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Tonsillectomy: Vasoconstrictive hydrolytic cold dissection method

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ABSTRACT

Background: Tonsillectomy, a common paediatric otolaryngology procedure, has undergone several evolutionary trends in the surgical techniques aimed at minimizing complications and improving patients' satisfaction. Despite the technological advancements in this respect, search for an ideal method is still ongoing, and some authorities are reverting back to the conventional methods. We wish to introduce the "Vasoconstrictive hydrolytic cold dissection" (VHCD) method. **Patients and Methods:** The VHCD method was described, and the outcome measures in one hundred and thirty-five patients who had the procedures were presented in tables. Data entrance was done with SPSS 14. **Results:** A total 135 patients comprising of 107 children aged 1-12 years and 28 adolescents/adults aged 14-52 years were operated upon using the VHCD between March 2009 and July 2012 by the same teams of Surgeons and Anaesthetists. The average surgical time and blood volume losses were 15 minutes and 5 mls for children and 12 mins and 10 mls for adults/adolescents, respectively. There was a single case (0.7%) of post-tonsillar bleed (reactionary haemorrhage). The rest (99.3%) recorded nil haemorrhage within and beyond first 2 weeks post-surgery. **Conclusions:** Surgeons used to other techniques of tonsillectomies may not revert to the cold steel; however, those practicing CSM will benefit from VHCD. We hereby recommend this simple, cost-effective modification of the cold steel tonsillectomy, which appears to have made dissection easier and also minimizes haemorrhage, a common complication of tonsillectomy surgery. It is timely in the advent of increased advocacy towards reversal to the conventional method of tonsillectomy. A randomized control trial is required for further evaluation of this method.

Key words: Normal saline, tonsillectomy, vasoconstrictive hydrolytic dissection

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INTRODUCTION

Tonsillectomy is a common surgical procedure among children and indeed in paediatric ENT practice. It is a relatively simple procedure with occasional severe complications, especially post-tonsillectomy haemorrhage. Efforts towards minimizing these complications and optimizing patients' satisfaction led to the introduction of several surgical techniques over the abandoned guillotine. These ranged from the "cold dissection" to the highly technologically-driven methods (HTDM) "hot dissection" such as diathermy, thermal welding, laser, coblation, microdebrider, ultrasonic or harmonic scalpel etc.[1]

The 20th century saw a shift to the HTDM, which appear fashionable and relatively easy, causing a drift from the conventional cold steel dissection,[2] which reigned over time following the reported short-comings of the guillotine.[3] Several researchers have evaluated the efficiencies of these methods. The proponents of HTDM argue that the risk of haemorrhage is less and the procedure relatively easy, whereas the opponents argue that the effect of the heat generated by HTDM (40-600 °C) to the surrounding tissues appear too significant to be neglected.[1]

Recent auditing/meta-analysis in the United Kingdom on Tonsillectomies over the last 100 years[4] revealed that the Cold Steel Method (CSM) comparatively appears superior (cost-effective with least complications) to the host of other methods. This important study scored cold dissection very high with least post-tonsillar haemorrhage (<2%) rate, post-operative pains, and scaring.[4] This collaborates with the National Audit report of the Royal College of Surgeons England on tonsillectomy,[5] which rated CSM superior to other methods and as a result the gold standard in the United Kingdom. However, the search for further improvements by otorhinolaryngologists still continues.

To this end, we aim to describe the "Vasoconstrictive hydrolytic cold dissection" method (VHCD), which has proved very efficient with a near zero post-tonsillectomy complication.

PATIENTS AND METHODS

Between March 2009 and July 2012, all willing patients that met the standard indications for tonsillectomy stable for general anaesthesia (American Society of Anaesthesiologists Physical Status Classification class I and II)[6] were included, whereas patients diagnosed of hypertension or with established allergy to adrenaline were to be excluded from this method (though we never encountered such within the period of our work). The indication among children enrolled for this surgery was mainly airway obstructive sleep apnoea, whereas all but one adult had tonsillectomy following recurrent bacterial tonsillitis. The other adult patient had biopsy tonsillectomy for suspected neoplasia. The same team of surgeons and anaesthetists were involved. Signed informed consents were obtained from all the patients or their parents (for minors).

