

# Haemorrhage Rates After Two Commonly Used Tonsillectomy Methods: a Multicenter Study

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## ABSTRACT

**Introduction:** Tonsillectomy is a frequently used, low-risk surgical procedure. The post-tonsillectomy haemorrhage occurs rarely, but is a life-threatening complication. Some studies show that the surgical technique affects the haemorrhage rate. **Aims:** To analyse the post-tonsillectomy haemorrhage rate, and to determine whether the effect of the surgical technique on the haemorrhage rate exists. **Methods:** We retrospectively reviewed data of all patients who underwent a tonsillectomy in three regional ENT departments in Bosnia and Herzegovina (Tuzla, Zenica and Bihać) between January 1<sup>st</sup> 2015 and October 31<sup>st</sup> 2016. Disorders which could affect the post-tonsillectomy haemorrhage rate were excluded. Tonsillectomy techniques used in these three centers were the hot technique (monopolar/bipolar forceps dissection and haemostasis) and the combined technique (cold steel dissection with monopolar/bipolar forceps haemostasis). **Results:** 1087 patients that underwent a tonsillectomy were analysed in this study. 864 (79.48%) of those were children. 922 (84.82%) patients were operated using the combined technique, 165 (15.17%) underwent a tonsillectomy using the hot technique. Post-tonsillectomy haemorrhage occurred in 46 (4.23%) patients. 45 (4.88%) patients had a postoperative haemorrhage after tonsillectomy using the combined technique, whereas haemorrhage occurred in 1 patient (0.6%) after using the hot technique. The haemorrhage rate was about eight times lower after tonsillectomy using the hot technique ( $p=0.012$ ). **Conclusion:** We conclude that the surgical technique used for tonsillectomy and adenotonsillectomy with the lowest post-tonsillectomy haemorrhage rate is the hot technique; these results are statistically significant. This technique should be used whenever possible, in order to lower the risk of post-tonsillectomy haemorrhage.

**Key words:** Tonsillectomy, haemorrhage, hot technique, combined technique.

## 1. INTRODUCTION

Tonsillectomy is a commonly used, low risk procedure. It is one of the oldest procedures done in ENT (1). Tonsillectomy techniques have changed constantly, mainly with an aim of reduction of complications, both intra- and postoperative, morbidity reduction and reduction of the surgery duration. Nevertheless, until today, no technique has shown clear superiority to others. Although the tonsillectomy is viewed as a low-risk surgery, it is potentially very harmful because of the most common complication – the post-operative bleeding (2).

Different surgical techniques are currently used. These are, among others, the cold steel dissection and various hot techniques; the Colorado needle, electrocautery, microdebrider and coblator. Different techniques can be used for tonsil bed haemostasis. These are compression with

gauze, monopolar/bipolar forceps haemostasis, coblator, suturing of pillars, among others. Earlier studies on this subject presented different conclusions about influence of surgical technique used for tonsillectomy on the postoperative haemorrhage rate. Generally, there are studies where haemorrhage rates are higher in hot techniques/electrocautery. On the other hand, there are studies which presented higher haemorrhage rates after using the cold dissection. Thirdly, there are studies that showed no effect of surgical technique on the haemorrhage rate (3-14).

Our primary aim is to determine the post-tonsillectomy haemorrhage rate. Determining the existence of effect of the surgical technique on the post-tonsillectomy haemorrhage rate is the secondary aim of our study.

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## 2. PATIENTS AND METHODS

This is a retrospective cross-sectional study, with a study period of 22 months (January 1<sup>st</sup> 2015 to October 31<sup>st</sup> 2016, inclusive). We reviewed medical charts of patients that underwent a tonsillectomy in three ENT departments in Bosnia and Herzegovina (Tuzla, Zenica and Bihac).

1087 tonsillectomy cases were included, which were sometimes accompanied by adenoidectomy. The sample included both children and adults of both sexes. All patients were aged three years or older. None of the patients had disorders and had not been undergoing treatments that would have had an effect on the incidence of the haemorrhage.

Surgical techniques used in these three departments are the hot technique (monopolar/bipolar forceps for dissection and haemostasis) and the combined technique (cold dissection and haemostasis with monopolar/bipolar forceps).

