Tonsillectomy in own material

Introduction: Tonsillectomy belongs to the most frequently performed surgical treatments; however, the necessity of its performance is questioned. Therefore, there are many attempts to unify and define the indications for the procedure.

Aim: The main objective of the current dissertation was an analysis of the clinical symptoms occurring in patients qualified for tonsillectomy, as well as a comparison of those with a histopathological image of the removed tonsils in a repeatedly carried out, unified pathomorphological examination. The secondary objective was the designation of the demographic profile, existing comorbidities, and complications in the form of postoperative bleeding in patients after tonsillectomy in own material.

Material and method: A retrospective analysis of 301 procedures of palatine tonsil removal was performed, which were completed in the years 2017–2019 at the Department of Otolaryngology with Division of Cranio-Maxillo-Facial Surgery of the Military Institute of Medicine, Warsaw, Poland. The indications were defined on the grounds of data from the anamnesis. Based on unified criteria, the removed material was divided into 2 groups: with the signs of Chronic Tonsillitis (CT) as well as Tonsillar Hyperthrophy (TH).

Results: The average size of tonsils was the greatest in a group of patients under 35 years of age, and smallest in the group over 51 years of age. As patients aged, the reduction in size of the palatal tonsils was observed. In the examined group, the histopathological diagnosis in the form of HT was found in 165 patients (54.8%), while CT in 136 (45.2%). It was proven that the larger the tonsils in the clinical picture, the more often the histopathological image responded to HT. Among clinical symptoms reported by patients qualified for tonsillectomy, the following were observed: recurring tonsil inflammation in 211 (70.1%), snoring and sleep apnea in 47 (15.6%), as well as sleep apnea in 33 (11%) patients. Primary bleeding occurred in 10 patients (3.34%), and secondary in 8 patients (2.66%). The most common comorbidities were cardiovascular burdens.

Conclusions: For most cases, clinical symptoms were confirmed by adequate features of removed material in histopathological examination. The most common histopathological diagnosis was tonsillar hyperthrophy.

KEYWORDS: chronic tonsillitis, histopathological examination, palatine tonsil, tonsillar hyperthrophy

ABBREVIATIONS

ANOVA – Analysis of Variance
CT – Chronic Tonsillitis
OSAS – obstructive sleep apnea syndrome
SIGN – Scottish Intercollegiate Guidelines Network
TH – Tonsillar Hyperthrophy

INTRODUCTION

Palatine tonsils are part of the pharyngeal lymphatic system of Waldeyer’s ring. It is an accumulation of lymphatic tissue which has a protective role for the body against bacteria, viruses, fungi and other pathogens. Palatine tonsils are involved in the body’s humoral and cellular immunity, and their specific function is to recognize pathogenic factors and allow access to the cells of the immune system, which undergo specific stimulation, leading to an increase in their number and the production of lymphocytes and corresponding antibodies capable of fighting microbes.

