

## L.5.2. Paediatric coblation tonsillectomy versus dissection tonsillectomy: a comparative study of post-operative pain and complications

J. Patel, S. Mandal, A. Rachmanidou

Department of Otolaryngology, University Hospital Lewisham, London, UK

**Objective:** Tonsillectomy is a common operation performed in children by a variety of surgical techniques. Recently, coblation technology has been used to remove tonsillar tissue, with anecdotal evidence of a reduction in post-operative morbidity. This prospective study was designed to evaluate this technique against the conventional sharp dissection/diathermy methods.

This double-blind randomised controlled trial compares rates of post-operative complications, including pain. We used a visual analogue scoring system (on a scale of 1–6) to monitor pain experienced in the 7-day post-operative period.

**Methods:** Three hundred paediatric patients were studied consecutively during a 9-month period. All the patients were children on the waiting list for routine elective tonsillectomy, with a history of chronic tonsillitis or obstructive tonsils.

We divided them equally into three main groups based on procedure performed and surgical technique used. Group A consisted of 100 patients who underwent classic tonsillectomy (sharp dissection), whilst the same number in group B had tonsillectomy performed by diathermy. The remaining 100 patient in study group C had coblation-assisted tonsillectomies. The majority of patients underwent adenoidectomy performed by suction diathermy, during the same surgical procedure.

Our exclusion criteria included any patients with known coagulation defects and all patients having tonsillectomy for suspected malignancy.

All patients received the same post-operative routine analgesia and antibiotic coverage, according to age and weight.

Operative proformas completed, allowed collation of information regarding specific operator and grade, surgical time, technical difficulties encountered, procedure performed, method of dissection and that of haemostasis (surgical ties/diathermy/coblation).

Post-operative complications including primary/secondary haemorrhage, infection, pain and vomiting were monitored. Hospital re-admission data was included for all patients, as well as those who obtained non-hospital medical treatment (via GP/A&E), for complications in the immediate post-operative period following home discharge.

We investigated post-operative pain assessment scores, as a specific end point of morbidity. Measuring pain scores on day 1, day 3 and day 7 post-operatively, using a nationally recognised visual analogue scoring system that conforms to the UK Pain Society Guidelines on outcome measures.

**Results:** There were no statistically significant differences between the three groups in terms of patient age, sex or operative time. Similarly the rates of post-operative infection were equal in all groups. However, we noted significantly fewer rates of both reactionary and secondary haemorrhage in group C (2.00% compared with 6.00 and 5.00% in control groups A and B, respectively,  $P < 0.05$ ).

There were also significantly reduced rates of post-operative vomiting in study group C.

There was no overall significant difference in pain scores or complications between the two control groups A and B.

Pain levels on day 1 and day 7 were equal in all groups (no statistical difference found). Whilst there was a statistically significant reduction found on day 3, in the children whose tonsils were removed by tissue coblation ( $P < 0.05$ ).

We also note that the occurrence of high levels of pain in the two control groups A and B, on four reported occasions, led to prolonged in-patient hospital stay. Whilst there were no delays in discharge in the study group for the above reason.

**Conclusions:** We note that start and end points of pain scores being monitoring (day 1 and day 7, respectively) were identical for all groups. The statistically significant reduction found on day 3, confirms data from previous studies demonstrating that this is the peak time for post-operative pain following any form of tonsillectomy.

This new technique using tissue coblation for tonsil removal offers significant advantages in the post-operative period, with rapid return to normal diet and a reduction in analgesic requirements following the surgery.

Coblation is associated with less post-operative pain and reduced rates of haemorrhage. Consequently, we recommend coblation tonsillectomy over other tonsillectomy techniques. We note that this new technique still warrants further study for cost analysis, in view of the disposable nature of equipment.



ELSEVIER

www.elsevier.com/locate/ijporl

## EDITORIAL

## How safe is paediatric tonsillectomy?

**KEYWORDS**

Tonsillectomy;  
Children;  
Safety;  
vCJD;  
Hemorrhage;  
Disposable  
instruments;  
Hot surgical  
techniques

The present millennium began with concerns that the population of the United Kingdom (UK) could be facing an epidemic of new variant Creutzfeld-Jacob disease (vCJD), the human form of bovine spongiform encephalopathy, known popularly as Mad Cow disease. Concern was sufficient for the UK Department of Health (DH) to hold high-level meetings with scientific advisors (Spongiform Encephalopathy Advisory Committee), and subsequently in January 2001 to ban reusable tonsillectomy instruments in England. It was believed that the tonsil could incubate the prions responsible for the disease, and it was also known that the prion was resistant to standard autoclaving.

