The Management of Post-Tonsillectomy Morbidity in Patients With Sleep Apnoea

CRISTIAN DRAGOS STEFANESCU1,2, RAZVAN HAINAROSIE1,2, OANA RUXANDRA ALIUS3,4, VIOREL ZAINEA1,4

1Gen. Dr. Aviator Victor Anastasiu National Institute of Aeronautical and Spatial Medicine, 88th Mircea Vulcanescu Str., 010825, Bucharest, Romania
2Carol Davila University Central Emergency Military Hospital, 88th Mircea Vulcanescu Str., 010825, Bucharest, Romania
3Carol Davila University of Medicine and Pharmacy, Faculty of Medicine, 8 Eroii Sanitari Blvd., 050474, Bucharest, Romania
4Institute of Phonoaudiology and Functional ENT surgery Prof. Dr. Dorin Hociota, 21th Mihail Cioranu Str., Bucharest, Romania

The Tonsillectomy in children or adults is an intervention commonly encountered in the ENT (Ear Nose and Throat) and Head and Neck surgeon practice. The current tendency is to perform this type of surgery in major ambulatory surgery centers. Two objectives are thus pursued: first of all, the increase of the patient quality of life through the reintegration into the family as quickly as possible and secondly, the expenses associated with continuous hospitalization are reduced. Any tertiary (multidisciplinary) sleep center must ensure the complete diagnosis and treatment (including surgery) of sleep respiratory disorders. Under these conditions the selection of patients and especially the implementation of the specific protocols in order to control the postoperative complications it becomes essential. The present paper describes our experience of tonsillectomy as treatment for selected patients with chronic rhonchopathy (snoring) and mild to moderate obstructive sleep apnoea. It was presented the impact of antibiotics protocols in reducing the main morbid outcomes following tonsillectomy, in our day surgery center. The obtained results can also be a prerequisite for the integrative approach of the patients with sleep apnoea who were recommended surgical treatment. Considering the wide range of therapeutic modalities used in sleep apnoea, each with its specific advantages and disadvantages, more extensive and multicenter studies are needed.

Keywords: post-tonsillectomy morbidity, day surgery center, sleep disorders

Tonsillectomy is the treatment of choice for obstructive tonsillar hypertrophy and chronic tonsillitis and is one of the most frequently performed surgical procedures by otolaryngologists in the general population. The improvement of new surgical techniques has reduced the mortality and complications of this procedure, however, postoperative morbidity is usually significant and postoperative pain continues to be the main symptom in these patients. One study mentions that over 90% of patients report pain in the first day after surgery and between 60 and 70% report pain at 2 or 3 days after surgery despite medical treatment. Thus, postoperative pain continues to be one of the most controversial points and there is, as yet, no clear consensus regarding its ideal treatment [1].

Regardless of the surgical technique employed, following tonsillectomy the tonsil beds remain exposed to bacteria from the oral cavity and, since the healing process is by secondary intention, there is an inflammatory response which contributes to postoperative morbidity. Some authors argue that this contributes to postoperative morbidity, especially in terms of pain, and have proposed that the use of antibiotics in the postoperative period could reduce local inflammation, stimulate healing and enhance recovery by reducing the amount of bacteria in the surgical wound [2].

Recent studies have assessed the impact of oral antibiotics on morbidity of patients undergoing tonsillectomy and concluded that antibiotics do not have a significant effect on pain reduction, need for analgesics, return to oral feeding or presence of postoperative bleeding. However, despite the lack of evidence showing a reduction in morbidity, the use of oral antibiotics in these patients as a form of prophylaxis and adjuvant treatment for reducing morbidity remains a routine practice by most otolaryngologists. There are even some otolaryngology books which suggest the prophylactic use of antibiotics routinely for 7 or 10 days, without justifying the benefits of their use. Moreover, current guidelines suggest that the indiscriminate and unjustified use of antibiotics promotes an increase of bacterial resistance. The most common aetiological agent has been Streptococcus pyogenes (S. pyogenes). However, an increase in the incidence of tonsillitis by species such as β-lactamase producing Staphylococcus aureus, S.pyogenes and Haemophilus influenza has been observed in the last decade [3].

Therefore, current treatment guidelines suggest avoiding the use of oral antibiotics postoperatively and limit their use to cases in which they are truly indicated (patients with cardiac valvulopathies or prosthetic valves).

