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REVIEW ARTICLE

How effective are common ENT operations?

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Abstract

Objective: To review the literature on the outcomes of ENT operations in order to assess whether ENT operations are effective.

Methods: The value of evidence-based medicine in relation to ENT was appraised, as was the perception of effectiveness. Literature on common ENT operations, including grommet insertion, tonsillectomy and adenoidectomy, and correction of the nasal septum, was evaluated.

Results and conclusion: When evaluating the effectiveness of ENT operations, the patient's overall condition and improvements after surgery should be measured. Objective and subjective factors should both be considered as good evidence, especially with the increasing role that evidence-based medicine plays in decisions of whether to operate. The literature review provides evidence that ENT operations are effective.

Key words: Adenoidectomy; Decision Making; Grommet Insertion; Hearing Loss; Nasal Surgery; Otitis Media With Effusion; Surgery; Quality Of Life; Tonsillectomy; Treatment Outcome

Introduction

Ear, nose and throat problems are common, and the management of most of these conditions belongs suitably to the general practitioners. However, when these conditions become complicated or chronic, referral to an ENT specialist may be necessary.[1] The question is: does surgical intervention benefit more than medical treatment and watchful waiting?

The approach to common ENT conditions has changed dramatically over the past 15 years with the growth of evidence-based practice. For example, there has been a 52 per cent reduction in the number of paediatric tonsillectomies performed as a result of the refinement of criteria for surgery, and the procedure is now only offered to those who are most likely to benefit.[2] Therefore, general practitioners have an important role in deciding when to refer, and ENT surgeons have an important role in deciding who to operate on. Guidelines can aid these decisions by determining who may benefit from surgery.[3,4]

Literature review

Evidence-based medicine in practice

Evidence-based medicine (EBM) aims to apply the best available evidence gained from scientific method in order to make decisions about the care of individual patients.[5]

The formal evaluation of medical interventions using controlled trials was established in the 1940s; however, it was not until 1972 that Professor Archie Cochrane, director of the Medical Research Council Epidemiology Research Unit, expressed what is now known as EBM.[6,7]

The basic principle of EBM is that we should treat when there is evidence of benefit, and not treat when there is evidence of no benefit or harm. Evidence-based medicine is a hot topic for clinicians, with the Cochrane Collaboration providing systematic reviews and the introduction of evidence-based practice journals. It has even become a common topic in the lay media.[8] However, there is some criticism of EBM in practice, ranging from EBM being 'old hat' to it being a dangerous innovation – serving cost cutters and suppressing clinical autonomy.[9] As EBM continues to evolve and adapt, it is useful to see how it applies to ENT surgery.

'Good' evidence and operation effectiveness

What counts as 'good' evidence and when is an ENT operation deemed as effective? Evidence is presented in many forms, from systemic reviews, meta-analyses and randomised, controlled trials, to case reports and expert and patient opinions, and this evidence can be ranked.[10] As there is such an emphasis on the use of large randomised studies, does that mean that clinical

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or patient opinion is not adequate evidence to assess whether an operation is effective? Furthermore, many of the meta-analyses of ENT operations focus solely on objective measurements such as hearing tests and tympanometry, and not on the patient's view of their hearing improvement.[11] This poses the question: is the subjective opinion of the patient outweighed by objective analysis?

Of course, doctors should use both individual clinical expertise and the best available external evidence, and neither alone is sufficient to obtain good evidence. Without clinical knowledge, individual practice risks being bullied by evidence, for even excellent external evidence may be irrelevant to, or inappropriate for, an individual patient. Without current best evidence, practice risks becoming rapidly out of date, to the disadvantage of patients.[10]

This leads on to the next question: what makes an ENT operation effective? Effectiveness is specific and grounded in the clinical stage of the condition being studied.[12] A question of clinical effectiveness asks whether, given the stage of the disease, the treatment being studied offers a worthwhile benefit compared to another option.

The range and effects of ENT conditions vary greatly. For example, congenital malformations such as prominent ears can cause psychological harm to a patient. Surgical correction by otoplasty or pinnaplasty is an effective intervention with satisfaction rates of 96 per cent.[13] Thus, this can be deemed effective with patient satisfaction as the marker of effectiveness. In contrast, surgical intervention to resect a laryngeal carcinoma is deemed effective by its survival rates. There is no 'one size fits all' of effectiveness regarding ENT operations, so they must be investigated individually.

Evidence of common ENT operations' effectiveness

Tympanostomy tubes for otitis media with effusion

Otitis media with effusion (OME) or 'glue ear' is common in children under the age of three years; between 10 and 30 per cent of children will suffer from OME.[4] The main symptom associated with OME is transient mild deafness of about 20–30 dB.

Tympanostomy tube (grommet) insertion is the second most common operation in the world (with the most common being circumcision).[14] Given the high prevalence of grommet insertion and the increasing role of EBM, ENT surgeons are being asked to prove that there is evidence for the effectiveness of OME surgical treatment.

