Modified Surgical Technique with Pillars Repair in Reducing Post Tonsillectomy Haemorrhage

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Tonsillectomy is one of the most frequent surgical procedures. It is a simple surgical procedure conducted under general anesthesia. Different tonsillectomy techniques have different impact on post-operative morbidity. The aim of the study is to compare the modified dissection method which is used to remove the tonsil in toto with no residual tonsillar tissue left behind and pillars repair by absorbable sutures leaving no raw area after tonsillectomy with the traditional method in reducing the rate of post-tonsillectomy bleeding. The study included 800 patients classified randomly into two groups: modified dissection method with pillars repair (group 1) and traditional dissection method (group 2). Each group included 400 patients. Regarding primary postoperative hemorrhage, there were 18 patients (2.25%) of whom 2 patients (11.11%) had to be returned to the operating theatre in group 1 compared to 32 (4%) of whom 16 patients (50%) had to be returned to the operating theatre among group II (P< 0.05). Regarding secondary postoperative hemorrhage due to infections there were no cases of bleeding in group I, while 8 cases (1%) had a bleeding in group II, 2 (25%) of whom had to be returned to the theatre requiring to ligature sutures (P < 0.004). The frequency of overall hemorrhage was statistically significant between both groups, overall hemorrhage was less in group I (P < 0.05). Tonsillectomy by the modified dissection method which is used to remove the tonsil in toto with no residual tonsillar tissue left behind and pillars repair by absorbable sutures leaving no raw area after tonsillectomy produce a benefit for our patients by reducing haemorrhage, especially haemorrhage requiring additional surgery.

Keywords: Tonsillectomy, Modified Dissection Method, Pillars Repair, Absorbable Suture, Post Tonsillectomy Haemorrhage.

INTRODUCTION

The vascular supply of the tonsil consist of five robust primary arteries, the surrounding tissues do not compress upon themselves. Tonsillectomy is said to be the ultimate test of hemorrhage (Isaacson, 2012). Tonsillectomy is one of the most frequent surgical procedures. It is a simple surgical procedures conducted under general anesthesia. However, complications can arise in the form of bleeding either immediately after post-operation or up to 9 days post-operation. (Lowe and van der Meulen, 2005). There is no standard technique of tonsillectomy throughout the world and the choice of the technique depends on the surgeon’s preference. Different tonsillectomy techniques have different impact on post-operative morbidity (Windfuhr et al., 2009). Generally tonsillectomy is considered simple but, in comparison with other similar operations, it implies a common and sometimes serious complication (D’Agostino et al., 2009). Considering that it is an elective procedure, it is often connected with a comparatively high bleeding rate. (Ahsan et al., 2007). Furthermore, bleeding in this location (the upper airways) always represents a significant risk. For this reason, there has been and still is a great deal of discussion regarding the different tonsillectomy techniques as well as primary haemostasis and the effect on reducing postoperative bleeding (Burton and Doree, 2007). Recent publications have identified different rates of postoperative haemorrhage between "cold" tonsillectomy techniques and "hot" (diathermy or coblation) tonsillectomy techniques, generally identifying lower bleeding rates after cold techniques (Walker and Gillies, 2007). For primary haemostasis, two different techniques are mainly used: bipolar diathermy and suture ligation, suturing the faucial pillars is typically
used in severe haemorrhage where other techniques have failed (Windfuhr et al., 2009). The technique of suturing the faucial pillars is used routinely as part of uvulopalatopharyngoplasty, after performing the tonsillectomy, with post-surgical haemorrhage occurring rarely. (McClelland and Jones, 2005). Hence the aim of the study to compare the modified dissection method which used to remove the tonsil in toto with no residual tonsillar tissue left behind and pillars repair by absorbable sutures leaving no raw area after tonsillectomy with the traditional method including dissections, started from upper pole down to the lower pole and remove of tonsil extracapsular with cut to lower pole, clamping and silk ligature, in reducing the rate of post-tonsillectomy bleeding.

PATIENT AND METHODS

The study included 800 patients classified randomly into two groups, modified dissection method with pillars repair (group 1) and traditional dissection method (group 2), each group included 400 patients.

We analyzed the data of patients in both comparison groups who underwent tonsillectomy in the period from January 2008 – until May 2016. According to paradise criteria, At least seven episodes of sore throat in the previous year, at least five episodes in each of the previous two years, or at least three episodes in each of the previous three years. (Baugh et al., 2011)

according to Brodsky grading scale, the size of the tonsils is categorized as 1 of 5 grades based on the percentage of oropharyngeal airway which denoted by the linear distance between the 2 anterior tonsillar pillars. (Siu Kwan et al., 2010)

We excluded any patient that had an acute infection within the last two weeks or drug intake that will increase susceptibility to bleeding, as nonsteroidal anti-inflammatory drugs or others. All patients underwent routine laboratory investigations.