The effectiveness of these defensive reactions impacts on the course of inflammation, conditioning its duration and frequency of relapse. Due to the anatomical structure of the palatine tonsils, predisposing the retention in crypts of cell residue, which is a breeding ground for bacteria, there may be spreading of micro-abscesses to the tissue, resulting in chronic tonsillitis (CT). The infection can also penetrate into the capillaries surrounding the tonsils and spread through the bloodstream to distant organs and cause focal infections in the form of rheumatic fever, glomerulonephritis, arthritis, psoriasis, myocarditis, and blood vessel diseases. In a clinical setting, it is sometimes difficult to distinguish between normal palatine tonsils and those changed on a chronic basis. In addition to the presence of liquid purulent contents with gray-yellow secretions escaping the crypts under pressure, the patient’s history includes: recurrent acute bacterial tonsillitis, slight pain and swallowing difficulties, swollen cervical lymph nodes, halitosis, immunosuppression, general weakness or fevers of unknown cause. Due to the low effectiveness of conservative approach, removal of the palatine tonsils (tonsillectomy) appears...
to be the only effective treatment for CT [1]. Indications for tonsillectomy were discussed by a large group of specialists in the field of otolaryngology, pediatric otolaryngology, pediatrics, rheumatology, cardiology and dermatology. The list of indications for this operation can be divided in terms of impact on: airway patency, infections and quality of life [2]. Airway obstruction caused by tonsillar hypertrophy leading to obstructive sleep apnea syndrome (OSAS) constitutes the most common cause of tonsillectomy in children [3]. The second most common reason for referring patients for removal of palatine tonsils are recurrent infections. In 1984, based on a randomized controlled trial, Paradise et al. [4] set out the guidelines for the indication of tonsillectomy in children, as a basic criterion taking into account the frequency of confirmed tonsillitis episodes during the year. Over a dozen years later, the Scottish Intercollegiate Guidelines Network (SIGN) recommended the use of similar guidelines regardless the age of the patients, however, the need to document data by the physician referring for surgery is emphasized, which is often difficult to verify [5]. In addition to recurrent inflammations, the group of infectious indications also includes recurrent peritonsillar abscess, and among the causes affecting the quality of life: severe halitosis and tonsillolithiasis [6]. Bleeding is the most common complication after tonsillectomy. It can be divided into: (1) primary – occurring within the first 24 hours and (2) secondary – up to 14 days after surgery [7]. Although this complication is potentially life threatening, tonsillectomy is one of the most common otorhinolaryngological procedures.

Currently, as reported by Eurostat, there is a slight upward trend in the number of procedures performed in Poland in the years 2012–2017 from 67.9 to 68.9 procedures in a group of 100,000 inhabitants. This places our country in one of the last positions in the European Union. The countries topping this list in Europe in the number of procedures performed in 2017 were: Iceland with a result of 589.7, and in the EU Estonia – 373.7. At the other end of the spectrum, there is Italy with 52 tonsillectomies per 100,000 [8].

The primary goal of this study was to analyze clinical signs occurring in patients qualified for tonsillectomy and to compare them with the histopathological picture of removed palatine tonsils in a repeated, unified pathomorphological examination. The secondary objective is to determine: the demographic profile, the occurrence of comorbidities and complications in the form of postoperative bleeding in patients after tonsillectomy in own material.

**MATERIAL AND METHOD**

We carried out a retrospective assessment of 301 tonsillectomies and re-examined histopathological material taken in 2017–2019 at the Department of Otolaryngology and Laryngological Oncology with the Department of Otolaryngology with Division of Cranio-Maxillofacial Surgery of the Military Institute of Medicine in Warsaw. Patients with suspected tonsil cancer and patients under 16 years of age were excluded.

Upon examination of 309 medical records (301 hospitalizations and 8 rehospitalizations due to secondary bleeding), the following clinical data were noted: recurrent palatine tonsillitis, peritonsillar abscesses, OSAS, snoring, co-morbidities, and primary and secondary bleeding.

**Description of the surgical procedure**

Tonsillectomy was performed under endotracheal anesthesia in an operating theater setting. Partially blunt and partially sharp extracapsular dissection of palatine tonsils from the surrounding muscles of the pharyngeal walls was performed using classic surgical instruments (cold steel tonsillectomy). Possible intraoperative bleeding was controlled with bipolar coagulation. In each case, the removed material was sent to further histopathological examination, which was carried out at the Department of Pathomorphology of the Military Institute of Medicine.

**Description of the histopathological procedure**

The collected material was subjected to routine processing (preservation of material in a 10% buffered formalin solution for 12–72 hours, macroscopic analysis and collection of specimens followed by transfer to a paraffin block). Sections 2–4 micrometers thick were made from each block and stained with hematoxylin and eosin. A microscopic analysis was performed for the current study. Since to date the available literature does not contain any strict histopathological criteria for distinguishing between chronic tonsillitis and tonsillar hypertrophy, own modification of available publication criteria has been used [9–12].