There is some controversy as to whether grommets are beneficial for OME. ENT-UK, the Cochrane Collaboration,[15] and the National Institute for Health and Care Excellence[4] support the use of grommets, but there is some evidence showing minimal benefit.[16] Some papers have reported that the audiological improvement following this operation is often only moderate, with an average of 12 dB improvement.[17] These studies have therefore concluded that grommets are not an effective solution for long-term hearing loss caused by OME. However, when outcomes are judged solely in terms of hearing improvement measured objectively by audiometry, one can miss the all-round improvement frequently reported post-operatively.[18]

There is good evidence to support the effectiveness of grommet insertion. A retrospective study comprising over 650 patients reported huge benefits as a result of grommet insertion, including improvement in hearing (92.1 per cent), reduced frequency of ear infections (74.1 per cent), fewer post-operative general practitioner visits (87 per cent) and less time off school (70.7 per cent).[18]

Otitis media with effusion can also provoke structural complications, including perforations of the tympanic membrane, tympanosclerosis, ossicular discontinuity and fixation, petrositis, facial paralysis, and cholesteatoma, all of which can result in a worsening of hearing with time.[19,20]

Hearing loss is a disability that has been shown to affect speech and language development, and may affect behaviour.[21] These changes may be subtle, and a single objective assessment such as audiological testing may not be as sensitive as the views of the child's parents, for example, who can observe their child's hearing and general behaviour over a longer time period.

In addition to hearing loss, long-lasting bilateral OME is associated with delayed cognitive and language development. A study by Maw *et al*. showed that the expressive language abilities of those treated with grommets 9 months previously were 5.76 months behind that of a reference population.[21] The abilities of untreated children were 9.36 months behind the expected level. As OME is most prevalent between one and three years of age, it coincides with a period of rapid childhood development. It can therefore be associated with behavioural problems in early years due to the inability to hear and the frustration this causes.[21]

The benefits of grommet insertion extend beyond the simple audiological improvement that occurs. Indeed, grommet insertion seems to have social, language and educational benefits. In addition, parent and patient satisfaction is high with this procedure.[22] It is important that these subjective factors are considered as good evidence, especially with the increasing role that EBM plays in decisions of whether to operate.

Tonsillectomy and adenoidectomy

Tonsillectomy with or without adenoidectomy is frequently performed in the UK, with over 51 000 operations performed in England on the National Health Service in 2005–2006; 58 per cent of these were carried out in children aged 0–14 years.[23]

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Tonsils are no longer seen as a useless focus of infection, but as lymph tissue that protects the upper airways. However, recurrent bacterial infection does alter this situation and chronic tonsillitis can turn tonsillar tissue into a nest for bacteria.[24]

Surgery is not a treatment for the acute condition, but is aimed at reducing the incidence of recurrent infections. Criteria for surgery has become stricter and tonsillectomy should only be considered if all of the following criteria are met: sore throats are due to tonsillitis, with five or more episodes of sore throat per year; and the symptoms have been occurring for at least a year, or the episodes of sore throat are disabling and prevent normal functioning.[25]

The effectiveness of tonsillectomy was examined in a 2009 systematic review of 7765 papers.[26] The review found that it was modestly effective, but most likely not effective all of the time. Perhaps this was because the criteria were not adhered to, resulting in some patients being over-operated on, and some under-operated.[23] Surgical treatment for tonsillitis therefore needs be individualised. However, surgery is effective for bacterial tonsillitis, which can persist for long periods. Recurrent episodes of tonsillitis have an effect on quality of life (QoL), and cause absence from work or school resulting in socioeconomic burden.[27]

Satisfaction following tonsillectomy was explored in the Scottish tonsillectomy audit, for which all ENT departments in Scotland participated.[28] Questionnaires were sent to 9773 patients. The majority of patients (90 per cent) felt that their throat was 'better' or 'cured' after tonsillectomy, and had spent less or no time off work or school since the operation. Ninety-seven per cent of patients questioned were 'glad' they had undergone the operation.[28]

Tonsillectomy and adenoidectomy are also effective in the treatment of obstructive sleep apnoea syndrome (OSAS). Patients with OSAS are usually brought to medical attention because of night-time breathing difficulties, causing restless sleep, unusual sleeping positions and daytime sleepiness.[29] A cross-sectional survey of adenotonsillectomy performed for infection and OSAS showed a shift in the incidence and indications of surgical procedures conducted over a 35-year period (from 1970 to 2005).[30] The rate of adenotonsillar surgery increased from 243 per 100 000 person-years in 1970 to 485 in 2005. Perhaps more dramatic, the indication of upper airway obstruction increased from 12 per cent of patients in 1970 to 77 per cent in 2005.[30]

Obstructive sleep apnoea syndrome has been shown to result in behavioural, emotional and neurocognitive difficulties. Paediatric OSAS has also been associated with cor pulmonale and right-sided heart failure, systemic hypertension, and failure to thrive.[28,31] A study by Goldstein *et al*. found that behavioural and emotional difficulties in children with sleep-disordered breathing improved after tonsillectomy and adenoidectomy.[31]

Even in an age of board-spectrum antibiotics, there is evidence that tonsillectomy and adenoidectomy give significant symptom relief and QoL improvement for properly selected child and adult patients with tonsillitis. These studies also suggest that tonsillectomy significantly reduces the time off work or school, decreases the number of visits to the general practitioner, and helps to improve emotional and behavioural difficulties caused by OSAS.

