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INCIDENCE OF POST-TONSILLECTOMY AND POST-ADENOTONSILLECTOMY HEMORRHAGE IN 5125 PATIENTS OPERATED DURING THE 1994-2005 PERIOD AT DEPARTMENT OF ENT, HEAD AND NECK SURGERY, OSIJEK UNIVERSITY HOSPITAL IN OSIJEK, CROATIA

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SUMMARY – The aim of this study was to determine the incidence of post-tonsillectomy and post-adenotonsillectomy hemorrhage, and to evaluate risk factors that contribute to this hemorrhage. It was a retrospective study including 5125 patients operated in general anesthesia at our Department between January 1, 1994 and December 31, 2005. A total of 169 (3.29 %) patients experienced postoperative bleeding; 69 (40.82%) of them required revision in operating room under general anesthesia. The incidence of bleeding was highest in the 20.01-30 age group. Primary bleeding (<24 h) occurred in 39 (0.76%) and secondary bleeding in 130 (2.53%) patients. The highest incidence of secondary post-tonsillectomy and post-adenotonsillectomy hemorrhage was between day 6 and day 7 of the operation. There was no statistical significance between men and women in the day when bleeding occurred. In the group of patients requiring revision in the operating room under general anesthesia, 59 (85%) patients had no additional diagnoses that may have contributed to postoperative hemorrhage. Two cases of excessive post-tonsillectomy bleeding requiring suture ligation of the external carotid artery are reported. Hemorrhage following tonsillectomy and adenotonsillectomy is rare and occurs mainly 6 days after surgery. A vast majority of patients do not need revision in the operating room. Male patients aged 20-30 were found to have an increased risk of postoperative hemorrhage.

Key words: *Tonsillectomy – adverse effects; Adenoidectomy – adverse effects; Postoperative hemorrhage – epidemiology; Risk factors; Age distribution*

Introduction

The aim of this study was to determine the incidence of post-tonsillectomy and post-adenotonsillectomy hemorrhage, and to evaluate risk factors that contribute to this hemorrhage in a group of patients operated at our institution during a 12-year period. The aim was also to determine the possible sex difference in the onset of hemorrhage; whether coexisting diagnoses such as hypertension, history of peritonsillar abscess, etc., contributed to post-tonsillectomy hemorrhage; and whether there was seasonal variation in the incidence of post-tonsillectomy hemorrhage. Tonsillectomy with or without adenoidectomy remains the most common surgical procedure in otorhinolaryngology, with hemorrhage as the most frequent and most significant complication[1]. It occurs as primary (<24 h) or secondary (>24 h) hemorrhage. Primary bleeding is considered to be related to operative technique[2], early loss of spasm of the blood vessels in tonsillar fossa, and insufficient blood clotting[3]. Secondary bleeding occurs within the first 10 postoperative days[2], and is believed to be related to many factors such as age, sex, use of nonsteroidal anti-inflam-

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matory drugs, avoiding advice on post-tonsillectomy diet and weather conditions[4]. The reported incidence of post-tonsillectomy bleeding varies, i.e. 1.5 %[2], 4%[1], 9.2%[4], 5.2%[5], 2.65%[6] and 3.9%[7]. Risk factors generally associated with post-tonsillectomy hemorrhage include age, sex, previous history of peritonsillar abscess, smoking, hypertension, and season when the operation is performed.

Patients and Methods

This was a retrospective study including 5125 patients (2590 male and 2534 female) operated on at ENT Department between January 1, 1994 and December 31, 2005. Tonsillectomy with or without adenoidectomy was performed in 4448 patients. The oldest patient from the tonsillectomy group was aged 58. Nine (0.2%) patients were aged 50.01-60. One of them had melanoma of the tonsil and was excluded from the study. Adenoidectomy was performed in 677 patients. The youngest patient in the adenoidectomy group was aged 3 years and 32.79% of these patients were under age 5 (Fig. 1). Patient data were collected using operation protocol books for those revised in the operating room under general anesthesia. Other patients admitted to Department requiring no revision in general anesthesia were recorded with the diagnosis of post-tonsillectomy hemorrhage and these data were collected from the book of inpatients. We indicated adenoidectomy in 677 and tonsillectomy with or without adenoidectomy in 4448 patients. All patients requiring tonsillectomy with or without adenoidectomy were included in the study. Preoperative studies included complete blood count, coagulation parameters (activated partial thromboplastin time and prothrombin time), anesthesiology check-up and blood group. The procedure was always performed in general anesthesia with oral intubation. All operations were done by different surgeons, and they all used cold technique with scissors, raspatory and snare. Some of them used ligature for hemostasis, and others used electrocautery. Adenoidectomy was performed by adenotome, and hemostasis was done by temporary packing of

