



Complications Following Tonsilloadenoidectomy

Ivan Baljošević*, Mladen Novkovic, Vladan Subarevic, Katarina Stankovic, Aleksandra Bajec-Opancina and Stefan Popovic

ORL Department, Mother and Child Health Care Institute of Serbia "Dr Vukan Cupic, Belgrade, Serbia

*Corresponding Author: Ivan Baljošević, ORL Department, Mother and Child Health Care Institute of Serbia "Dr Vukan Cupic, Belgrade, Serbia.

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Abstract

Aim of study: The aim of this study is to present the incidence of complications following tonsilloadenoidectomy and to determine causative factors for complications.

Methods: The study is a prospective analysis encompassing 200 children aged 2,5 to 10 years with a history of tonsilloadenoidectomy from October 2017 to April 2018. The results were determined using descriptive statistical methods.

Results: 124 or 62% of treated patients were males and 76 or 38% females, 71 or 36% were children aged 2.5 to 4 years, 89 or 44% children aged 5 to 7 years and 40 or 20% children aged 8 to 10 years. Postoperative hemorrhage was classified as either primary (within 24h) seen in 3 patients or secondary (after 24h) seen in 8, with a total post-tonsillectomy hemorrhage rate of 11 (5,5%). Other complications included elevated body temperature seen in 16 (8%) cases, vomiting in 16 (8%), dehydration in 8 (4%), and diarrhea in 6 (3%).

Conclusion: Bleeding following tonsilloadenoidectomy appears more often in children with a history of frequent tonsillopharyngitis prior to operation and vomiting and diarrhea were more frequent in children aged 2 to 4 years.

Keywords: Tonsillectomy; Complications; Children

Introduction

With or without adenoidectomy, tonsillectomy represents one of the most common surgical procedures. Various postoperative complications are known to occur of which hemorrhage is definitely the most severe. Classification of post-tonsillectomy hemorrhage into primary (within 24 hours) and secondary (after 24 hours) has been widely accepted in literature. Apart from bleeding, most patients in the early postoperative period experience nausea, vomiting, oropharyngeal pain or repeated otalgia.

Aim of study

The aim of this study is to present the incidence of complications following tonsilloadenoidectomy and to determine their causative factors.

Materials and Work Methods

This is a prospective study performed in the otorhinolaryngology department of The Institute for Mother and Child Health Care of Serbia, Belgrade - a tertiary care pediatric institution. The prospective study encompassed 200 children aged 2.5 to 10 years

with a history of tonsilloadenoidectomy performed between October 2017 and April 2018. In order to diagnose all patients correctly a clinical otorhinolaryngological examination was performed. Upon hospital admission the patients had to bring a medical report from a pediatrician and meaningful throat/nasal culture and sensitivity findings. Preoperative laboratory tests included a complete blood count (CBC), bleeding time and coagulation screening test (PT, INR, aPTT, Fibrinogen) and were performed at the Institute for Mother and Child Health Care. Children with systemic diseases and syndromes were excluded from the study. Of the 200 patients who underwent tonsillectomy, conventional cold steel tonsillectomy was performed in 90 patients and APC argon plasma coagulation module using ERBE for the removal of palatine tonsils was performed in 110 patients. Adenoidectomy was performed using the classical surgical method involving curettage and hemostasis with visualization of the nasopharynx. The patients were discharged from hospital after 48 hours. The results were processed by means of descriptive statistics methods.

Results

Of the total number of patients, 124 (62%) were male and 76 (38%) females. 71 (36%) were children aged 2,5 to 4 years, 89 (44%) children aged 5 to 7 years and 40 (20%) children aged 8 to 10 years. All patients were given oral antibiotics and analgesics postoperatively. Mean patients age was 5.4 years. Post-tonsillectomy hemorrhage was definitely the most severe complication. It was classified as either primary (within the first 24 hour) seen in 3 patients, or secondary, (after 24 hours) and seen in 8 patients. Primary hemorrhage involved the palatine fossae in two cases and the nasopharynx in one case. Secondary hemorrhage always involved the palatine fossae. Post-operative hemorrhage was controlled using thermocauterization under general anesthesia.

Other post-operative complications included elevated body temperature (16 cases or 8%), vomiting (16 cases or 8%), dehydration (8 cases or 4%) and diarrhea (6 cases or 3%). Four patients experienced all three symptoms: vomiting, diarrhea and dehydration.

