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Review Article

Local Anesthesia and Sedation in Otorhinolaryngology Endoscopic Surgery - Functional Endoscopic Sinus Surgery and Tympanoplasty - Routines and Epidemiology in a Reference Center -

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ABSTRACT

Objectives: The purpose of this study is to confirm the possibility of performing Functional Endoscopic Sinus Surgery and Otologic Endoscopic Surgery under local anesthesia and sedation, with safety and lower costs, compared to general anesthesia.

Materials and Methods: During three months, all patients submitted to endoscopic surgery in otorhinolaryngology were evaluated, according to costs, surgical time, return because of anesthesia complications and patient´s satisfaction with anesthesia.

Results: By T test analysis, local anesthesia with sedation has low cost, compared to general anesthesia. There were no complications among the patients and they had a high degree of satisfaction with the anesthesia.

Conclusion: local anesthesia with sedation is perfectly possible for functional endoscopic sinus surgery and endoscopic otologic surgeries.

Keywords: Sedation; Local anesthesia; Endoscopic surgery; Otorhinolaryngology anesthesia

INTRODUCTION

Advances in Functional Sinus Surgery and in otologic surgery can provide to the patient minimally invasive techniques, using fiber optic endoscopes.

It is known that sinus inflammation is related to a block ostiomeatal complex, which can be treated with the correction of the obstruction. This correction is called Functional Endoscopic Sinus Surgery (FESS) and has been practiced since 80s, with technical refinement up to now, making it in a minimally invasive manner. Fiber optic endoscopes improves postnasal space access in a way to restore normal sinus ventilation and mucocilliary function [1,2].

After the development of FESS, endoscopes started to be used to perform middle ear surgery, just in 1990s, improving inspection of the middle ear through a myringotomy incision, to rule out perilymphatic fistula, for identification of cholesteatoma, or for evaluation of the status of the ossicular chain. It also helps in chronic ear surgery, locating hidden cholesteatoma in some areas, such as the Eustachian tube, attic, sinus tympani, and beneath an intact posterior canal wall [3].

During this development, it was thought that patients should preferably be operated under local/topical anesthesia with combined sedation. In this manner, patients would be able to signal any kind of pain or discomfort, alerting and allowing the surgeon to minimize trauma and complications [4,5]. Now-a-days, after technique advances, FESS can be much bigger procedure, prolonged and accompanied by bleeding, but is still possible to have a good and secure local anesthesia with sedation.

When we talk about otorhinolaryngologic Endoscopic surgery, there are two main kinds of anesthesia: general anesthesia and sedation with local anesthesia. Each one has specific indications, according to the anesthesiologist, surgeon requirements, kind of surgery, surgical technique and patient, evaluated in pre-anesthetic appointment.

The objective of this study is to confirm that they can be performed under local anesthesia and sedation, evaluating the response of patients under sedation (satisfaction), low costs and low degree of complications, provided that with a careful surgeon and correct technique.

MATERIALS AND METHODS

During March, April and May 2017, we evaluate patients submitted to endoscopic surgeries in IPO´s Hospital (Paranaense Institute of Otorhinolaryngology Hospital), a reference center for otorhinolaryngology in our town. There were excluded patients that had association with aesthetic procedures or others, because it influences on duration time.

The patients of the study were told they would be submitted to a local anesthesia and sedation or general anesthesia, all of them agreed and signed the consent. The choice of anesthesia was according to anesthesiologist criteria, evaluating the procedure, history of the patient and surgeon demand. They were not distributed randomically.

In the sedation all patients received 1 mcg/ kg of fentanyl, 0.5 mg/ kg of meperidine, 3-5 mg of midazolam (0.1 mg/ kg) and 2 mcg/ kg of clonidine at induction of anesthesia. All of them received supplementary oxygen with an oral catheter. During the procedure, fentanyl and midazolam may be repeated if the patient is awake or complains of pain.

In FESS, after sedation, surgeons put a nasal cotton with oxymetazoline and neotutocaine 1% for maximum 5 minutes, after that, they performed local anesthesia with lidocaine 2% and adrenaline, 1:100000, all over the surgical field, including: septum, nasal crest, inferior turbinate, middle turbinate, uncinated process, ethmoidal bulla, anterior ethmoid sinus and all lateral nasal wall. It is important to observe the nasal mucosa bulging and getting pale because of the vasoconstrictors action. Always goes forward with a near already infiltrated point.

