[24] Codman EA. The product of a hospital. *Surgery, Gynaecology and Obstetrics* 1914;**18:**491–96.

[25] Bunker JP, Barnes BA, Mosteller F. *Costs, Risks and Benefits of Surgery*. Oxford: Oxford University Press, 1977.

[26] McPherson K, Bunker JP. Costs, risks and benefits of surgery: a milestone in the development of health services research. *J Roy Soc Med* 2007;**100:**387–90.

[27] McPherson K, Wennberg JE, Hovind O, Clifford P. Small area variation in the use of common surgical procedures: an international comparison of new England, England and Norway. *N Engl J Med* 1982;**307:**1310–14.

[28] McPherson K, Strong P, Jones L, Britton BJ. Do cholecystectomy rates correlate with geographic variations in the prevalence of gallstones? *The Lancet* 1984; 1092–93.

[29] *The Dartmouth Atlas of Health Care 2006*, Centre for the Evaluation of Clinical Sciences. Dartmouth Medical School.

Published by Oxford University Press on behalf of the International Epidemiological Association

International Journal of Epidemiology 2008;**37**:23–25
doi:10.1093/ije/dym259

Commentary: Tonsillectomy—then and now

Martin J Burton

Accepted 13 November 2007

Dr Alison Glover's article reminds us—if we need reminding—that tonsillectomy has long been a controversial operation.[1] It remains so today and recently, when calls were made in the UK to 'stop doing unnecessary operations', tonsillectomy was quickly cited as one of these. In 1936, Alison Glover clearly thought that many tonsillectomies being undertaken were unnecessary. Both then and now, this lack of necessity presumably refers to the belief that patients are no better off after tonsillectomy than they would have been had they not had the surgery. The wide variation in rates of tonsillectomy between and within countries seen 70 years ago, continues to the present day.[2]

It is difficult to work out from Dr Alison Glover's article what the contemporary indications for tonsillectomy were. Mention is made several times of 'enlargement' and of sore throats and colds. When I rescued the 1937 edition of St Clair Thomson's classic ENT text book 'Diseases of the Throat and Nose' from a library's discard pile I felt sure it would be useful one day; it has proved so now.[3] Contemporary indications included:

1. 'Any interference with respiration, night or day.
2. Threatened alteration of voice or articulation.
3. Eustachian catarrh, or the presence of inflammatory middle-ear disease.
4. Chronic enlargement of the cervical glands
5. Chronic lacunar tonsillitis with recurrent exacerbations.
6. If adenoids [are going to be removed] the opportunity should be utilized for removing tonsils if also the cause of symptoms.
7. Attacks due to septic absorption through the tonsils, or a chronic condition of ill-health which can be attributed to infection through the tonsillar area.
8. Frequent attacks of tonsillar inflammation, or of peri-tonsillar abscess.'

The authors also comment (perhaps hinting at the increased frequency of tonsillectomy noted by Dr Alison Glover):

> 'Recently "*sepsis of the tonsils*" has been claimed as the cause of a large variety of disorders, and tonsil enucleation, at all ages, has become more frequent.'

It is axiomatic that removing the tonsils (more specifically the palatine tonsils—those ovoid lumps of lymphoid tissue located between the faucial pillars in the oropharynx) will prevent an individual developing palatine tonsillitis. This is as true as the inevitability of a patient who has undergone appendicectomy being unable thereafter to develop appendicitis. But just as appendicectomy is not a panacea for all gastrointestinal disease, removing the tonsils is not a measure that will permanently rid the patient of sore throats or pharyngitis. And herein lies the key issue relating to tonsillectomy today.

By its nature, tonsillectomy is a prophylactic procedure, undertaken to prevent future episodes of infection. In which case, how certain can one be that

Department of Otolaryngology—Head & Neck Surgery, University of Oxford, Level LG1, West Wing, John Radcliffe Hospital, Headley Way, Oxford, OX3 9DU, UK.
E-mail: mburton@cochrane-ent.org

without surgery a patient will continue to have infected episodes? If a patient keeps their tonsils and *does* continue to have troublesome infections, will they be due to the continued presence of the palatine tonsils?