## 3. RESULTS

1087 patients underwent a tonsillectomy, some accompanied by adenoidectomy. Age, sex distribution and diagnoses are shown in Table 1.

Hot technique was used in 165 (15.17) patients, and the rest, 922 (84.82%) patients, were operated using the combined technique. Of the total number of tonsillectomy cases, 46 patients were presented with the postoperative haemorrhage, which represents a post-tonsillectomy haemorrhage rate of 4.23%. One patient (0.6%) operated using the hot technique had a post-tonsillectomy haemorrhage, and 45 patients (4.88%) presented with the postoperative haemorrhage were operated using the

	Tuzla	Zenica	Bihac	Total
Children	419 (81.67%)	345 (74.03%)	100 (92.59%)	864 (79.48%)
age (months):				
average	88	-	97	104
min.	23	-	42	23
max.	177	-	174	177
sex:				
male	237 (56.56%)	191 (55.36%)	65 (65%)	493 (57.06%)
female	182 (43.44%)	154 (44.64%)	35 (35%)	371 (42.94%)
Adults	94 (18.32%)	121 (25.97%)	8 (7.41%)	223 (20.52%)
age (months):				
average	308	-	275	369
min.	180	-	185	180
max.	741	-	372	741
sex:				
male	46 (48.49%)	35 (28.93%)	2 (25%)	83 (37.22%)
female	48 (51.06%)	86 (71.07%)	6 (75%)	140 (62.78%)
<b>Adentonsillar hypertrophy (ATH)</b>	271 (52.82%)	294 (63.09%)	45 (41.66%)	610 (56.12%)
Adenoid hypertrophy (AH)	146 (28.46%)	31 (6.65%)	47 (43.52%)	224 (20.61%)
Chronic tonsillitis (TC)	96 (18.71%)	141 (30.26%)	16 (14.81%)	253 (23.27%)

Table 1. Age, sex and diagnosis distribution of patients

combined technique. Therefore, the rate of post-tonsillectomy haemorrhage was lower after using the hot technique (p=0.012). Adult patients had a 4.3 times higher post-tonsillectomy haemorrhage rate than children. These, and other data concerning haemorrhage rates after the two tonsillectomy methods in our three centers are presented in Table 2.

It is important to highlight that of the 46 patients presented with the post-tonsillectomy haemorrhage, 16 (34.8%) patients required a surgical reintervention, which represents a reintervention rate of 1.47% of the total number of patients in our sample. The postoperative haemorrhage occurred on average of 7.4 days after the operation.

None of the operated patients required an external carotis artery ligation, and there is no cases of death in our patient group.

	Tuzla	Zenica	Bihac	Total (N/%)
Children	10 (2.38%)	12 (3.47%)	2 (2%)	24 (2.77%)
Adults	10 (10.6%)	11 (9.09%)	1 (12.5%)	22 (9.86%)
Ratio: Adults/Children	1.0:1.0	1.09:1.0	2.0:1.0	1.09:1.00
Average time of appearing haemorrhage after operation min-max (days)	1-14 <sup>th</sup> (children) 1-12 <sup>th</sup> (adults)	1-14 <sup>th</sup> (children) 3-12 (adults)	1-14 <sup>th</sup> (children) 8 <sup>th</sup> (adults)	1-14 <sup>th</sup> (children) 1-14 <sup>th</sup> (adults)
Haemorrhage after ATH children / adults	8 (1%) / 1(10%)	11 (91.67%)/ 0(0%)	1 (50%)/0 (0%)	20(83.33%)/1(4.55%)
Haemorrhage after AH	1 (10%)	0 (0)	0(0%)	1 (4.17%)/ 0 (0%)
Haemorrhage after TC children / adults	1(10%)/9(90%)	1(8.33%)/11 (100%)	1(50%)/1(100%)	3(12.5%)/ 21 (95.45%)
Reintervention children/adults	3(30%)/2(20%)	5(41.6%)/3(27.3%)	2(100%)/1(100%)	10(41.7%)/6(27.8%)
Operative technique:				
Hot technique (Mono/bipolar dissection and haemostasis)	165 / 1 (0.6)	-	-	165/ 1 (0.6)
Combined technique (cold dissection with mono/bipolar thermocoagulation)	348/ 19 (5.45)	466/ 23 (4.9)	108 / 3 (2.8)	922/ 45 (4.88)