In otologic surgery, after sedation, infiltration was performed, as well, with lidocaine 2% and adrenaline, 1:100000, in the retroauricular area, the quadrants of canal, superficial and deep in the osteocartilaginous junction. It begins with a retroauricular injection, bulging the posterior wall of external auditory canal. Infiltration of external auditory meatus in its deep four quadrants completes local anesthesia. For this, we use 5-8 ml of the solution for an effective local anesthesia.

The maximum volume of local anesthetics is estimated by the weight of each patient, 7 mg/ kg of lidocaine with vasoconstrictor and the total is used all over the nasal cavity and structures as the surgery goes on.

Other drugs are metoclopramide 10 mg, cefazolin 1 g, dexamethasone 10 mg for adults or 0.5 mg/ kg for children, Dipyrone 1 g, and Ketoprofen 100 mg. If it is necessary, in the end of the surgery it is used naloxone 0.2 mg to reverse the opioid action, titrating it with dose-response.

In the cases that requires general anesthesia, induction was carried

out with fentanyl 2-3 mcg/ kg, propofol 3 mg/ kg and rocuronium 0.5 mg/ kg, followed by tracheal intubation by direct laryngoscopy. After that, surgeons performed the same local anesthesia, in order to reduce bleeding, because of the vasoconstrictor effect of adrenaline. Anesthesia was maintained with isoflurane and nitrous oxide or air mixed with oxygen, according to anesthesiologist indication. In the end of the procedure, the neuromuscular block was reverted with neostigmine 2 mg associated with atropine 1 mg.

In FESS, Surgery starts with the correction of nasal septum deviation; after that, with a rigid endoscope "0" degree and 4 mm, all nasal cavities is evaluated: septum, mucosa, perforations, or any kind of disease or anatomic variation. It is done the correction of abnormalities and obstructions of all facial sinus, starting from maxillar, than ethmoid, sphenoid and frontal, according to established techniques in endoscopic sinus surgery, which are not the aim of the study.

In tympanoplasty, the access is inside the external auditory canal, with a rigid endoscope, and technique consists in freshening the edges of the perforation to promote healing and placing a graft lateral to the defect.

We analyzed in all patients costs of anesthesia, procedure duration, degree of patient satisfaction and return because of anesthetic complications.

RESULTS

In the analyzed period, from the 2748 surgical procedures at this hospital, all otorhinolaryngologic, 410 were endoscopic surgeries, 93.42% were FESS and the other 6.58% were Tympanoplasty. Considering the anesthesia kind, 96.35% were performed with local anesthesia and sedation and only 3.65% required general anesthesia.

The descriptive analysis of patient's characteristics bay age and gender are summarized in table 1,2.

There were no related complications in patients of general anesthesia or in those who received local anesthesia and sedation; therefore, they seem not to be decisive factor for selecting one or another type of anesthesia.

All patients showed the same degree of subjective satisfaction with the anesthesia, and all would accept to be submitted to the same anesthesia again.

Descriptive analysis of costs, duration and surgery are mentioned in table 3, 4.

DISCUSSION

The anesthesia in otorhinolaryngology has particularities that require familiarity with anatomy and physiology of the organs [6] (especially in the surgical area), a big knowledge and great pre anesthetic evaluation, and a very high cooperation and confidence between the surgeon and anesthesiologist. We think these are the main factors that improve the success of the procedure and of the anesthesia.

The choice and administration of the anesthesia interferes directly in patient comfort and safety, bleeding reduction and procedure success. Some surgeons do not feel comfortable performing the procedure under local anesthesia and sedation [7]. Even if the general anesthesia is not necessary for many otorhinolaryngology surgeries, it is difficult to assure the complete nociceptive block with topic or local

Table 1: Patients Characteristics – by age

	Average age (Years)	Minimum age	Maximum age
Total	36.68	4	79
Local + Sedation Fess	36.25	12	79
Local + Sedation Tympanoplasty	43.04	23	63
General Fess	22.69	4	52
General Tympanoplasty	7.5	7	8
Local + Sedation	36.68	12	79
General Anesthesia	20,66	4	52

Table 2: Patients Characteristics – by gender

	Female	Male
Total	192	218
Local + Sedation Fess	172	197
Local + Sedation Tympanoplasty	14	11
General Fess	5	9
General Tympanoplasty	1	1
Local + Sedation	186	208
General Anesthesia	6	10

The variables analyzed were costs, duration of surgery, patient satisfaction and return because of anesthetic complications.