The objective of this study was to compare the postoperative morbidity of patients undergoing tonsillectomy using an antibiotic prophylaxis scheme with a single dose of intravenous (IV) antibiotics against an oral antibiotic (cefuroxime, fig. 1) for 7 days.

* email: razvan@riaclinic.com, Phone: 0727224447

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Fig. 1.Cefuroxime (C16H16N4O8S) - structural formula

All authors have contributed equally to this paper.
**Experimental part**

This was an open, non-randomised clinical trial conducted at the National Institute of Aeronautical and Spatial Medicine, among patients aged between 18 and 65 years and presenting clinical criteria of tonsillar hypertrophy and obstructive sleep apnoea, exclusively treated with tonsillectomy or uvulopalatopharyngoplasty with tonsillectomy, between September 2014 and September 2017. Any patients who were allergic to cephalosporins or paracetamol were excluded from the study. Exclusion criteria corresponded to patients who presented postoperative bleeding or who did not attend any of the 3 control visits. We obtained informed consent from each patient. The study protocol was approved by the Ethics Committee of the National Institute of Aeronautical and Spatial Medicine.

Patients were non randomly assigned (in the strict order of presentation at the sleep department and taking into account the patient’s option for home treatment) to one of 2 groups. The control group was administered IV cefuroxime 1.5 g in a single preoperative dose (during anaesthetic induction), whilst the experimental group received IV cefuroxime 1.5 g in a single dose plus cefuroxime 500 mg tablets every 12 h for 7 days. All surgical interventions were performed by the same otolaryngologist using a 20 W bipolar radiofrequency technique. The surgical procedure was performed on our outpatient surgery center. Both groups were prescribed oral paracetamol at a dosage of 200mg every 6h [4].

After the surgery, patients were given a questionnaire which had to be completed daily for 7 days. This questionnaire used a visual analogue pain scale in order to help patient to describe the intensity of their pain. The scale consists of various images which are assigned a numerical value, where 0 represents no pain and 10 represents the worst possible pain. Patients were scheduled for days 4 and 8 after surgery, in order to conduct an evaluation and confirm the progress of the questionnaire, and at 14 days for reassessment.

For the statistical analysis we used descriptive tests such as absolute frequencies, percentages, means and standard derivations. For the differential analysis we used the χ²-test and the Student's t-test for independent samples. We considered a value of P<.05 as statistically significant. We used the statistical software package SPSS® version 21.0.

**Results and discussions**

The study included 112 patients undergoing tonsillectomy or uvulopalatopharyngoplasty with tonsillectomy (Table 1), who were non-randomly assigned to either of the 2 treatment groups: control group, preoperative IV antibiotic alone (n=28), or experimental group, preoperative IV antibiotic plus oral antibiotic for 7 days (n=84). A total of 78 patients underwent tonsillectomy (69.45%), whilst 34 only underwent tonsillectomy (30.55%).

We evaluated the presence and intensity of pain during the first 7 days after surgery (Table 1). We also evaluated the presence and intensity of postoperative pain at 4 and 8 days after surgery, with no significant differences being found between both groups (Table 2). The intensity of pain at 4 days was 2.05±1.15 in the experimental group and 2.12±1.22 in the control group (P=.90). In the experimental group, 72 patients (85%) suffered some degree of pain after 4 days, compared with 43 patients in the control group (89%) (P=.68). The intensity of pain on the eighth postoperative day in the experimental group was 0.07±0.35, whilst in the control group it was 0.06±0.25 (P=.54).

The return to normal activities in patients in the experimental group took place after 3.05±1.28 days, and in those in the control group after 3.17±1.35 days (P=.68). There were no cases of infectious complications in any of the patients during the follow-up period (14 days).

Tonsillectomy is one of the most commonly performed procedures by otolaryngologists. Advances in new surgical techniques make this surgery a safe procedure, however, postoperative morbidity and in particular the treatment of postoperative pain continues to be a controversial point, with no clear consensus on its ideal treatment. The search for various treatments to decrease postoperative morbidity in tonsillectomy is justifiable, as analgesics do not control pain adequately and this is reflected as postoperative pain. Some authors accept the theory that, due to the fact that the tonsil beds remain exposed to bacteria in the oral cavity and that the healing process is through secondary intention, there is an inflammatory response which contributes to postoperative morbidity. Therefore, they have chosen the postoperative use of oral antibiotics, aiming to reduce pain during this period, and this has now become a common practice by most otolaryngologists. However, very few studies have evaluated the effect of antibiotics in the...
The use of a single dose of an intravenous antibiotic, such as indiscriminate use. From the economic standpoint, the use of a single dose of an intravenous antibiotic, such as cefuroxime, is much more economical than the postoperative oral use of cefuroxime. This shows that the use of a single IV antibiotic dose helps to reduce costs in healthcare institutions or the financial burden for patients who have to acquire the drug by themselves [7-9]. Although the present study did not assess the potential adverse effects of the use of antibiotics in the postperiod, period, this factor should also be taken into account. Due to the frequency and volume of patients undergoing tonsillectomy, the risk of adverse effects may translate into a significant risk for patients if we consider the limited efficacy of postoperative antibiotics to control morbidity in patients undergoing tonsillectomy.