We recorded every post-operative event including even minor, haemorrhage as such, we also evaluated bleeding that was reported by the patient or the staff without verification by a medical doctor. We defined primary haemorrhage as a bleeding within 24 hours after surgery, all later occurring bleeding as secondary haemorrhage. (James et al., 2001) With regard to postoperative haemorrhage, we analyzed only tonsillectomy bleeding. If a patient underwent an adenotonsillectomy and bleed due to the adenoidectomy wound, we did not take this haemorrhage into account for this study. We have a standard procedure for returning a patient to the theatre, but no standard for documenting all bleeding episodes.

The operations were performed mostly by same physician. All operations were performed under general endotracheal anesthesia and lying patients in supine position with pillow under their shoulders, with tonsillar exposure provided by a Crowe-Davis mouth gag.

In group one, the tonsillectomy technique was the same in all patients, after snipping the mucosa of the anterior tonsillar pillar from the upper pole to the lower pole with sharp scissors, then separation of The tonsil from its bed either by the blunt (cotton or gauze) or sharp (dissector or artery forceps) dissections, from tonsillar capsule toward its bed and remove of tonsil extra-capsular in toto with no residual tonsillar tissue left behind. (Photo 1a and b).

For haemostasis during tonsillectomy we used suction and gauze then suture ligation for pillars repair was done in all patients using absorbable simple interrupted sutures 2/0(chromic or vicryl) 3 or 4 stitches according to need (Figure 2 a, and b). Chromic gut has been manufactured with chromium salts to reduce enzyme digestion and therefore maintains strength for 10-14 days making it useful for mucosal closures. Vicryl (Polyglactin 910), a synthetic braided co-polymer, its absorption between 56 and 70 days. It handles well, has minimal tissue reactivity, and does not tear tissue(McCarty, 1990). We use needle half circle blunt tip 26 mm or 30 mm, started from posterior pillars to anterior one including bleeding point if found(Photo 2a, and b). We never used diathermy in group one.

In group two, the tonsillectomy technique was the same in all patients. After snipping the mucosa of the anterior tonsillar pillar from the upper pole to the lower pole with scissors, then separation of the tonsil from its bed either by the blunt (cotton or gauze) or sharp (dissector or artery forceps) dissections, started from upper pole down to the lower pole and remove of tonsil extracapsular with cut to lower pole, clamping and silk ligature 0, Photo 3 and 4.

For haemostasis during tonsillectomy we used suction, gauze, diathermy and silk ligature 0, Photo 5 and 6.

Post-operative antibiotic therapy was prescribed for patients in both groups and analgesic according to need with normal scheduled diet and follow up after one week, two week then one month.

RESULTS

The study was conducted from January 2008 until May 2016. 404 (50.50%) of 800 patients were males, 396 (49.50%) were females. There was no significant difference between the sex distributions in the both groups (P > 0.05), Figure 1.

The age ranged from 3.5 years old to 20.10 years old with a mean ± SD of 12.23 ± 6.45 years in group I, while it ranged from 4.00 to 19.5 years old with a mean ± SD of 13.34 ± 5.45 years old in group II, (P > 0.05), Figure 2.

Surgery time ranged from 20 to 30 minutes with a mean ± SD of 24.35 ± 3.88 minutes in group I while; it ranged from 15.40 till 25 minutes with a mean ± SD of 22.34 ± 6.58 in group II (P > 0.05), Figure 3.
Photo 1a. The tonsils, medial surfaces

Photo 1b. The tonsils, lateral surfaces

Photo 2a. Pillars repaired by chromic sutures

Photo 2b. Pillars repaired by vicryl sutures

Photo 3. Cutting the lower pole

Photo 4. Lower pole ligature
Figure 1. Sex distributions

Figure 2. Age distribution
Regarding primary postoperative hemorrhage, there were 18 patients (2.25%) of whom 2 patients (11.11%) had to be returned to the operating theatre in group I compared to 32 (4%) of whom 16 patients (50%) had to be returned to the operating theatre among group II \( (P<0.05) \). Regarding secondary postoperative hemorrhage due to infections there was no cases of bleeding in group I, while 8 cases (1%) had a bleeding in group II,2 (25%) of whom had to be returned to the theatre requiring to ligature sutures \( (P<0.004) \), Figure 4.

The frequency of overall hemorrhage was statistically significant between both groups, overall hemorrhage was less in group I \( (P<0.05) \). The number of postoperative hemorrhage within the first 24 hours that had to be managed in the operating theatre was 2 patients among group I (11.11%) compared to 16 (50%) among group II \( (P<0.01) \).