Operative technique

All the surgeries were done under general anaesthesia. Induction was done with administration of suxamethoniun and endotracheal intubation with appropriate-sized endotracheal tube. Maintenance was with isofluorane, intravenous fluids, and continuous monitoring of vital signs. The tonsil is picked at the medial free border and gently pulled towards the uvula to expose the tonsillar white line (the area of mucosa medial to the free edge of the anterior faucial pillar). At the midpoint between the inferior and superior poles of the tonsil, 3-5 mls (3 mls on average in children and 5 mls in adults relative to their tonsillar volumes) of 1:200,000 dilution of adrenaline in normal saline is injected into the tonsillar fossa [Figure 1]. The fluid separates the loose tissues holding the tonsillar parenchyma from the superior constrictors muscles within the fossa. It also delineates the tonsils clearly from its capsule. And, the adrenaline assists in vasoconstriction and haemostasis. This is left for about 3-5 minutes (average of 3 mins in children and 5 in adults) before the commencement of sharp and blunt dissection of the tonsils. During the course of dissection, a clear interphase is created, and most times, the tonsils simply pop out like an "egg" out the shell. Tiny piece of gauze (Peanut size) is laid within this plane, in between the dissector and the tonsillar bed, to protect dissector overshot to the muscular fibres while dissecting down to the inferior poles. Within 2-3 minutes, clean and relatively avascular dissection is achieved and tonsils snared.

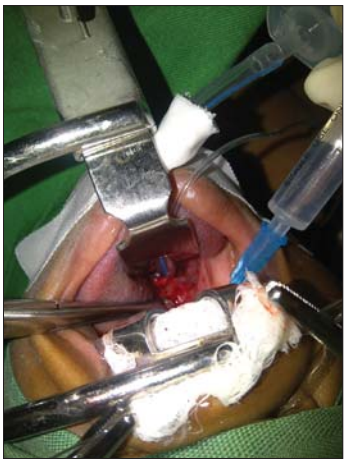


Figure 1: A picture demonstrating the Vasoconctrictive hydrolytic cold dissection tonsillectomy. It shows the Boyle davis Mouth gag is place in place and saline being infused under the tonsillar capsule via the tonsillar white line. Gauye is also in place for dabbing of the minimal blood/fluid from surgery site

After dissection, the tonsillar fossae are packed with the gauze soaked in the same solution for about 2-3 minutes to ensure complete haemostasis. Extubation was done post-op when volatile agents were turned off and patients' airway reflexes had returned with satisfactory outcome.

An estimated blood loss was evaluated via sterile surgical towel (gauze) embedded in the oral cavity below the operating field and also used for dabbing blood from the surgical field. This bunch of gauze was earlier weighed (dry) prior to commencement of procedure and later weighed (wet) after surgery. The volume of the fluid (mls) injected in the tonsillar fossa was subtracted from the total volume (ml) per weight (gm) difference of gauze to obtain the estimated blood loss following each tonsillectomy.

For the patients that had adenotosillectomy, a complete haemostasis was ensured post-adenoidectomy prior to the commencement of tonsillectomy.

The "surgery time" for the purpose of this study is the duration between the assembling of Boyle Davis Mouth gag by the ENT surgeons (post-anaesthesia) and disassembling of the same apparatus (post-tonsillectomy/achievement of full haemostasis).

RESULTS

A total of 135 patients were operated upon using the VHCD method. There were 107 patients (79.3%) aged

≤ 12 years, age range 1-12 years (mean 4.43 ± 0.2 years); with a male: female ratio 4:1. The remaining 28 patients had age range 14-52 years (mean 27.38 ± 1.6 years) and male:female ratio 1:1.

Basically, 3 indications were recorded for tonsillectomies during the study in the order shown. The most dominant was obstructive sleep disease/sleep apnoea observed among the paediatric age group, whereas recurrent tonsillitis dominated the adolescent/adult group.