I have been careful in my choice of words here, using the term 'infections' in a purposefully rather vague way. It is sometimes said that tonsillectomy is only performed in patients with tonsillitis, to prevent tonsillitis. But clinical situations are rarely this simple. It is difficult to be sure that all of the episodes comprising malaise, fever and sore throat, accompanied by redness and swelling of the palatine tonsils are due primarily (let alone solely) to infection of those tonsils. Conversely, when the palatine tonsils are removed, the other lymphoid aggregates that comprise Waldeyer's ring of lymphoid tissue remain, as do all the soft tissues of the pharynx. All these are susceptible to infection and inflammation and the associated clinical features of sore throat, dysphagia, with malaise and fever.

There is some information available from randomized controlled trials (RCTs) to suggest that—rather like in the financial markets—the past does not always predict the future. Just because an individual has been suffering from repeated severe episodes of 'tonsillitis' in the past, this pattern may not continue.[4–6] In the 'bad old days' of long waiting lists in the British National Health Service, patients could be put on the waiting list for tonsillectomy with severe problems, only to remark when called for surgery 12–18 months later that they no longer had any trouble at all, some not even having a single episode since they were put on the waiting list.

There have been a number of RCTs looking at tonsillectomy and adeno-tonsillectomy in children[4–6] and one at tonsillectomy in adults.[7] Data on follow-up beyond the first year after randomization/surgery are so limited that no conclusions can be drawn about the effect of surgery beyond that first year. Within that year, surgery results in a very modest reduction in the number of days with a throat infection or sore throat; 17 days in the surgical group rather than 21 in the un-operated controls. Of the 17 days of pain however between 7 and 14 of those days comprised the immediate post-operative period and are entirely predictable. This issue of predictability is likely to be important to patients and their families and contrasts with the unpredictable nature of the other days with sore throats. The vast majority of patients who respond to questionnaires about their or their child's tonsillectomy (about half of all patients), profess to be very pleased that it was done.[8]

I have observed that most patients arriving for a consultation about their tonsils have made up their mind what they want to have done beforehand. Many are determined to have them out and are rarely dissuaded by explanations about the natural history of sore throats and tonsillitis as described above, combined with a detailed description of the operation, the convalescence required and the risks of primary and secondary haemorrhage. These individuals often have a family member or friend who has had their tonsils out or have been referred by their GP '*for* tonsillectomy' and are keen to follow their advice. A second, smaller group desperately *don't* want surgery unless absolutely necessary. Once the same explanation has been given, and the elective nature of the procedure emphasized, they seem to relax in the knowledge that they may legitimately decline surgery; 'the doctor said I didn't *have* to have them out'.

Is their consensus amongst otolaryngologists on those patients in whom it is appropriate to consider tonsillectomy? Criteria based on those proposed by Dr Paradise and his team from Pittsburgh and used in their RCT are widely used for children.[4] The 'Paradise criteria' require a standard to be met in terms of frequency of infection, a child needing to have had seven or more episodes in the preceding year, five or more in each of the preceding 2 years, or three or more in each of the preceding 3 years. The original criteria for the RCT required specific clinical features, including at least one of the following: temperature of $\geqslant 38.3^{\circ}C$, cervical lymphadenopathy, tonsillar or pharyngeal exudates or positive culture for group A beta-haemolytic streptococcus. In contemporary practice in the UK, accurate information about these clinical features are not always available to otolaryngologists, and a judgement is often made about the severity of the episodes of sore throat/tonsillitis based solely on the history. In adults, one or two episodes a year necessitating time off work, or two quinsies (peri-tonsillar abscesses) are usually deemed 'sufficient' to consider surgery. As I have noted above, armed with a full explanation of the pertinent facts about natural history (that the past does not necessarily predict the future and that tonsillectomy does not prevent all sore throats) and a clear description of the nature and risks of surgery, a significant number of individuals still choose to have a tonsillectomy.