While the action was well intended, it soon became apparent that the consequences of it were probably worse than what it was intended to prevent. This was because the quality of the disposable instruments available, particularly the diathermy forceps, was so poor that complication rates rose and a death occurred, apparently as a direct consequence. A theoretical risk in the future had been replaced by a real risk now. The decision was promptly reversed in December 2001 following discussions with ENT-UK [1], the relevant professional body, formerly the British Association of Otolaryngologists-HNS (BAO-HNS), which had expressed serious concerns. A proposal for a National Prospective Tonsillectomy Audit (NPTA) was made by the ENT

Comparative Audit Committee of ENT-UK and the Clinical Effectiveness Unit of the Royal College of Surgeons (Eng.). This proved timely and was duly funded by the Department of Health for England (hereafter, DH). The Audit ran for over a year, and included over 40,000 cases of tonsillectomy/adeno-tonsillectomy. The interim findings caused such concern to the Steering Committee representing the sponsoring organisations, that half way through it, ENT-UK and the National Institute for Clinical Excellence (NICE) felt compelled to issue an interim report and warning on the findings, which was published in a high-impact journal [2]. The London Times even ran a headline “*Stop using killer tonsil instruments, Doctors told*”

This story shows the interest in, and some exaggeration over, the safety of tonsillectomy in recent years. Just how safe is this operation and can we make it safer?

About 50,000–60,000 tonsillectomies are carried out in England and Northern Ireland every year. Fifty-six percent of these are on patients under 16 years, and 10% on those under 5 years old [3]. Very few of these operations can be classified as life saving, though 33% of under 5 year olds and 9% of 5–16 year olds do have the operation for pharyngeal obstruction [3]. It is therefore particularly important that any risks be properly understood by both patient and clinician.

Potential risk comes from two areas, prion transfer of vCJD on surgical instruments, and postoperative haemorrhage.

The risk of vCJD transfer by surgical instruments is still unknown. Frosh estimated that a third of ENT theatres could contain a contaminated instrument set [4]. In spite of the DH spending huge sums of money on upgrading instrument decontamination, the methods apparently still do not destroy prion [5]. Due to the policy adopted of cattle testing with destruction of positive cases and herds in contact with them, any beef from cattle infected with BSE

will have been consumed in the UK in the late 1980s and early 1990s. There is little evidence of large-scale outbreaks in other countries, just sporadic cases. New UK cases peaked in 2000 and there have been 143 deaths from the disease in the UK. Only 2 cases of vCJD due to blood transfusion have been identified in the UK, and none from transfer via surgical instruments. From these 2 cases, it would appear that there is a genotype susceptibility factor, which about half the population possesses. The Health Protection Agency, with the support of ENT-UK, is currently collecting routine tonsil specimens (100,000 pairs) to test for the presence of prion, but it is likely to be a few years before they report. In any case, the species barrier to disease transmission is very high. Thus, whatever the incidence of prion found in the tonsils, its relationship to the person developing the disease is currently unknown [6,7].

The risk of patients contracting vCJD as a result of surgery therefore seems negligible in the light of current knowledge. Despite this, the vCJD scare in the UK has probably given some boost to the emergence of disposable instruments of better quality; the movement is likely to continue, particularly for instruments with channels that are difficult to clean [5].

The interest in postoperative risk has moved back to haemorrhage. Other adverse incidents causing either delayed discharge or readmission such as post-operative nausea and vomiting (PONV) and pain or fever, are self-limiting and not life-threatening. The most exhaustive study of post-operative complications of tonsillectomy is given in the Final Report of the National Prospective Tonsillectomy Audit from the RCS (Eng) [3].

Of the reasons causing delayed discharge, haemorrhage was the cause in 22%, but accounted for 77% of re-admissions. It is reassuring that bleeding in the paediatric population is less than in adults, being 3% in the 5–15 year olds and only 1.9% in the more vulnerable <5s group (cf. 4.9% in adults). Many units have a policy of re-admitting any patient who says they spat out blood, whether actively bleeding on presentation or not; others are stricter. The incidence of patients having a “significant” episode of bleeding (blood flowing from the mouth for more than 1 min) may be much higher than is commonly realised, according to a Scottish study, which found the rate to be 40% by this definition [8]. It is therefore probably best to define serious haemorrhage pragmatically by “rate of return to theatre”, as the range for different practice is likely to be much narrower than for re-admission. On this basis children in both older and younger age groups come out with the same rate of 0.8% (cf. adults

1.2%) [3], i.e. most haemorrhages are not serious and less than 1% are thought to be severe enough to return the patient to theatre to stop the bleeding. We also need to remember that there will be perhaps 1 or 2 deaths per year in England and Northern Ireland linked to tonsillectomy (adults + children), that is 1 per 24,000 or so operations [9], which is similar to the North American experience [10]. Such an occurrence is tragic for the individual and family in what is overwhelmingly an elective operation, and although it is low, parents need to be made aware of this risk.