Ten cases of vomiting were reported within the first 24 hours following operation and 6 cases on the second day after operation. Vomiting subsided spontaneously within a couple of hours after

operation in 4 cases, following intravenous (IV) rehydration and use of H2 receptors antagonists post-operatively on the second day (4 cases) and after the use of antiemetics on the third post-operative day when there was no improvement following administration of aforementioned therapy (8 cases). Two cases of diarrhea were reported on the second post-operative day (vomiting and diarrhea were present concurrently in both cases), 2 cases on the third post-operative day and 2 cases on the fifth post-operative day. Symptoms disappeared after IV rehydration and judicious administration of anti-diarrheals. Elevated body temperature (above 37,5 C) was registered two days after operation in 12 patients and three days following operation in 4 patients. Ten patients whose laboratory findings were within normal ranges continued receiving the usual therapy with the result that their temperature dropped to normal on the fourth post-operative day. Six patients whose laboratory tests showed a higher leucocyte count and elevated CRP were administered intravenous antibiotics, (third generation Cephalosporins), whereupon their temperature dropped to normal on the fifth post-operative day. The total number of children with complications was 29 (14,5%). The use of statistical methods did not show the existence of significant statistical correlation between age and complications in patients. Chi square is 1.170 for df 2, $p = 0.557$ i.e., $p > 0,05$. There is neither a statistically significant correlation between frequent pre-operative tonsillar infections and complications, chi square is 0.000 for df 1, $p = 0.990$, i.e., $p > 0,05$, nor is there a statistically significant correlation between frequent pre-operative tonsillar infections and post-tonsillectomy hemorrhage, chi square $P = 0.840$, $p > 0,05$.

Discussion

With or without adenoidectomy, tonsillectomy nowadays represents a routine surgical procedure that can be performed through the use of classical instruments (the so called cold-steel technique) or with modern devices such as the Argon-plasma coagulator. Surgical removal of tonsils and adenoids leaves in the oropharynx and nasopharynx a large operative area that heals spontaneously through the process of platelet and fibrin deposition. Although this surgical intervention normally ends up without any complications, vomiting, diarrhea, dehydration and definitely the most severe complication, bleeding, may occur. Bleeding which is a potentially life-threatening complication is rare but requires different measures of conservative or surgical

treatment. According to available literature the incidence of post-tonsillectomy hemorrhage varies between 2 -7% percent [1,2]. The classification into primary bleeding (within the first 24 hours) and secondary bleeding (after 24hours post-tonsillectomy) is common. Treatment of secondary bleeding following pediatric tonsillectomy relative to an increased number of outpatient surgical interventions represents one of the main topics of clinical studies, with an incidence rate between 0,5 and 9,3% and a mean value of 1,5% [3]. The study conducted by our team has registered a total of 11 (5,5%) patients with hemorrhage, 3 in the first 24 hours following operation and 8 after 24 hours. Some authors refer to significant differences in complication rates between different surgical techniques: 0,9% with coblator technique, 0,9% with monopolar electrocautery and 0,7% with microdebrider [1,2]. Our study showed no differences in complication rates between cold steel tonsillectomy and hot tonsillectomy using argon plasma coagulation. Only one patient with registered bleeding was less than 4 years old, all other patients were older than 7 years. Medical literature intimates that bleeding is rarer in younger children who undergo tonsillectomy because of tonsillar hypertrophy without a history of frequent bacterial tonsillopharyngitis; for example insightful differences between the two cohorts have been described: patients with tonsillar hypertrophy have elevated thrombocyte activation during sleep and increased thrombocyte activation index before treatment with continuous positive airway pressure (CPAP), when compared to patients without tonsillar hypertrophy [4,5]. Plasma fibrinogen levels in these patients are frequently increased [6,7]. Moreover, Robinson., *et al.* has found that activated coagulation factors XII a, VII A, thrombin-antithrombin and soluble P-selectin are higher in patients with hypertrophic tonsils and do not fall after treatment with CPAP [8]. Rangemark., *et al.* documented increased plasminogen activator inhibitor (PAI-1) levels in these children during exercise and rest [9]. Other authors indicated that children aged more than 6 years have a greater risk of bleeding due to frequent bacterial tonsillopharyngitis or chronic tonsillitis. Their reports contributed to the hypothesis that rather than tonsillar or adenoid hyperplasia accompanied by an increase in T and B lymphocytes, it is chronic or recurrent tonsillitis coupled with a vascular reaction that most probably contributes to the problem of bleeding [3]. Other possibilities include increased vascularization or fibrosis in chronic tonsillitis contributing to a greater risk of bleeding in patients following tonsillectomy [10-13].