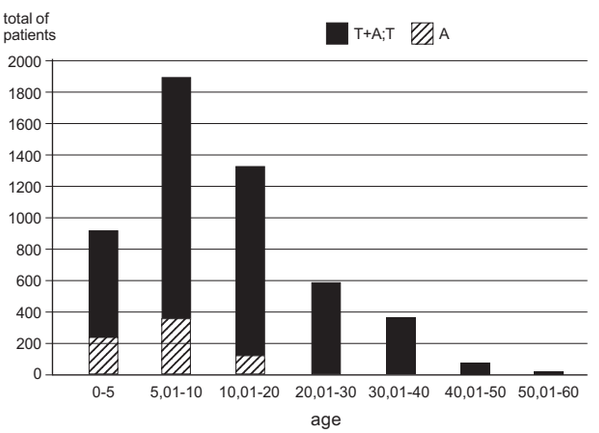

Fig. 1. Age distribution of patients undergoing tonsillectomy and adenotonsillectomy between January 1, 1994 and December 31, 2005 at Department of ENT, Head and Neck Surgery, Osijek University Hospital, Osijek, Croatia.

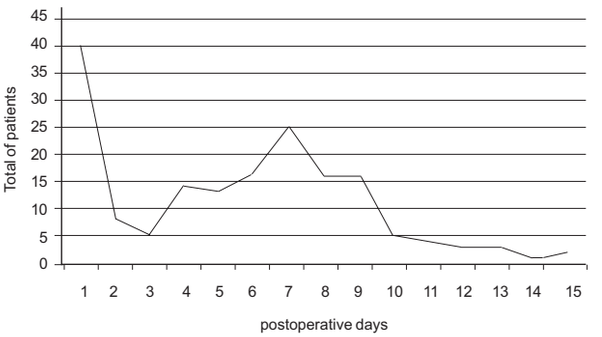

Fig. 2. Incidence of primary and secondary hemorrhage in patients undergoing tonsillectomy and adenotonsillectomy between January 1, 1994 and December 31, 2005 at Department of ENT, Head and Neck Surgery, Osijek University Hospital, Osijek, Croatia.

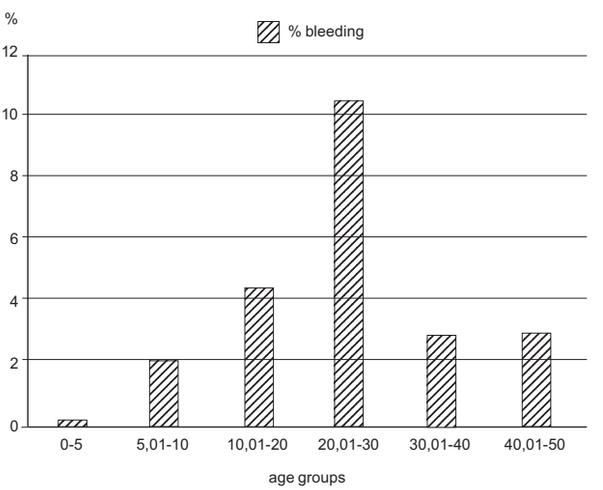

Fig. 3. Incidence of post-tonsillectomy and post-adenotonsillectomy hemorrhage according to age groups in 5125 patients operated on between January 1, 1994 and December 31, 2005 at Department of ENT, Head and Neck Surgery, Osijek University Hospital, Osijek, Croatia.

the nasopharynx. After the surgery, patients received analgesics and oral fluid. They were discharged from the hospital on the next day, after being examined by the surgeon. They received advice on diet and use of analgesics. Control check-up was scheduled in 7 days at our Department.