According to the above, the following were assessed:

- number of lymphoid nodules/10 mm²: presence of lymphoid nodules in a count > 10/ mm²;
- type of lymphoid follicles: division into (1) primary follicles without follicle centers and (2) secondary follicles with the presence of follicle centers;
- the presence of chronic inflammatory infiltrate: the presence of individual leukocytes or their groups infiltrating the tonsillar surface epithelium and subepithelial connective tissue;
- the presence of epithelial defects: Ugras's abscess – leukocyte clusters leading to epithelial degradation and defects in the superficial layer;
- the presence of fibrosis;
- the test material was divided into two histopathological groups: (1) chronic tonsillitis (CT) and (2) tonsillar hypertrophy (th);
- To assess the size of palatine tonsils, we used Pirquet's 5-grade scale [13].

Based on the interview data, we have extracted the following operational qualification acceptance criteria:

- recurrent bacterial tonsillitis – based on SIGN criteria, minimum 5 episodes per year, symptoms for at least a year [5];
- past peritonsillar abscess;
- OSAS and/or snoring.

The test results were submitted to a statistical analysis. The Kolmogorov–Smirnov and Lilliefors tests (K-S d = 0.102; p < 0.1),
as well as analysis of variance (ANOVA) were used. Calculations were performed using the STATISTICA 6pl package for \((\alpha) = 0.05\). Statistical relevance was constituted by results of \(p < 0.05\).

**RESULTS**

The age of the operated patients ranged from 16 to 71; the average was 8 years. The study group included 170 men (56.5%) and 131 women (43.5%). The most numerous group (153 people) were patients before 35 years of age, while the least numerous above 51 years of age (64 individuals).

In the examined group of 301 people, the average size of palatine tonsils was 2.53 according to Pirquet’s scale. The values for men and women were similar. Statistically significant dependence was found between the age of patients and the size of palatine tonsils. The average size of tonsils was the largest in the group of patients before 35 years of age and was 2.61 according to Pirquet’s scale, while in the group of patients over 51 years it was the smallest – 2.38. A significant correlation was demonstrated \((p < 0.05)\) between the age of patients and the size of palatine tonsils. With the age of patients, the size of palatine tonsils decreased. In histopathological examination, signs of CT were observed in 136 patients \((45.2\%)\), while features of TH in 165 \((54.8\%)\). Statistically significant correlations \((p < 0.05)\) between tonsil size in groups were demonstrated. The average size of palatine tonsils in the TH group was 2.67, while in the CT group – 2.37 according to the Pirquet scale. A statistically significant dependence was demonstrated; the larger the palatine tonsils in the clinical picture, the more often the histopathological picture corresponds to TH. However, the smaller the palatine tonsils in the macroscopic image, the more often CT is described in pathomorphological diagnosis. In the age group under 50 years of age there was a prevalence of TH. As patients age, the frequency of histopathological diagnosis of CT increases, and the diagnosis of TH decreases. Then the proportions are reversed in favor of CT.

Based on the patients’ history, the symptoms reported by patients before tonsillectomy were determined. Some people reported one dominant, isolated symptom, while others more than one or a combination of symptoms. Of the 301 analyzed subjects, 211 \((70.1\%)\) reported recurrent tonsillitis. A total of 184 \((61.1\%)\) patients noted similar isolated symptoms, and the remaining symptoms were combined with other ailments (Tab. I.). In the excised material, histopathological features of CT \((120\%)\) compared to those of TH \((91\%)\) were more frequent in patients reporting recurrent inflammation. Recurrent tonsillitis in people with histopathological diagnosis of CT constituted 120 cases \((isolated – 103)\), and in microscopic diagnosis TH – 91 \((isolated – 81)\). Apnea in the CT group constituted 21 cases \((isolated – 1)\), while in patients with TH we recorded 73 \((isolated – 32, apnea + snoring – 34)\). Snoring in the CT group occurred in 29 people \((isolated – 2)\), and in TH in 47 \((apnea + snoring – 34)\).