The discussion which followed Dr Alison Glover's presentation is as illuminating as the paper itself, particularly because the speakers in 1938 mentioned a number of things with resonate with current practice. Sir Arthur MacNalty, President of the Section of Epidemiology and State Medicine at the Royal Society of Medicine, before whom the paper was read, noted that the need for children to have their tonsils removed was the 'honest belief of many practitioners' and that 'this belief had spread to the laity and the influence of parental pressure could not be ignored'. One Dr Layton commented that the decision about whether or not to recommend tonsillectomy was a 'very hard one' and he felt that 'at least as much time should be given to deciding whether any operation should be done, as to the doing of it'. Mr E D D David spoke in similar vein, emphasising the need for careful selection of patients. In more recent times,

the patient presenting for tonsillectomy has often been seen by the most junior member of the surgical team. I agree with Dr Layton that the process of assessment and counselling of patients is less straightforward than might first appear and demands the attention of a senior surgeon.

It is still the honest belief of many otolaryngologists, including myself, that tonsillectomy is a useful procedure in some patients, reducing the number and severity of episodes of throat infection in individuals who, without surgery, would have continued to have problems. The difficulty comes in identifying those patients in whom this is most likely to be the case. Until such time as we identify specific biomarkers for, or develop better predictive models of, recurrent throat infections, there will always be uncertainty about the necessity or effectiveness of tonsillectomy in an individual patient.

Iain Chalmers has written extensively about uncertainty and comments that:

> 'A prerequisite for constructive debate about uncertainties about the effects of treatments is a greater willingness among professionals and the public to admit and discuss them, combined with the humility to acknowledge that good intentions alone have not protected patients from the unintended harmful effects of treatments.'[9]

Nearly 70 years after Dr Alison Glover's presentation, my colleagues in the thriving Section of Laryngology & Rhinology at the Royal Society of Medicine are more aware than ever of the uncertainty surrounding the effectiveness of tonsillectomy and the importance of sharing that uncertainty with patients. But, like their forebears they have witnessed dramatic evidence of improvements in health following tonsillectomy in some patients and see any proposal to 'ban' tonsillectomy as depriving patients of that potential benefit. They recognize the absence of evidence for the long-term effects of surgery, but rightly do not accept this as evidence of the absence of a positive, beneficial effect in some. When the uncertainty is openly and transparently shared with patients, the possible benefits being weighed with the risks and potential harms of surgery, all patients will exercise their right to choose and some will elect to undergo surgery. Others will not. Whether or not those who fund healthcare will continue to give this choice to patients is a different question; how much uncertainty are commissioners of healthcare provision prepared to pay for?

References

[1] Alison GJ. The incidence of tonsillectomy in school children. *Proceedings of the Royal Society of Medicine* 1938;**31:**1219–36. Reprinted *Int J Epidemiol* 2008;**37:**09–19.

[2] Van Den Akker EH, Hoes AW, Burton MJ, Schilder AG. Large international differences in (adeno)tonsillectomy rates. *Clin Otolaryngol Allied Sci* 2004;**29:**161–64.

[3] Thomson SC, Negus VE. *Diseases of the Nose & Throat*. 4th edn. London: Cassell & Company Ltd, 1937.

[4] Paradise JL, Bluestone CD, Bachman RZ *et al*. Efficacy of tonsillectomy for recurrent throat infection in severely affected children. Results of parallel randomized and nonrandomized clinical trials. *N Engl J Med* 1984;**310:**674–83.

[5] Paradise JL, Bluestone CD, Colborn DK, Bernard BS, Rockette HE, Kurs-Lasky M. Tonsillectomy and adenotonsillectomy for recurrent throat infection in moderately affected children. *Pediatrics* 2002;**110**(1 Pt 1):7–15.

[6] van Staaij BK, van den Akker EH, Rovers MM, Hordijk GJ, Hoes AW, Schilder AG. Effectiveness of adenotonsillectomy in children with mild symptoms of throat infections or adenotonsillar hypertrophy: open, randomised controlled trial. *Br Med J* 2004;**329:**651.

[7] Alho OP, Koivunen P, Penna T, Teppo H, Koskela M, Luotonen J. Tonsillectomy versus watchful waiting in recurrent streptococcal pharyngitis in adults: randomised controlled trial. *Br Med J* 2007;**334:**939.

[8] Blair RL, McKerrow WS, Carter NW, Fenton A. The Scottish tonsillectomy audit. Audit Sub-Committee of the Scottish Otolaryngological Society. *J Laryngol Otol* 1996;**110 (Suppl. 20):**1–25.

[9] Chalmers I. Well informed uncertainties about the effects of treatments. *Br Med J* 2004;**328:**475–76.