Neither of both patient groups was it necessary to be returned to theatre twice. Likewise blood transfusions or opening the neck for haemostasis, for example by ligation of the external carotid artery, furthermore, there was no case observed with infection of the sutured faucial area.

**DISCUSSION**

In our study, there was no significant difference between the sex distributions in both groups \( (P>0.05) \), while the sex distribution after tonsillectomy in favour of female patients corresponds to the group of all patients that underwent tonsillectomy in Germany and Great Britain \( (Gotz Senska et al., 2012) \).

The overall age distribution in our study was not statistically significant as the age distribution of the patients of afore mentioned studies. In our study, the mean operating time in both patient groups was around half an hour, but we saw a significant difference of five minutes. The time required to suture the faucial pillars after tonsillectomy is therefore of some significance.

These results coincide with Gotz Senska et al. 2012, but they saw a significant difference of eight minutes.

The rate of haemorrhage leading to a return to the operating theatre was significantly different between both groups. It is difficult to compare this study with other studies on this topic directly. This is mainly because the definitions of primary versus secondary haemorrhage and the necessity to return to the operating theatre are vastly different. Nevertheless, there are numerous studies that deal with this subject in a similar manner.

We defined primary haemorrhage as a bleeding within 24 hours after surgery, all later occurring bleeding as secondary haemorrhage \( (James Liu et al., 2001) \). Overall there is a huge variety of data regarding the rate of postoperative haemorrhage after tonsillectomy that led to a return to the theatre. In the last 30 years, a multitude of researchers have investigated the cause, incidence, and management of post-tonsillectomy haemorrhage, yielding haemorrhage rates between 0.28% and 20%. Primary hemorrhage is defined as bleeding that occurs in the first 24 postoperative hours. Secondary hemorrhage, or postoperative bleeding after 24 hours, has as its origin the sloughing of (eschar) whitish membrane formed after tonsillectomy, trauma secondary to solid food ingestion, tonsil bed infection, postoperative nonsteroidal anti-inflammatory drug usage, or idiopathic causes. \( (James Liu et al., 2001) \). While in other studies they ranged from under one and up to six per cent \( (Klask et al., 2003; Windfuhr et al., 2005; Krishna and Lee, 2001) \). The Audit of British Association of Otorhinolaryngologists published a notably low rate of haemorrhage that led to a return to theatre. They saw around one per cent of bleedings in 40,000 tonsillectomies. Such low rates were questioned until just a few years ago by Windfuhr and Sesterhenn 2001, for their imprecise study design and short follow up. Now, however, the publication of the British audit removes any such doubt as far as the described surgery and documentation are concerned. At the same time, a German audit by the BQS (German Institute for Quality and Patient Security) found a bleeding rate of 3.1% requiring a return to the theatre in.
116,000 tonsillectomies. These findings coincide with data from other studies that analysed their own patients or took an audit (Carmody et al., 1982; Kristensen and Tveterås, 1984; Tami et al., 1987; Windfuhr and Sesterhenn, 2001).

Our rate of 0.005% of postoperative haemorrhage managed in the operating theatre in Group I while 0.04 in group II is among the lowest ever published. This means that most haemorrhage leading to a return to the theatre occurs with a likelihood of 60–70% as a primary haemorrhage within the first 24 hrs (Windfuhr et al., 2005; Windfuhr and Sesterhenn, 2001; Schmidt et al., 1996). Contrary to other studies, we saw no fatal bleedings caused by arterial dissection or aneurysm spurium (Schmidt et al., 1996; Gardner, 1968; van Crijlsen et al., 2008), and haematomas were observed rarely (Ramjettan and Singh, 1996). Moreover, the very few cases of haematomas needed no surgical intervention and had no negative influence on patient comfort. Permanent nasal regurgitation never occurred. At other institutions such complications led them to abandon methods such as suture ligation completely in the caudal tonsil pillar region only (Gardner, 1968; van Crijlsen et al., 2008). Likewise, we saw no haematomas requiring surgery as described in a study evaluating the benefits of suturing the faucial pillars for pain reduction (Weighill et al., 1986).

CONCLUSION

We are convinced that tonsillectomy by the modified dissection method which is used to remove the tonsil in toto with no residual tonsillar tissue left behind and pillars repair by absorbable sutures leaving no raw area after tonsillectomy, produce a benefit for our patients by reducing haemorrhage, especially haemorrhage requiring additional surgery. Despite the later onset of bleeding, we see no disadvantage for the patients. We saw no nasal regurgitation or increased need for analgesics, although this subject will be dealt with in further studies.

REFERENCES


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