Another post-operative complication presented in this paper was elevated body temperature (above 37,5 C). Twelve out of 16 children had their elevated body temperature registered on the second post-operative day and 4 on the third post-operative day. All patients had complete blood count and CRP done. Also, blood cultures and oropharyngeal swabs with culture and sensitivity were performed and a pediatrician was consulted. Most patients [10] were less than 4 years old. In all cases oropharyngeal swabs and blood cultures were negative. In most cases [10] the lab results were within normal ranges, patients continued their usual therapy and their temperature dropped to normal by the fourth post-operative day. These children had less fluid and food introduced into their bodies with the result that the ensuing relative dehydration caused elevated body temperature. Elevated body temperature is often linked to other simultaneous complications. For example, hemorrhage was seen in 4 out of 6 patients with elevated temperature and leukocytosis. Elevated body temperature was defined as 37,5 C and above. It is considered significant if it occurs 8 hours after operation or persists following therapy with antipyretics. Inadequate fluid intake is followed by dehydration, elevated body temperature, high urine specific gravity (USG) or oliguria. Patients were given intravenous rehydration and encouraged to take fluids. Recovery after tonsillectomy is usually painful, resulting in decreased food and fluid intake, therefore nausea and vomiting are frequently registered [14]. Most children were less than 4 years old with lower pain thresholds. In spite of oral analgesics (ibuprofen, paracetamol), some children completely refused to take in food or liquids. Also, because of their frequently unpleasant taste, analgesic syrups can additionally cause nausea. In our study, we registered vomiting in 16 patients and both vomiting and diarrhea in 6 patients. When diminished fluid and food intake lasts more than 24 hours, dehydration may ensue (8 children in our study). One or two vomiting episodes were expected in the first 8 hours and were not treated. All patients with vomiting were treated with Ondansetron. Two or more episodes of vomiting within a 24-hour period was defined as prolonged vomiting. Treatment included intravenous rehydration and antiemetics, whereupon these symptoms stopped. Studies have found obese children to be at a greater risk for complications following tonsillectomy. Obese and overweight children are at a significantly greater risk for obstructive breathing disorders after tonsillectomy and prolonged hospitalization [15].

Localisation of bleeding sites	
Tonsillar fossa	Nasopharynx
early 2	1
late 8	0

Table 1: Bleeding distribution in terms of time and site.

Elevated body temperature	16 (8%)
Vomiting	16 (8%)
Diarrhea	6 (3%)
Dehydration	8 (4%)

Table 2: Percentage of complications following tonsillectomy.

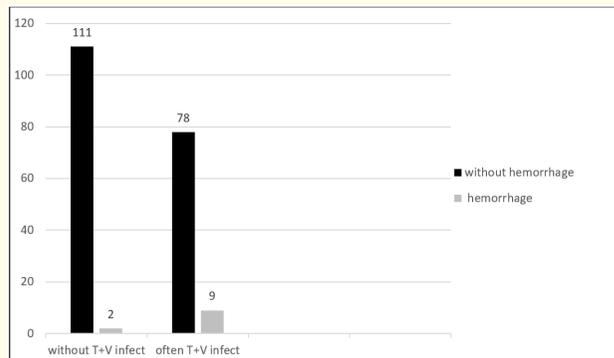


Figure 3: Frequency of frequent pre-operative palatine tonsil infections and occurrence of post-operative bleeding. Chi square, $P = 0.840$, $p > 0,05$.

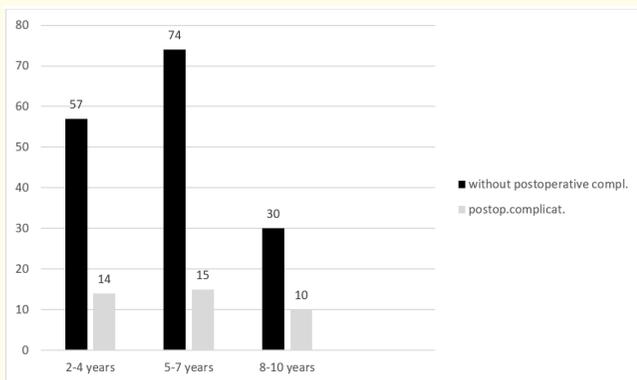


Figure 1: Patient age and occurrence of complications. Chi square is 1.170 for df 2, $p = 0.557$ i.e., $p > 0,05$.

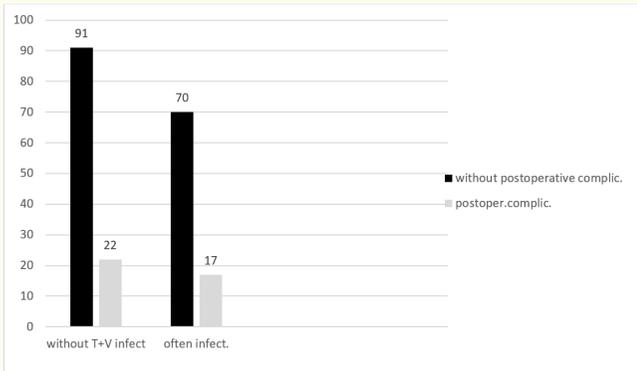


Figure 2: Frequent pre-operative tonsillitis and occurrence of complications. Chi square is 0.000 for df 1, $p = 0.990$, i.e., $p > 0,05$.

Conclusion

The most frequent complications following tonsillectomy are elevated body temperature and vomiting, but by far the most severe is bleeding. Post-tonsillectomy hemorrhage is more frequent in children over 7 years of age who had frequent tonsillitis prior to operation. Vomiting and diarrhea are more frequent in children aged 2 to 4 years, and result from pain during swallowing and are followed by nausea and inadequate oral food intake and rehydration. Joint complications such as bleeding, elevated body temperature and vomiting are frequently registered. Depending on the age of the child and the frequency of pre-operative tonsillitis, an observant approach toward each patient can at least partially foresee and prevent post-operative complications.

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