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Hydrogen Peroxide 3%: Is it Beneficial in Tonsillectomy?

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بيروكسيد الهيدروجين 3%: هل هو مفيد لعملية استئصال اللوزتين؟

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الملخص: الهدف: عملية استئصال اللوزتين هي إحدى أكثر أنواع العمليات التي تؤدى من قبل أطباء الأنف والأذن والحنجرة في جميع أنحاء العالم. هؤلاء الأطباء في بحث دائم لطريقة تقلل وقت العملية وكذلك فقدان الدم . تهدف الدراسة لتقييم تأثير بيروكسيد الهيدروجين 3% في الوقت المستغرق، حجم الدم المفقود وعدد الغرز لعملية استئصال اللوزتين. **الطريقة:** هذه دراسة ارتيادية ل 30)) مريضا أجريت لهم عملية استئصال اللوزتين في شعبة الأنف والأذن والحنجرة- مستشفى البصرة العام في العراق . في الفترة من شهر شباط إلى شهر تموز لعام 2006. استخدم بيروكسيد الهيدروجين 3% مع حزمة الشاش كعامل موقف للنزف في مجموعة الدراسة (15 مريضا). بينما لم يستخدم أي شيء مع الشاش في المجموعة الضابطة (15 مريضا). **النتائج:** استخدام بيروكسيد الهيدروجين 3% أدى إلى تقليل وقت العملية بقدر 31% وتقليل فقدان الدم بقدر 32.9% وكذلك تقليل عدد الغرز إلى 50% بالمقارنة مع المجموعة الضابطة . كل هذه النتائج ذات دلالة إحصائية معتدة. **الخلاصة:** الاستخدام الموضعي لبيرو كسيد الهيدروجين 3% في سرير اللوزة بعد استئصالها أدى إلى اختزال وقت العملية وكمية الدم المفقودة وعدد الغرز المستخدمة.

مفتاح الكلمات: استئصال اللوزتين . بيروكسيد الهيدروجين . ايقاف النزف .

ABSTRACT ***Objectives:*** The world over, tonsillectomy is one of the operations most frequently performed by otolaryngologists, who are in search of a technique of tonsillectomy where the operation time and operative blood loss is reduced. This study was carried out to evaluate the effect of hydrogen peroxide 3% on tonsillectomy times, blood loss during the surgery and on the number of ties used. ***Methods:*** A pilot study of 30 patients was carried out in the Department of Otolaryngology of Basrah General Hospital, Iraq, in the period from February to July 2006. Tonsillectomy was performed using hydrogen peroxide 3% as a haemostatic agent in Group A (n = 15), while in Group B (n = 15) no agent was used with the gauze pack. ***Results:*** The application of hydrogen peroxide 3% in the tonsillar fossae reduced the operation time by 31%, the operative blood loss by 32.9% and also reduced the number of ties used by 50% in Group A. All these results are statistically significant. ***Conclusion:*** The local application of 3% hydrogen peroxide on the tonsillar bed after tonsillectomy is beneficial in regard to decreasing the procedure time, the volume of blood loss, and the number of ties used.

Keywords: Tonsillectomy; Hydrogen peroxide; Haemostasis.

As far as we know, Celsus was the first person to recognize tonsillar disease and its relationship to infection performing the first tonsillectomy in 40 A.D.[1] The popularity of tonsillectomy peaked in the 1930s, but after the use of antibiotics became widespread, enthusiasm for the procedure waned and its use had decreased dramatically by the 1960s. Concerned about the morbidity inherent in the surgical procedure, paediatricians began to question its value relative to medical management with antimicrobials. The tide turned again in the 1980s, when Paradise et al demonstrated that surgery significantly improved patient outcomes compared with medical therapy.[2]

Chronic tonsillitis is one of the most common and frequent illnesses within otolaryngology. Tonsillectomy is also one of the most frequently performed surgical procedures. Patients' quality of life and general health becomes demonstrably reduced by chronic palate and pharyngeal infections.[3] Hitherto tonsillectomy outcome studies were mostly done on children.[4, 5]

Hydrogen peroxide has been used as a disinfectant.[6] Delivering hydrogen peroxide into wounds kills fibroblasts and occludes local microvasculature.[7, 8] It has been used for decades as an effervescent haemostatic agent in arthroplasty in orthopedics.[9]

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The aims of this prospective study were to evaluate the effects of hydrogen peroxide 3% on tonsillectomy time, operative blood loss and the number of ties used to achieve complete haemostasis.

METHODS

Thirty randomly selected patients underwent tonsillectomy in the Department of Otolaryngology of Basrah General Hospital, Iraq. As air embolism is occasionally known following H_20_2 usage, the risk was mentioned to all patients. Some then refused to take part in the study, but all those who were included accepted the possibility of risk and gave their permission. In Group A (n = 15), a hydrogen peroxide 3% impregnated gauze pack was applied to one tonsillar fossa after the tonsil had been removed; in Group B (n = 15), no agent was used with the pack. The tonsillectomy was performed by the conventional dissection and snare method. The stubborn bleeders were ligated with silk suture.