Table 3: Descriptive analysis of variables of interest by type of anesthesia and surgery.

	Minimum	Median	Average	Maximum
Costs (in Real – R$)				
Local + Sedation FESS	512.20	512.2	603.65	1511,45
Local + Sedation Tympanoplasty	524.48	524.48	542.51	975.33
General FESS	512.20	1383.49	1183.42	1383.49
General Tympanoplasty	1179.39	1179.39	1179.39	1179.39
Local + Sedation	512.20	512.20	599.77	1511.45
General	512.20	1383.49	1182.88	1383.49
Duration of surgery (min)				
Local + Sedation FESS	20	80	82.43	300
Local + Sedation Tympanoplasty	25	80	69.4	125
General FESS	60	100	101.54	155
General Tympanoplasty	30	35	35	40
Local + Sedation	20	80	81.60	300
General	30	90	92.67	155

By T test variables, cost of anesthesia and duration differ between the two groups, being always lower in the local + sedation group, not statistically significant.

Table 4: T test results

	Anesthesia	N	Average	Std. Deviation	Std Error Average	*p*
Costs (in Real - R$)	Local + Sedation	394	599.5477	275.65478	13.86970	0.062
	General	16	1182.8820	321.78158	83.08365	
Duration	Local + Sedation	394	81.59	31.883	1.604	0.185
	General	16	92.67	37.553	9.696	

anesthesia, this way, the use of anxiolytic and analgesic drugs makes the procedure feasible [8].

It is important to emphasize the need of a rigorous airway evaluation, because difficult airway requires specific planning and approach in scheduled procedures. If there is some patient with a previous detected difficult airway, the anesthesiologist should provide a safe airway assessment and, may be, the sedation may not be the ideal choice. The airway approach during the surgery, in case of complication, may become a full disaster, with serious damage for the patient. Due to minimize this, it is a better choice a conscious sedation or general anesthesia, planning the airway manipulation, regarding the available devices, anesthesiologist experience and international guidelines for airway management.

The drugs used by the anesthesiologists are well established, according to Chakrabarty, et al. [9-11] and the experience of the anesthesiologist is fundamental to control the doses used and repeating them as needed.

Jourdy and Kacker [12] already demonstrate the effectiveness of local anesthesia and sedation for otologic surgeries. For many patients is safer to perform under local anesthesia [12,13]. Liang and Irwing showed that 89% of patients undergoing ear surgery with local anesthesia would opt for the same anesthesia if they needed another surgery.

Anesthetic properties interfere in vasodilatation and cardiac frequency and, this way, in the amount of bleeding. Propofol and other inhalatory agents causes vasodilatation, but neither all significantly affects cardiac frequency. Isoflurane causes more tachycardia, sevoflurane less and propofol, inhibiting baroreflex, may cause bradycardia and reduce the cardiac output [14,15]. This way, TIVA produces better surgical conditions when compared with balanced or full inhalatory anesthesia, as observed in the study of HJ. Ahn, et al. [16] but further studies are necessary to evaluate the benefits of venous agents in more difficult cases, as fungic allergic sinusitis, nasal polyposis, revision surgeries, where is expected more bleeding. U Buyukkocak, et al. [17] demonstrated in sinonasal surgery that intravenous sedation techniques did not change mean arterial pressure, heart rate or SpO_2 clinically and produced a similar level of light sedation.

Several studies compare inhalatory agents to venous agents in general anesthesia for otorhinolaryngology procedures, but we still need further studies comparing results of local anesthesia and total intravenous general anesthesia, with specific indications and recommendations.

The results show us the costs of local anesthesia and sedation are lower than the costs with general anesthesia, but it is necessary a randomized trial to make a better analysis, as it was already demonstrated for cochlear implant [18]. Regardless the cost, safety is the main factor that must influence anesthesia choice.

This article confirms this feasible approach of sedation for endoscopic surgery in otorhinolaryngology, with patient's safety and satisfaction.

CONCLUSION

Otorhinolaryngologic endoscopic surgeries are some of the most common otorhinolaryngologic procedures and a good anesthetic management is essential for a successful outcome. All kinds of anesthesia are well accepted by patients and provide conditions for the surgeon to act. It is important to plan properly, considering patient comorbidities, surgeon and anesthesiologist experience, and individual preference, to avoid complications. After all, we can see that local anesthesia with sedation is perfectly possible for functional endoscopic sinus surgery and endoscopic otologic surgeries.

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