The study included all patients presenting with bleeding, whether or not requiring revision in the operating room in general anesthesia. Complete blood count was taken on patient readmission. Those who did not need hemostasis in the operating room were readmitted for overnight stay and treated conservatively with K and C vitamins, Calcihept injections and bed rest. In patients referred to the operating room, ligature and electrocautery were used.

In our study we used SPSS 13.0 for Windows and Microsoft Excel computer programs. Mann-Whitney U test was employed to test sex differences in the onset of postoperative hemorrhage. Pearson correlation was used to assess the possible correlation between the season (months) and number of bleedings following tonsillectomy or adenotonsillectomy.

Microsoft Excel and Microsoft Power Point were used to make charts (Figs. 1, 2 and 3).

Results

Postoperative hemorrhage developed in 169 (3.29%) patients; only 69 (1.34%) of them required hemostasis in general anesthesia. The youngest patient in this group was aged 5 and the oldest 45 (mean age 18.34; standard deviation 8.47; standard error mean 1.0204). There was no case of hemorrhage in the adenoidectomy group. Primary hemorrhage occurred in 39 (0.76%) patients. Secondary hemorrhage developed in 130 (2.53%) patients between day 1 and day 17 (Fig. 2). The majority (35.5%) of patients that developed post-tonsillectomy hemorrhage were aged 20-30. Only one (0.59%) postoperative hemorrhage occurred in the 0-5 age group. Analysis of the incidence of hemorrhage across age groups showed highest incidence (10.45%) in young adults and lowest incidence (0.11%) in children aged 0-5.

Mann-Whitney U test yielded no statistically significant difference in the onset of hemorrhage between 91 male and 78 female patients (169 bleeding patients) ($p=0.690$; $p>0.05$). In the total number of patients, postoperative hemorrhage was slightly more common in male patients (52.6%).

Analysis of history data on 69 patients needing hemostasis in general anesthesia revealed that 59 (85.5%) of them had no coexisting diagnosis, whereas ten patients had coexistent diagnoses, i.e. arterial hypertension in two (2.89%), coagulopathy in three (4.34%) patients, and peritonsillar abscess, proteinuria, vasculitis and chronic sinusitis in one (1.44%) patient each. Two male patients aged 22 and 26 had excessive post-tonsillectomy hemorrhage that required suture ligation of external carotid artery. In both cases hemorrhage occurred on the day of operation. Revision was conducted in general anesthesia using ligature in tonsillar fossa. Hemorrhage was massive and recurred on the same day, thus necessitating ligature of external carotid artery. In one of these patients hemophilia C was subsequently discovered, while the other had tonsillitis and allergy to penicillin. However, neither of them developed any sequels associated with these events. Pearson correlation yielded no association between the incidence of hemorrhage and season of the operation ($p=0.651$).

Discussion

Our results indicate that tonsillectomy with or without adenoidectomy is a rather safe procedure which can be done as one-day surgery. It is generally known that hemorrhage is more common in adults than in children[2]. This is confirmed by our finding of the highest incidence of postoperative hemorrhage in young adults. Secondary hemorrhage is more common than primary hemorrhage and peaks between postoperative day 6 and day 7. It is consistent with literature reports[6]. In our study, male patients had a higher incidence of bleeding, as also reported from other studies[2,7]. Excessive bleeding that requires ligature of external carotid artery is an extremely rare complication. In our study it occurred in one *per* 2562.5 patients. In their study, Winfuhr *et al.* report on external carotid artery ligature in one *per* 1902.3 patients[2].

There are different reports on weather influence on post-tonsillectomy and post-adenoidectomy hemorrhage. Some of them suggest that operating during warm weather can reduce post-tonsillectomy hemorrhage[4], whereas others found the vast majority of postoperative hemorrhage to occur in the beginning of warm season[8]. We found no correlation between the month of the year and rate of hemorrhage. To investigate seasonal effects such as humidity, atmospheric pressure, minimum and maximum air temperature on post-tonsillectomy hemorrhage, we have started collecting data to conduct a study in the near future in an attempt to answer this question.

