

Oropharyngeal packing for resistant post-tonsillectomy bleeding

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Background

Tonsillectomy remains a common surgical procedure with a substantial risk for complications, the greatest of which is postoperative hemorrhage.

Objective

The aim of this study was to assess the efficiency of oropharyngeal packing around the orotracheal tube to control resistant, potentially lethal, post-tonsillectomy bleeding.

Patients and methods

Six patients were presented to our institution with massive (potentially fatal) post-tonsillectomy hemorrhage from January 2002 to June 2011. After failure of initial measures to control bleeding, oropharyngeal packing around the orotracheal tube with or without a nasogastric tube was inserted to compress the bleeding areas.

Results

Oropharyngeal packing succeeded in controlling and stopping resistant post-tonsillectomy bleeding in all cases.

Conclusion

Resistant, potentially fatal, post-tonsillectomy bleeding could be controlled by oropharyngeal packing around orotracheal tubes, and this can be tried first before external carotid artery ligation.

Keywords:

packing, post-tonsillectomy hemorrhage, tonsillectomy

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Introduction

Tonsillectomy is defined as a surgical procedure that completely removes the tonsil, including its capsule, by dissecting the peritonsillar space between the tonsil capsule and the muscular wall [1]. Tonsillectomy remains a common surgical procedure with a substantial risk for complications, the most serious of which is postoperative hemorrhage [2].

Post-tonsillectomy hemorrhage seems to be a rare but unavoidable complication. Because of the high frequency of tonsillectomies performed, it can be estimated that some of them may result in a lethal outcome. Immediate surgical treatment can avoid the lethal outcome in most cases [3]. Lethal outcomes occurred with an estimated incidence of 1/75 000 [4]. Mortality results from airway obstruction from blood clots and hemorrhagic shock [5].

Post-tonsillectomy hemorrhage can be divided into two broad categories: primary, occurring less than 24 h after surgery, and secondary, occurring more than 24 h, commonly 5–10 days, after the operation. Post-tonsillectomy secondary hemorrhage has a reported rate of 3–5% leading to readmission to hospital [6].

Primary bleeding is generally related to the surgical technique, whereas environmental factors that influence oropharyngeal healing contribute to delayed (secondary) hemorrhage, which typically results from sloughing of the surgical eschar from the tonsillar fossa [7,8].

Ligation of the external carotid artery (ECA) is the method of choice in patients with excessive uncontrolled post-tonsillectomy hemorrhage, but still there were lethal outcomes even after ECA ligation [9]. The aim of this study was to assess the efficiency of oropharyngeal packing around the orotracheal tube to control resistant, potentially lethal, post-tonsillectomy bleeding.

Patients and methods

A retrospective review of six patients who were managed by oropharyngeal packing in the Emergency Unit of the Otorhinolaryngology Department, Zagazig University Hospitals, Egypt, in the period from January 2002 to January 2012. All the patients presented with excessive repeated attacks of type 4 post-tonsillectomy bleeding (according to the Walner standardization of post-tonsillectomy bleeding [10]).

These patients were transferred immediately to the operative room. Careful orotracheal intubation was performed by the anesthesiologist, and then a complete blood count was obtained to assess the degree of hemorrhage and also to establish the baseline level in case of further bleeding.

Any fresh clots were removed. The wound was irrigated with H₂O₂ solution and trials to control bleeding using bipolar diathermy or suture ligation were attempted by two different surgeons. After failure of these trials, three patients underwent bilateral ECA ligation without control of the bleeding. The oropharyngeal packing was inserted and pressed around the orotracheal tube in these three cases. In the other three patients, oropharyngeal packing was inserted without ECA ligation. The cuffed orotracheal tube was maintained for respiration in all cases, whereas the nasogastric tube was inserted for feeding only in the first two cases, and no nasogastric tube was inserted in the last four patients.

The oropharyngeal packing was kept in place, uniformly pressing the tonsillectomy beds and the surrounding areas for 48 h, in the ICU, where patients were sedated to tolerate it. The cuffed orotracheal tube was fixed well and secured in place. Any blood deficits were replaced during the surgery and during the stay in the ICU. Feeding was maintained in the ICU through a nasogastric tube in the first two patients, whereas in the last four cases, intravenous fluids were used under the supervision of ICU physicians.

After 48 h, the pack, the endotracheal tube and the nasogastric tube (if was used) were removed, and as no bleeding was detected, patients could begin post-tonsillectomy oral feeding. Patients were closely observed in the hospital for 1 week, during which patients were re-investigated. A broad-spectrum prophylactic antibiotic and metronidazol were given to all patients for 10 days, starting from the day of admission.

Patients were allowed to go home with appropriate instructions, especially to return to the hospital

immediately if they noticed any oral bleeding. Then, the patients were followed up after discharge for evaluation of the results at a weekly interval for 1 month.

Results

Six patients were included in this study, five (83.3%) male and one (16.7%) female. The age of the patients ranged from 5 to 11 years (mean age 7.5 years).

The indications for tonsillectomy were recurrent or chronic tonsillitis in all patients. All the patients had no history of coagulopathy, and their preoperative investigations were within normal limits. None of the patients had risk factors for hemorrhage such as hypertension, hyperthyroidism, or anticoagulation therapy. All the patients presented with secondary post-tonsillectomy severe hemorrhage, which did not respond to conservative measures (Table 1).

Oropharyngeal packing around the oral endotracheal tube and the nasogastric tube (in the first two cases only) succeeded in controlling and stopping resistant post-tonsillectomy bleeding in all cases (100%). No death occurred in any of our cases. No failure to stop bleeding or the need for any other surgical intervention occurred. No patients returned with re-bleeding during the follow-up for 1 month.

