signal any kind of pain or discomfort, alerting and allowing the surgeon to minimize trauma and complications [2].

Endoscopic surgery under local anesthesia may allow for a day-care surgical procedure for the patient; however, extensive procedures, revision surgeries, and uncooperative and pediatric age group patients will warrant the use of general anesthesia [3].

Aim of the work

Our study aims to compare the efficacy of local versus general anesthesia for endoscopic surgical treatment of sinonasal polyposis during operation as well as during early and late postoperative periods together with patient's acceptance for the surgery.

Patients and methods

A total of 40 patients not less than 15 years old with sinonasal polyposis were included in the study. All cases presented to the outpatient clinic of the Otolaryngology Department, during the period from June 2015 through June 2017. They are numbered from 1 to 40, patients with odd number were put in group 1 and underwent endoscopic nasal surgery under local anesthesia. And those with even number were put

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in group 2 and underwent endoscopic nasal surgery under general anesthesia. The study was approved from the ORL ethics committee before conducting the study. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

We have excluded patients under 15 years old, recurrent cases, patients with Samter's triad or fungal sinusitis or cystic fibrosis. All patients were subjected to routine history with full endoscopic examination and computed tomographic scan imaging to obtain clinical and radiological staging for the polyposis [4,5].

Surgical procedures

The surgical procedure used in our study is the Messerklinger technique [6]. In this study, for all of the patients operated on for the first time intranasally where no surgical landmarks had been altered by earlier trauma or disease, the surgical procedure will be functional in its origin and according to the basic rules of the Messerklinger technique. Concerning instrumentation, a traumatic meticulous surgical was conducted through cutting instruments and shavers used in both techniques.

The anesthesiological procedures

Group 1

Patients in this group underwent endoscopic nasal surgery under local anesthesia. Preoperatively, there is intravenous administration of an analgesic (fentanyl 0.1 mg) and a sedative (diazepam 5–10 mg). The technique used starts by packing nasal cavity by cotton pads soaked in 10 ml adrenaline+10 ml xylocaine 2%+10 distilled water in the area of the middle meatus, medial to the middle turbinate, and inferior meatus. Infiltration anesthesia by using injection of 0.5 ml adrenaline ampoule+10 ml xylocaine 2%+10 ml distilled water was achieved by a 27-G spinal needle in order to obtain: greater palatine nerve block, anterior ethmoidal nerve block, and sphenopalatine ganglion block.

Group 2

Patients in this group will undergo endoscopic nasal surgery under general anesthesia, oral intubation with hypotensive technique used as well as administered potent opioids.

Outcome

The patients in the two groups are compared: (a) intraoperative for pain score (pain level according to the numeric rating scale) during surgery in group 1 done under local anesthesia [7,8], amount of blood loss, time of surgery, and surgeon comfort for the assessment of intraoperative surgical field bleeding according to Fromme *et al.* [9] and (b) postoperatively for hospital stay, blood clots, and synechiae in the first and second weeks, and recurrence of polyps after 1 and 6 months (clinically and radiologically).

Statistical analysis

The clinical and laboratory data were statistically analyzed by using Microsoft Excel 2010 and Statistical Package for the Social Sciences, version 19.0, to obtain descriptive statistics and analytical studies used were Wilcoxon's test, χ^2 test, Pearson's correlation, and Spearman's correlation.

Results

The present study included 40 patients with sinonasal polyposis who were divided randomly into two groups. Group 1 underwent endoscopic nasal surgery under local anesthesia and group 2 underwent endoscopic nasal surgery under general anesthesia. Most of the patients who were done under local anesthesia showed good acceptance for surgery, short time of surgery, and less bloody field than those who were operated under general anesthesia (the *P* value was significant regarding bleeding and time during surgery under local anesthesia) (Table 1).

Discussion

NP are one of the most common inflammatory mass lesions of the nose that affect a large percentage of the population [1].

The surgical option is usually carried out for cases with failure of medical treatment. FESS is considered the gold standard for the surgical treatment of chronic rhinosinusitis with or without NP. This surgical technique is aimed to restore the normal sinus ventilation and drainage removing polyps or other tissue obstructing the airway or the osteomeatal complex [10].