Another group of indications was constituted by snoring and apnea in 47 \((15.6\%)\), the third most common isolated apnea – in 33 patients \((11\%)\). The average size of palatine tonsils was the largest in the group of patients burdened with snoring and recurrent inflammation. However, the smallest average size was found in patients reporting sleep apnea. Past peritonsillar abscess was reported by 23 patients. The great majority of abscesses occurred in the CT group than in the TH group \((18 vs 5)\).

In 151 patients no coexisting internal diseases were found. A detailed list of diseases by group is given in Tab. I. Postoperative bleeding was observed in 18 patients \((5.98\%)\). In 10 \((3.32\%)\) individuals there was primary bleeding, while secondary occurred in 8 \((2.66\%)\).

**DISCUSSION**

Tonsillectomy is among the most frequent surgical procedures in Otorhinolaryngology Clinics; however, at times the necessity of its performance is questioned, which is why numerous studies, analyses, as well as attempts of standardization, definition of
surgical and clinical indications, and even development of new surgical techniques are undertaken. In our study, we analyzed clinical symptoms occurring in patients qualified for tonsillectomy and compared them with the histopathological picture subjected to a standardized analysis. The material was slightly dominated by 56.5% male population, unlike the observations of other researchers [14]. In the data collected by us from 301 medical records, the most common ailment was recurrent tonsillitis, which was found in 211 people, or 70.1% of the total analyzed group. In the study of Torres et al. [15] the largest group were patients with recurrent tonsillitis (74.85%), so our results can be considered comparable. In a study by Chow et al. [16] conducted in a group of 181 adults, the indications for surgery included: sleep apnea in 84 patients (46%), chronic tonsillitis in 69 (39%) and snoring in 21 (12%). In our observation, following histopathological verification of material collected from 211 people reporting recurrent bacterial tonsillitis, CT was diagnosed in 120, and the remaining 91 had characteristics of hypertrophy – TH. Clinically reported snoring occurred in 94 people reporting sleep apnea, TH was found in 73, and CT in 21 cases, i.e. in most patients with clinical signs of airway obstruction, the features of palatine hypertrophy can be confirmed. Data available in the literature indicated that chronic tonsillitis occurred in 12–37.4% of patients with peritonsillar abscesses [17–19]. In our study, the percentage of CT group patients with a history of peri-tonsillar abscess was 13.23%. On the other hand, Mazur et al. [20] reported peritonsillar abscess in 35.5%, but the cited study did not use unified histopathological markers of inflammation, but only data from medical history. Seshemani et al. [21] observed that patients with tonsillitis had systemic diseases: 2.99% had heart disease and 2.43% lung disease. In our analysis, the burden of cardiovascular diseases occurred in 22.4% of operated patients, and the burden of pulmonary diseases in 5.31%, therefore they were more frequent than in the compared study. Although tonsillectomy does not pose a surgical challenge in a technical sense, it can be complicated by a condition directly threatening the patient’s life. The reported mortality rates range from 1/10,000 to 1/35,000 [23, 24]. The main cause of death is bleeding, the frequency of which ranges from 1.5% to 14% [22, 23].

In our study, bleeding occurred in 5.98%, of which primary bleeding appeared 10 and secondary bleeding 8 times. Windfuhr et al. [24] reported 79 episodes of bleeding, where 9 were primary bleeding and 70 were secondary bleeding. The ratio of primary to secondary bleeding was 13%, while in our study there were opposing tendencies. We did not note any cases resulting in the patient’s death in the collected material.

CONCLUSIONS

In the retrospective analysis of patients qualified for tonsillectomy, in the majority of cases clinical symptoms were translated in microscopic examination into the presence of corresponding morphological markers. The most common histopathological diagnosis was tonsillar hypertrophy. The most numerous groups of patients qualified for tonsillectomy were men before 35 years of age. Patients qualified for surgery were most often burdened with cardiovascular diseases.

REFERENCES