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References

1. COLLISON PJ, METTLER B. Factors associated with post-tonsillectomy hemorrhage. Ear Nose Throat J 2000;79:640-2, 644, 646.
2. WINDFUHR JP, CHEN YS, REMMERT S. Hemorrhage following tonsillectomy and adenoidectomy in 15,218 patients. Otolaryngol Head Neck Surg 2005;132:281-6.
3. PADOVAN I. Kirurgija orofarinksa. In: PADOVAN I, editor. Otorinolaringologija 3. Kirurgija usne šupljine, ždrijela, grla i vrata. Zagreb: Školska knjiga, 1987:?_?.
4. LEE MS, MONTAGUE ML, HUSSAIN SS. The influence of weather on the frequency of secondary posttonsillectomy hemorrhage. J Laryngol Otol 2005;119:894-8.
5. KLUG TE, OVESEN T. Post-tonsillectomy hemorrhage: incidence and risk factors. Ugeskr Laeger 2006;168:2559-62.
6. WINDFUHR JP, SESTERHENN K. Hemorrhage after tonsillectomy. Analysis of 229 cases. HNO 2001;49:706-12.
7. WINDFUHR JP, CHEN YS. Incidence of post-tonsillectomy hemorrhage in children and adults: a study of 4,848 patients. Ear Nose Throat J 2002;81:626-8, 630, 632.
8. DUBS R, PRIMAULT B. Meteorological observations concerning hemorrhages after tonsillectomy. Laryngol Rhinol Otol 1975;54:755-61.

Sažetak

INCIDENCIJA KRVARENJA NAKON TONZILEKTOMIJE I ADENOTONZILEKTOMIJE U 5125 BOLESNIKA OPERIRANIH OD 1994. DO 2005. GODINE NA ODJELU ZA UHO, GRLO, NOS I KIRURGIJU GLAVE I VRATA KLINIČKE BOLNICE OSIJEK U OSIJEKU

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Cilj studije bio je utvrditi incidenciju krvarenja nakon tonzilektomije i adenotonzilektomije te procijeniti čimbenike rizika koji tom krvarenju doprinose. Ovo je bila retrospektivna studija 5125 bolesnika operiranih u općoj anesteziji na našem Odjelu od 1. siječnja 1994. do 31. prosinca 2005. godine. Poslijeoperacijsko krvarenje zabilježeno je u 169 (3,29%) bolesnika; kod 69 (40,82%) od njih bila je potrebna revizija zahvata u općoj anesteziji u operacijskoj sali. Incidencija krvarenja bila je najviša u dobnoj skupini od 20,01 do 30 godina. Primarno krvarenje (<24 h) je nastupilo u 39 (0,76%), a sekundarno krvarenje u 130 (2,53%) bolesnika. Najviša incidencija sekundarnog krvarenja poslije tonzilektomije i adenotonzilektomije zabilježena je između 6. i 7. dana od operacije. Nije bilo statistički značajne razlike u danu nastupa krvarenja između muških i ženskih bolesnika. U skupini bolesnika kod kojih je bila potrebna revizija zahvata pod općom anestezijom u operacijskoj sali 59 (85%) bolesnika nije imalo nikakve dodatne dijagnoze koje bi mogle doprinijeti poslijeoperacijskom krvarenju. Opisujemo dva slučaja prekomjernog krvarenja nakon tonzilektomije koji su zahtijevali ligaturu vanjske karotidne arterije šavovima. Krvarenje nakon tonzilektomije i adenotonzilektomije je rijetko i nastupa uglavnom 6 dana od operacije. Kod velike većine bolesnika nije potrebna revizija u operacijskoj sali. Utvrdili smo kako muški bolesnici u dobi od 20 do 30 godina imaju povećan rizik od poslijeoperacijskog krvarenja.

Ključne riječi: *Tonzilektomija – štetni učinci; Adenoidektomija – štetni učinci; Poslijeoperacijsko krvarenje – epidemiologija; Čimbenici rizika; Dobna raspodjela*