Tonsillectomy operation time was calculated as the time interval between the first incision to the time when all bleeding and oozing was secured completely. The operative blood loss was calculated by weighing the blood impregnated gauze packs against an equal number of unused packs as well by measuring the volume of blood for each group separately, subtracting the volume of hydrogen peroxide used. The volume of blood in the packs was calculated by dividing the weight of blood on the pack by the specific gravity of blood, i.e. 1.055.[10] The results of the study were statistically analysed by using paired t -test for significance

RESULTS

The age range of the studied patients was 2-32 years: 17 were males and 13 were females. The average time for tonsillectomy in the non-hydrogen peroxide group was 12.9 minutes. With the use of hydrogen peroxide 3%, the average time was reduced to 8.9 minutes, which meant reduction in tonsillectomy time of 31%. This is statistically significant ($p < 0.0001$). The average operative blood loss in the non-hydrogen peroxide group was 45.5 ml while that in hydrogen peroxide group was 30.5 ml, which means a 32.9 % reduction in operative blood loss. These results are statistically significant ($p < 0.0001$). The maximum numbers of ties use were four. In the non-hydrogen peroxide group, the average number of ties was 1.5, while that in hydrogen peroxide group was 0.75. This mean a 50% reduction in the number of ligatures used in tonsillectomy after the use of hydrogen peroxide as a haemostatic agent, which is also statistically significant ($p < 0.0001$). All these results are shown in Table 1.

Table 1: ***Comparison between non-H_2O_2 and H_2O_2 groups regarding time, blood loss and number of ties in tonsillectomy.***

Groups	Average %	Decrease %
Time of tonsillectomy in minutes		
Group B (n=15), Non-H_2O_2	12.9	
Group A (n=15), H_2O_2	8.9	31
Blood loss (ml)		
Group B, Non-H_2O_2	45.5	
Group A, H_2O_2	30.5	32.9
No. of ties used		
Group B, Non-H_2O_2	1.5	
Group A, H_2O_2	0.75	50

DISCUSSION

The first known tonsillectomy was performed by Cornelius Celsus about 2000 years ago. After enucleating the tonsil with his fingernail, he suggested the fossae should be washed with vinegar and painted with a medication to reduce bleeding.[1] Since that time techniques for faster tonsillectomy with less bleeding have been searched for and various haemostatic agents and technique been tried. Sharp and Rogers,[11] used calcium alginate swabs to achieve haemostasis after tonsillectomy, but reduction in both tonsillectomy time and blood loss was not significant.

In the past, many studies were done utilizing electro cauterization for haemostasis with Papangelou[12] demonstrated a 30% reduction. Waston and Murty, in their study of 1,036 cases, [13] achieved good haemostasis and a tonsillectomy time of 9.2 ± 40min, but the use of electro-cauterization results in increased postoperative pain and excessive slough formation in the tonsillar bed which results in infection and secondary haemorrhage.[13] Laser tonsillectomy under general anaesthesia is shown to reduce surgical blood loss and postoperative pain as well as increase the recovery rate.[14-16]

The use of hydrogen peroxide as a haemostatic agent in tonsillectomy was not found when review-

ing the available literature. Hydrogen peroxide has been used for decades as a haemostatic agent in orthopaedics.[9] Chang et al, [17] carried out a study in 120 pediatric patients undergoing adenoidectomy with use of cold hydrogen peroxide. They found that the incidence of oozing and active bleeding decreased when cold hydrogen peroxide was applied.

The present study confirms that the use of hydrogen peroxide in tonsillectomy achieved a reduction in tonsillectomy time and operative blood loss by 31% and 32.9%, respectively. All these results are statistically significant.

No adverse effect was reported by the use of hydrogen peroxide in tonsillectomy in the present study despite some reports stating that dangerous sequelae can result from the use of such a preparation, especially when used in neurosurgical fields. Dubey et al[18] presented a case of suspected gas embolism following hydrogen peroxide irrigation of the surgical field during posterior fossa surgery in the prone position. Severe cardiovascular collapse occurred when the wound was irrigated with a hydrogen peroxide solution.

The interesting additional benefit of hydrogen peroxide is its action to clarify the exact localizations of bleeders which need to be ligated, especially in cases of difficult dissection in fibrotic tonsils with excessive bleeding. This advantage has been utilized by Kalloo et al, who used hydrogen peroxide spray through an endoscope. This resulted in enhancement of clot dissolution and endoscopic visualization of the bleeding source.[19] The limitations of this present study are the absence of testing the long term effect of hydrogen peroxide and no long term follow-up of the patients. The number of patients studied was also relatively small, indicating the need to perform a broader study with a longer period of follow up.

CONCLUSION

Local application of 3% hydrogen peroxide on the tonsillar bed after tonsillectomy is beneficial as it decreases the procedure time and the volume of blood loss as well as number of ties used.

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