Table 2. Post-tonsillectomy haemorrhage rates

## 4. DISCUSSION

864 (79.48%) of investigated patients in our study were children and 610 (56.12%) had adenotonsillar hypertrophy as an indication for adenotonsillectomy. Almost 85% of patients were operated using the combined technique (cold dissection with mono/bipolar thermocoagulation). The post-tonsillectomy haemorrhage rate for all patients was 4.23%. Haemorrhage rate was 0.6% for patients operated using the hot technique (monopolar/bipolar dissection and haemostasis) and 4.88% for patients operated using the combined technique (cold dissection with monopolar/bipolar thermocoagulation), with statistically significant difference ( $p=0.012$ ).

Strengths and weaknesses of the methods: Although many studies were published on this subject, no such study has been done in the region of Bosnia and Herzegovina. Because the patient data system in these 3 analysed clinical departments was modernised 2 years ago, it is almost impossible to access patient data older than 2 years. Therefore, our study consists of a relatively small patient group, which can be seen as a limitation.

Other authors mostly compared a hot with a cold tonsillectomy technique (cold steel dissection and haemostasis), and analysed other different techniques as well. In our study centres, only two surgical techniques (hot and combined) were used and therefore only the effect of these two techniques on the haemorrhage rate was analysed. The combined technique is mostly done as a cold steel technique, with electrocautery only being used for the haemostasis.

The haemorrhage rate in our study was 4.23%, which is higher than rates presented by Gendy et al. (2) and Lowe et al. (3) (3.6% and 3.3%, respectively). Harju et al. (4) and Ali et al. (5) presented higher post-tonsillectomy haemorrhage rates (12% and 6.7%, respectively).

In a study of Al-Qahtani et al. (6), patients that underwent tonsillectomy using monopolar dissection, had a significantly lower haemorrhage rate than those operated using the cold dissection only (0.8% vs 1.9%), which corresponds the results of our study. Similar results were presented by Seshamani et al. (7), where the haemorrhage rates after using all hot techniques were significantly lower than the haemorrhage rate after the cold dissection combined with cold haemostasis.

Betancourt et al. (8) presented the lowest haemorrhage rate after cold dissection with monopolar forceps haemostasis (2.09%), which could be seen as our „combined“ technique, which contradicts our results. Similarly, Lee et al. (9) showed that the rate of post-tonsillectomy haemorrhage was higher using the hot technique (12.5%) than the rate of haemorrhage after using the cold dissection (5.5%). Ali et al. (5) presented the lowest haemorrhage rate after using the cold technique, whereas the highest rate was presented in patients operated using the hot technique, which is different from our results as well. Further studies also contradict our results, where in each study the highest haemorrhage rate was presented after using different hot/electrocautery methods (monopolar/bipolar forceps), as shown by Brown et al. (10), Pang et al. (11) and Yilmaz et al. (12). Alam et al. (13) and Had-

dow et al. (14) reported that there was no influence of the surgical technique on the post-tonsillectomy haemorrhage rate, and therefore contradict our results as well.

As shown in our results, using the electrocautery technique instead of cold steel dissection with mono-/bipolar forceps haemostasis resulted in a significantly lower rate of post-tonsillectomy haemorrhage, which corresponds with the results of some authors. However, many studies contradict our results. That combined with the fact that our study consisted of a relatively small patient group, and only two surgical techniques were used, it would be of great value, if an even larger, multicenter study would be done on this subject, which possibly consists of more than two surgical techniques, to further analyse and compare haemorrhage rates, in order to help surgeons at choosing the surgical technique for the tonsillectomy.

## 5. CONCLUSIONS

We conclude in our study that the surgical technique with the lowest postoperative haemorrhage rate is the hot technique (dissection and haemostasis by monopolar/bipolar forceps). These results were statistically significant. Therefore, this surgical technique should be preferred by surgeons whenever possible, in order to lower the risk of post-tonsillectomy haemorrhage and therefore to avoid this potentially life-threatening complication.

• Conflict of interest: none declared

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