This is a display of summary of the duration of surgery and maximal blood volume loss with VHCD. The patients were classified into children (taken as ages 12 and below for the purpose of this study) and adolescents/adults [taken as age above 12 years]. The estimated blood loss appears less in children, whereas the surgery duration is shorter in adults [Table 1]. Overall, the estimated duration of surgery was between 12-5 minutes and average blood loss ≤ 6 mls. One immediate post-tonsillectomy bleed in a 49-years-old adult was recorded. This was as a result of reactionary haemorrhage orchestrated by abnormal violent movements from patient while waking from anaesthesia. An immediate re-exploration and ligation of a bleeding vessel was done to arrest the situation. No other patient recorded immediate or delayed post-tonsillar haemorrhage, and all were discharged from the hospital within 24 hours post-surgery. It is worthy of note that the follow-up of all the patients within the first 2 weeks recorded no delayed tonsillar bleed.

DISCUSSION

Tonsillectomy being predominantly a paediatric procedure justifies the skew to the < 12 years age group of the patients enrolled in this study. However, the reason for the disparity in the male: female ratios among the children and the adults we could not explain. Although this is in conformity with earlier studies that showed that tonsillectomy is performed more in males during their first 10 years of life, females in their second decade and is of equal ratio in later age groups.[7-9] The indications showed that obstructive disease/obstructive sleep apnoea was predominant and again in the paediatric age group. This was also observed in previous studies[10,11] while recurrent tonsillitis was more common in the older children and adults. The rarity of unilateral tonsilomegaly[12] was also in displayed here as illustrated in Table 2.

Vasoconstrictive hydrolytic dissection is a simple modification of the "cold steel dissection method," which appears relatively simple, easy, and cost-effective. There is no learning curve/difficulty in adapting this method, no procurement of expensive instruments, and the surgery time appears shorter with excellent outcome.

Our experience over 3 years was illustrated by Table 1 above. A relatively good operation time (less than half an hour), minimal intra-operative estimated blood loss, and a near zero record (99.3%) of post-operative haemorrhage (immediate or delayed) are the hallmarks. This method minimizes the chance for blood transfusion. It is imperative that overtime one can significantly improve on the operation time to compare with the Harmonic scalpel[1] giving that the tissue planes for dissection are clearly delineated with less difficulty in separating the tonsils.

For the same reason, tonsillectomies for recurrent tonsillitis (with features of circatrization) also appear easier with this method. The minimal/clean tissue handling and easy haemostasis devoid of diathermy[13] associated with this method may minimize post-tonsillectomy pain. The main feature of this method

Table 1: The summary of the outcome measures

Age ranges of patients	No	Average surgical time	Estimated blood loss	Post tonsillectomy haemorrhage	Average hospital stay (hrs)
Children	107	15 minutes	≤ 5 mls	Nil	24
Adolescents/Adults	28	12 minutes	≤ 10 mls	1	24
Overall Total/average	135	14.2 minutes	≤ 6.0 mls	1	24

Table 2: Indications for tonsillectomies

Indication	No of patients	Percentage	Age ranges
Obstructive airway disease/sleep apnoea	86	63.7	1-12 years
Recurrent tonsillitis	48	35.6	10-49
Unilateral tonsillomegaly (biopsy tonsillectomy)	1	0.7	52
Total	135	100	–

lies in the hydrolytic dissection effect of the normal saline infused into the tonsillar fossa, which assists in the separation of the areolar tissues "oto-dissection". The adrenaline solution is made very weak 1:200,000 to avoid arrhythmias, reactionary haemorrhages, and other possible reactions that may result. Furthermore, one may infuse only plain saline where contraindication to adrenaline is obvious or envisaged.

To the best of the authors' knowledge, this method of tonsillectomy (VHCD) has not been reported. However, the study serves as a pilot, and a randomized control trial is required to further prove the efficacy of the VHCD method over the conventional cold dissection method.

CONCLUSION

The surgeons who use other techniques (HTDM) of tonsillectomies may not revert to cold steel; however, those practicing CSM will benefit from VHCD. We hereby recommend this simple, cost-effective modification of the cold steel tonsillectomy, which appears to have made dissection easier and also minimizes haemorrhage. It is timely in the advent of increased advocacy towards reversal to the conventional method of tonsillectomy.

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