Conclusions
The use of preoperative intravenous antibiotics has the same efficacy as oral antibiotics in the postoperative period for the control of morbidity among patients undergoing tonsillectomy and offers a safe option for antimicrobial prophylaxis. There is no evidence to support the routine prescription of oral antibiotic in patients undergoing tonsillectomy for sleep apnoea, as it has not been shown to offer a significant benefit in reducing postoperative pain, the incidence of postoperative bleeding or infectious complications. However, the choice of patients undergoing tonsillectomy for oral treatment with antibiotics should not be neglected. This paradigm is very difficult to influence in Romania.

References

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Table 2
PRESENCE AND INTENSITY OF POSTOPERATIVE PAIN AT 4 AND 8 DAYS

<table>
<thead>
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<th>Control group (n=28)</th>
<th>P</th>
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<td>Intensity of pain</td>
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<td>Presence of pain</td>
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<td>0.68</td>
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<tr>
<td><strong>Postoperative pain at 8 days</strong></td>
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<tr>
<td>Intensity of pain</td>
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<td>0.54</td>
</tr>
<tr>
<td>Presence of pain</td>
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reduction of postoperative morbidity. The present study compared 2 different antibiotic schemes, in order to evaluate their efficacy in reducing postoperative morbidity in patients undergoing tonsillectomy for sleep apnoea.

The results showed that pain in patients undergoing tonsillectomy reached its maximum intensity in the first postoperative day and decreased thereafter, tending to remit on the sixth day in the majority of patients. Furthermore, no difference in the presence and intensity of pain between the 2 groups was observed during the first 7 postoperative days, so both schemes appear to be equally effective for postoperative pain control. We compared the presence and intensity of pain reported between the fourth and eighth postoperative days and found no difference between them. This was consistent with other studies, which concluded that the postoperative use of oral antibiotics does not reduce pain significantly in patients undergoing tonsillectomy. Based on these findings, it is not possible to justify the use of postoperative antibiotics with the objective of reducing postoperative pain [5,6].

Regarding the number days until return to normal activities, the results of the study showed that there were no differences between both groups. Regarding the time period until return to normal diet, the results showed that the use of oral antibiotics did not reduce the number of days. We evaluated the presence and duration of other symptoms, such as nausea and halitosis, and found no differences between the 2 groups.

Postoperative bleeding is one of the most feared complications of tonsillectomy. The reported incidence varies widely, ranging from 0% to 11.5% of cases, depending on the series and on the surgical technique employed. There were no cases of postoperative bleeding in the experimental group. In the present study, the incidence of postoperative bleeding was 0.9%. Since this event appeared in the first 24h and the patient corresponded to the control group, this complication could be attributed to the surgical technique, without any benefit from the use of oral antibiotics to reduce the incidence of postoperative bleeding being observed. No infectious complications appeared in any patient during the follow-up period (14 days), showing that the administration of a single dose of IV cefuroxime is sufficient as a method of prophylaxis to prevent infectious complications.

The unjustified use of antibiotics in the postoperative period may entail consequences for the patient and the community, as an increase in bacterial resistance to antibiotics is a factor to be taken into account to prevent such indiscriminate use. From the economic standpoint, the use of a single dose of an intravenous antibiotic, such as cefuroxime, is much more economical than the postoperative oral use of cefuroxime. This shows that the use of a single IV antibiotic dose helps to reduce costs in healthcare institutions or the financial burden for patients who have to acquire the drug by themselves [7-9]. Although the present study did not assess the potential adverse effects of the use of antibiotics in the postoperative period, this factor should also be taken into account. Due to the frequency and volume of patients undergoing tonsillectomy, the risk of adverse effects may translate into a significant risk for patients if we consider the limited efficacy of postoperative antibiotics to control morbidity in patients undergoing tonsillectomy.