Although, the FESS technique is fundamental, little data has been written and discussed about the various needs for different types of anesthesia in addition to local, topical anesthesia, though the use and advantages of local, topical anesthesia versus general anesthesia

Table 1 Showing the comparison of results between both groups (G.A vs L.A)

	LA group (N=20)		GA group (N=20)		P value
	Count	%	Count	%	
Sex					
Male	9		11		
Female	11		9		0.341
Age	21–65		15–60		
Clinical and endoscopic grading of sinonasal polyposis					
Grade I	2	10	0	0	0.335
Grade II	7	35	5	25	
Grade III	11	55	15	75	
CT scan (radiological) grading before surgery	12–24		8–24		0.610
Patient acceptance during surgery					
No pain	0	0	75% of patients in group 1 tolerated the procedure well. Two of the five patients with fair response completed surgery under general anesthesia, i.e. 10%		
Very good	6	30			
Good	9	45			
Fair	5	25			
Amount of blood loss (ml)	10–70		20–70		0.029*
Time of surgery (min)	20–90		45–120		0.001*
Surgeon comfort during surgery (as regard bleeding)					
Good	18	90	16	80	0.113
Fair	2	10	4	20	
Amount of blood loss during removal of the nasal packing after 24 h	There was no packing within the local anesthetic subjected patient		2–10 ml		
First visit 1 week postoperative (blood clots)					
No clots	18	90	14	70	0.114
Blood clots	2	10	6	30	
Second visit 2 weeks postoperative (synechiae)					
No synechiae	20	100	15	75	0.017*
Synechiae	0	0	5	25	
Third visit 1 month postoperative (residual polyps)					
No residual polyps	16	80	19	95	0.151
Residual polyps	4	20	1	5	
Fourth visit 6 months postoperative (recurrence of polyps and its grading clinically)					
No recurrence	13	65	15	75	0.12
Recurrence grade I	1	5	1	5	
Recurrence grade II	4	20	2	10	
Recurrence grade III	2	10	2	10	
Fourth visit 6 months postoperative (recurrence as shown radiologically)					
No recurrence	13	65	15	75	0.490
Recurrence	7	35	5	25	

CT, computed tomography; GA, general anesthesia; LA, local anesthesia. *Significance level obtained ($P < 0.05$).

have been widely debated [11]. Therefore, our study aimed to evaluate the general and local anesthesia effects on the different parameters of surgical procedures or during actual surgery or postsurgery.

Danielsen and Olofsson in 1996 reported that the use of local anesthesia for endoscopic sinus surgery has great advantages such as: (a) increased safety because

the patient operated upon is able to signal any kind of pain or discomfort, (b) reduced mucosal bleeding, and (c) easy mobilization of the patient and hence less hospital stay and less cost of surgery especially to offer this treatment mainly on a day-case, outpatient basis. Also they advised to apply this anesthesiological setting to a carefully selected group of patients, who are thoroughly mentally prepared and informed

beforehand [12]. Moreover, local anesthesia with sedation may result in shorter operative times, shorter recovery times, and less frequent nausea, emesis, and epistaxis than those operated upon under general anesthesia [2,3].

Our study was carried out on 40 cases of both sexes (male and female) of various ages. Analysis of our data showed nearly equal distribution of our cases in both sexes. The same applies in different age groups. This denotes that our method of randomization was good.

Regarding the grading of sinonasal polyposis, it is noteworthy that grade III is the most recorded cases within our study, this might be attributed to the grades being the most indicative cases which need surgical intervention. Also, our result showed that there is no significant difference within the grading of polyposis within the studied cases between the local and general anesthetic groups, which strengthens the results of our comparison. Meanwhile, the radiological staging of the studied cases of both groups were nearly similar, thus the results are not biased.

The patient acceptance of pain during local anesthesia was highly significant. About 75% of patients (15 patients out of 20 cases) accepted the surgical procedures using local anesthesia. Two patients had to be operated upon under general anesthesia. These two patients were given general anesthesia toward the end of the procedure for a short period, so they were considered within group 1. These results coincide with the results of Fedok and colleagues who noticed that of the studied 1647 cases, 75% from the total patients were satisfied without any complaint, 22% felt pain and pain causing anxiety moderate or stress. The remaining 3% felt severe discomfort during the surgery [2].