What can be done to minimise risk? The audit found that the rate of return to theatre overall varied with technique, instrumentation and to a lesser extent level of training of the surgeon, but due to the low event rate, i.e. small number of patients returning to theatre, the differences were generally not statistically different. The overall risk appeared higher for operations performed with any hot technique throughout, compared to using cold steel and ties/packs, but the difference was only statistically significant for coblation (odds ratio = 2.8). Nonetheless, the differences were statistically different for readmission for tonsillar haemorrhage, and using a hot technique throughout was estimated to have an increased risk of between 2.5 and 3 times higher than a tonsillectomy performed with cold steel and ties/packs. Balanced against this it appears that coblation achieved a day case rate almost 6 times that of cold steel, probably because of less postoperative pain. Given issues about probably inadequate levels of training with the new hot techniques and lack of specification of power levels on electro-surgical equipment, the Audit Steering Committee was not inclined to interpret the differences shown as necessarily meaning that hot techniques were essentially less safe.

For tonsillectomies performed with cold steel + ties/packs, the relative risk of haemorrhage and return to theatre after using disposable, as opposed to reusable, instruments was 4.1 and 3.1, respectively. It was only slightly elevated for operations using bipolar diathermy. As before, only estimates based on haemorrhage as the complication showed statistically significant differences. The numbers of disposable instruments used in operations was small, as the audit occurred after the Health Departments for England and Northern Ireland withdrew their use. The Welsh DH had an embargo on tonsillectomy until they could develop quality single use instruments, and in doing so, it would appear that they have reduced this risk [11].

Risk can be lowered further if proper supervised training takes place, not only of trainees so that they become skilled in the more difficult, but safer,

technique of cold steel and ties, but also in the proper use of hot techniques. This is particularly so if the technique is novel. Coblation is a safe procedure in the right hands, but it is not a technique for everyone. How long does it take to move up the learning curve? This will depend on the technique. Diathermy dissection could be learnt quickly on a few cases, which is possibly why it became so popular with trainees, while coblation is more difficult and takes somewhat longer to learn. All departments should regularly audit their results, and take immediate action if results show poor outcomes or a high level of complications, compared to a large body of reference data such as the UK audit [3].

Laboratory research needs to be carried out to determine the relationship between the energy delivered to the tissues in hot techniques and the associated tissue damage in open wounds. The problem is that the reading on the dial is not the same as the energy delivered, and is not the same from one manufacturer to the other. Diathermy and other electro-surgical equipment should be fitted both with fail-safe mechanisms and true power setting (energy level delivered). The surgeon would then be better informed of what was happening on pressing the foot pedal.

An elective procedure such as tonsillectomy must be made as safe as is humanly possible. Although the incidence of serious mishap is low, parents and patients must be fully informed that there are risks, as with many other recognised treatments.

## References

- [1] DH Press Release 2001/0623, Friday 14th December 2001.
- [2] NICE Press Release, Wednesday 24th March 2004.
- [3] National Prospective Tonsillectomy Audit, Final Report, May 2005, Royal College of Surgeons (England).
- [4] A. Frosh, R. Joyce, A. Johnson, Iatrogenic vCJD from surgical instruments, *BMJ* 322 (2001) 1558–1559.
- [5] A. Johnson, Why we should be using disposable instruments for tonsillectomy, *ENT News* 11 (2003) 55.
- [6] D.A. Hilton, et al., Prevalence of lymphoreticular prion protein accumulation in UK tissue samples, *J. Pathol.* 203 (3) (2004) 733–739.
- [7] A. Coghlan, Tonsil Tests suggest thousands harbour vCJD, *New Scientist* (May 2004).
- [8] A.S. Evans, et al., Assessment of secondary haemorrhage rates following adult tonsillectomy—a telephone survey and literature review, *Clin. Otolaryngol.* 28 (6) (2003) 489–491.
- [9] UK Hospital Episode Statistics Data, 2003–2004.
- [10] K.J. Jee, *Essential Otolaryngology Head and Neck Surgery*, seventh ed., Appleton & Lange, Stamford, CT, 1999.
- [11] A. Tomkinson, et al., Instrumentation and patient characteristics that influence postoperative haemorrhage rates following tonsil and adenoid surgery, *Clin. Otolaryngol.* 30 (2005) 338–346.

Peter M. Brown FRCS  
*Chairman Comparative Audit Committee ENT-UK,  
c/o The Saxon Clinic, Saxon Street,  
Milton Keynes MK6 5LR, UK*

9 December 2005

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

SCIENCE @ DIRECT®