All patients included in this study received blood transfusions. Resuscitation was needed and performed successfully in two cases after severe bleeding occurred before admission to the operative room.

ECA ligation was performed in the first three cases bilaterally and it failed to control bleeding. However, in the last three cases, packs were inserted by which bleeding could be controlled without ECA ligation. The site of bleeding was the left tonsillar bed in three cases, the right bed in two cases, and bilateral in one case.

Secondary infection was considered as the cause of bleeding in three cases when no cause of bleeding other than infection could be detected by history,

Table 1 Data of the six cases included in this study

Numbers	Sex	Age (years)	Postoperative days of bleeding	Tonsillar bed of bleeding	Bilateral ECA ligation
1	Male	8	5	Left	Done
2	Male	7	8	Bilateral	Done
3	Male	9	6	Right	Done
4	Male	5	9	Left	Not done
5	Female	11	3	Left	Not done
6	Male	5	4	Right	Not done
Total (n = 6)	5 male, 1 female	Mean age 7.5 years	3–9 postoperative days	3 left, 2 right, and one bilateral	3 bilateral ECA ligation

ECA, external carotid artery.

examination, laboratory tests for the bleeding profile, Doppler of neck vessels or angiography.

During follow-up after discharge, tonsillar beds were examined at each visit. The post-tonsillectomy membrane disappeared after 2 weeks in all cases, and patients returned to their normal activities.

Discussion

Tonsillectomy remains one of the most common surgical procedures performed in the world [6]. Hemorrhage is the most common, significant, and severe complication of tonsillectomy. Reported bleeding rates range from 0.28 to 20% in the literature [11]. In a literature-based study by Blakley [12], post-tonsillectomy bleeding rates of about 5% are typical. Episodes of post-tonsillectomy hemorrhage are unpredictable [3,13], unavoidable [3], and potentially life-threatening [3,5,14]. Mortality results from airway obstruction, from blood clots and hemorrhagic shock [5]. Tonsillectomy is considered the ultimate test of hemostasis as the blood supply to the tonsils arises from five primary arteries in an area unable to collapse upon itself [5].

Six patients with potentially fatal severe post-tonsillectomy bleeding were included in this study: five (83.3%) male patients and only one (16.7%) female patient. Some studies [13,15,16] mentioned that post-tonsillectomy hemorrhage is significantly more common and severe in men, whereas Carmody *et al.* [17] found a significant predominance of post-tonsillectomy hemorrhage among women. However, Windfuhr *et al.* [8] found that sex remained irrelevant as a contributing risk factor for severe post-tonsillectomy bleeding.

Although post-tonsillectomy hemorrhage is more common in adults [13,15,16] or older children (10–19 years) [17], children seem to be more susceptible to serious post-tonsillectomy hemorrhage [3,8,18]. All the cases managed in the current study were children younger than 12 years.

Chronic or recurrent tonsillar infection was the only indication for tonsillectomy in our study, which insured the suggestion of Windfuhr *et al.* [15] that chronic or recurrent infection likely plays a role in the incidence of postoperative hemorrhage. Gabriel *et al.* [19] and Windfuhr [3] mentioned that normal preoperative tests do not help us to identify patients with increased risk for developing hemorrhage. They concluded that the absence of previous bleeding and normal lab tests could not predict postoperative bleeding. This was the

case in our study as none of our patients had a history of hemorrhagic tendency, risk factors of hemorrhage, or abnormal lab results.

The probability and the intensity of post-tonsillectomy hemorrhage appear to be unpredictable [3,13,19]. One of the significant risk factors for post-tonsillectomy hemorrhage is excessive intraoperative blood loss [20]. In our study, we could not exactly estimate the blood loss in the primary surgery as all the patients were referred from other centers or came by themselves for control of the secondary post-tonsillectomy hemorrhage, and the data of the primary surgery could not be obtained.

Ligature of ECA is the method of choice in patients with excessive post-tonsillectomy hemorrhage that failed all other measures, but there are still lethal outcomes after ECA ligation [9]. The extensive blood supply of the tonsillar fossa is composed of a complex network of anastomosing arteries primarily arising from the ipsilateral ECA system. However, contribution from the internal carotid and the vertebral arteries exist and contralateral vessels circulate through the circle of Willis. Therefore, extensive intraoperative or postoperative hemorrhage may not always cease after ligation of ECA [13]. This was evident in our study as bleeding did not stop even after bilateral ECA ligation in three patients.

According to the standardization of post-tonsillectomy bleeding described by Walner [10], type 4 bleeding requires aggressive intervention under general anesthesia and/or transfusion. This intervention includes embolization or ECA ligation. The authors of this study recommend using an oropharyngeal pack on top of the endotracheal tube first or even after failure of ECA ligation in type 4 (potentially lethal) post-tonsillectomy bleeding before the situation becomes irreversible as this may avoid worsening to type 5 post-tonsillectomy bleeding (death). The oropharyngeal pack could be the last resort to control this potentially lethal bleeding, saving the patient's life.

The results of this study showed that the oropharyngeal pack controlled apparently untreatable bleeding and saved what was previously considered as the unavoidable mortality of post-tonsillectomy bleeding not controlled by bilateral ECA ligation. This provides an easy, effective, and rapidly available life-saving intervention without the need for extra instrumentations, tools, or experience. It can avoid ECA ligation or angioembolization, which may not be available in small centers or at a time of emergency, and can be used as a last resort if these measures fail to control the bleeding.

Conclusion

Resistant, potentially fatal, post-tonsillectomy bleeding could be controlled by oropharyngeal packing around the oral endotracheal tube and this can be tried first before ECA ligation.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

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