The amount of blood loss in group 1 has a significant decrease than group 2 especially in the mean volume of blood loss, which might be attributed to the use of local vasoconstriction with a local anesthetic agent offering a comfortable surgery of little bloody field. Also, this is attributed to that in our study we depend on blocking the greater palatine area with a concentration of local anesthetic and vasoconstrictor agent. These techniques were successful in decreasing the bleeding during surgery under local anesthesia with prolongation of the effect of local anesthetic agent.

This result was in agreement with the reported results by Gurr and colleagues who used laser Doppler blood

flowmetry to measure the mucosal blood flow of the inferior turbinate before and after injection of the greater palatine canal. They found a 4.7% decrease in blood flow to the inferior turbinate mucosa ($P=0.571$) after the injection [13].

On the other hand, sphenopalatine nerve block used in our study showed a marked decrease of blood loss during surgery under local anesthesia. Abu-Zaid and Ahmed applied intraoperative endoscopic sphenopalatine ganglion block in sinonasal surgery. In that study they evaluated the effect of bilateral endoscopic sphenopalatine ganglion block combined with general anesthesia in sinonasal surgery with respect to blood loss, recovery time, postoperative pain, and postoperative complications. The results of that study was carried on 30 cases, and showed significant decrease in blood loss, postoperative pain, and complication in the group operated upon under general anesthesia with a bilateral sphenopalatine ganglion block [14].

The time of surgery was highly significant less in group 1 than in group 2. This due to the decrease of blood in the field together with the nature of the procedures being somewhat limited. In group 2, the time of general anesthesia mostly added to the time of surgery.

Also this was agreed with Kennedy who reported that the use of local anesthesia for endoscopic sinus surgery permitted us to offer this treatment mainly on a day-case, outpatient. And this allowed to improve the cost benefit of endoscopic sinus surgeries [15]. Carlson [16] reported that the total cost of endoscopic sinus surgery under general anesthesia is 13 700 US dollars while the cost of the same surgery under local anesthesia is 1500 US dollars.

While the main disadvantage of local anesthesia is still considered suitable for minor procedures and in selected patients, the general anesthesia is preferred for most cases to meet more challenging surgical needs as mentioned by Gittelman *et al.* [17].

Interestingly, our study has shown that the use of local anesthesia did not show any significance in postoperative wound bleeding, blood clot, and crust formation in comparison with the other group.

It is noteworthy that the synechia formation was significantly less in group 1 than group 2; this is attributed to limited tissue injury during operation under local anesthesia and no nasal packing in the immediate postoperative period.

Regarding the presence of any operative residual polyp after 1 month, we could not detect any significant difference between both the examined groups.

As regards the recurrence of the polyps after 6 months of surgery, group 1 under local anesthesia and group 2 done under general anesthesia were nearly the same with no difference between both groups.

So far, the recurrence etiologies were still unknown, but there were many possible causes such as the increase in the inflammatory and allergic polyps as in eosinophil-rich NP which had a higher postoperative recurrence rate [18]. Therefore, the postsurgical treatment of all our cases was dependent mainly on corticosteroid therapy either systemic or nasal steroids for the prevention of recurrence similar to that reported by Pujols *et al.* [19], who stated that intranasal glucocorticoids constitute presently the best treatment of NP and also postsurgery and postpone the need for a new surgery.

Also, it has been stated that patients with various previous surgical interventions are most prone to revision operations and recurrence of the polyposis in comparison with patients who have not experienced any surgical intervention [20]. That is why we exclude revision cases from our study so as not to have biased results.

From the previously mentioned data, it was clear that surgery of sinonasal polyposis under local anesthesia has the advantage of less cost and avoidance of exposure to general anesthesia with all risks of general anesthesia.

Conclusion

Surgery of sinonasal polyposis under local anesthesia was an effective method for the treatment of nasal polyposis as regards patient acceptance for surgery, time of surgery, offering very good surgical field with little bleeding, and short hospital stay with smooth recovery of the patient and less cost.

Larger prospective cohorts of patients need to be investigated to identify all the clinic-pathological

variables capable of pinpointing patients at higher risk of recurrent sinonasal polyposis after surgery.

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Conflicts of interest

There are no conflicts of interest.

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