Nasal septum correction

Most septal deviations are probably due to trauma, often unidentified, that occurred in early childhood, and are often considered to be variations of normal anatomy. Most do not cause airway complications, unless they obstruct at least 50 per cent of the anterior-inferior part of the airway, which can cause contralateral inferior turbinate hypertrophy.[32]

Nasal obstruction is the most common pre-operative symptom in patients who undergo nasal septum correction.[33] An extremely deviated septum that completely obstructs a nasal passage certainly requires surgery. Yet, with less obvious deformities, ENT surgeons have to decide if the deviation is the cause of the patient's symptoms and, consequently, whether surgical management will be helpful.

Some studies have criticised the use of nasal correction surgery. Most studies use physical examination as a marker of whether to operate; however, this method is subjective and may introduce an examination bias.[34]

The predictive value of objective measures of nasal airway resistance is also controversial. Acoustic rhinometry can be used to assess the efficacy of nasal septum correction, yet the results may not correlate well with the patient's symptoms.[35] Patients with significant nasal obstruction may have a small septal deviation, while other patients with a severe anatomical septal defect may have mild symptoms.[33] Rhinometry is still experimental and may need further investigation before it can be used as an outcomes assessment.[35]

A study of the effect of nasal septoplasty on obstructive sleep apnoea (OSA) reported that most patients experienced improvement in nasal and sleep symptoms after correction.[34] Yet, with nasal surgery alone, it was found that the continuous positive airway pressure levels required to correct OSA decreased after nasal surgery.[34] The study did, however, conclude that correction of the obstructed nasal airway should be included in the overall treatment plan for OSA.

As subjective and objective measures are difficult to quantify in septal deviation, a 2004 study used a validated outcomes instrument, the Nasal Obstruction Septoplasty Effectiveness ('NOSE') scale, three months prior to and six months after septoplasty.[35] Correction of a deviated nasal septum resulted in significant QoL improvement, high patient satisfaction and decreased medication use. Patients who experienced a higher degree of symptomatic nasal obstruction had the largest improvements following surgery.[35]

Nasal septum correction is a commonly performed ENT operation; its selection relies largely on clinical

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judgment alone, which is difficult to measure and thus difficult to apply EBM to. Therefore, variation and bias may be inevitable. Adjunctive diagnostic tools and further studies may be useful to help reduce the number of unnecessary surgical procedures performed.

Conclusion

When evaluating the evidence for the effectiveness of ENT operations, the patient's overall condition and improvements after surgery should be measured. The word 'effectiveness' should also be considered from many perspectives, regarding the patient as a whole.

There is evidence, measured both objectively and subjectively, that ENT operations are effective in the management of many conditions. Otorhinolaryngological operations have a fundamental role in the management of ENT-related conditions. Whilst medical management has a key role and a multidisciplinary approach is crucial, accompanying surgery can further aid the effective treatment of these conditions.

There is evidence that ENT operations are effective in treating the hearing loss associated with glue ear and the sore throat caused by tonsillitis, but it also offers more. The literature shows that ENT operations benefit patients in terms of their education, behaviour, confidence and neurocognitive abilities. The operations allow for effective communication and give the opportunity for patients to live more fulfilled lives; they can relieve the social isolation associated with deafness, improve QoL, increase income and employment rates, and prevent further morbidity and mortality.

References

1 Hannaford PC, Simpson JA, Bisset AF, Davis A, McKerrow W, Mills R. The prevalence of ear, nose and throat problems in the community: results from a national cross-sectional postal survey in Scotland. *Fam Pract* 2005;**22**:227–33
2 Bond J, Wilson J, Eccles M, Vanoli A, Steen N, Clarke R *et al*. Protocol for north of England and Scotland study of tonsillectomy and adeno-tonsillectomy in children (NESSTAC). A pragmatic randomised controlled trial comparing surgical intervention with conventional medical treatment in children with recurrent sore throats. *BMC Ear Nose Throat Disord* 2006;**6**:13
3 Scottish Intercollegiate Guidelines Network. *117 Management of Sore Throat and Indications for Tonsillectomy: A National Clinical Guideline*. Edinburgh: SIGN, 2010
4 National Institute for Health and Care Excellence. Surgical management of otitis media with effusion in children. In: http://guidance.nice.org.uk/CG60 [24 May 2015]
5 Timmermans S, Mauck A. The promises and pitfalls of evidence-based medicine. *Health Aff (Millwood)* 2005;**24**:18–28
6 [No authors listed]. Streptomycin treatment of pulmonary tuberculosis. *Br Med J* 1948;**2**:769–82
7 Cochrane A. *Effectiveness and Efficiency: Random Reflections on Health Services*. London: Royal Society of Medicine Press, 1999
8 Sackett DL, Rosenberg W, Gray J, Haynes RB, Richardson WS. Evidence based medicine: what it is and what it isn't. *BMJ* 1996; **312**:71–2
9 Grahame-Smith D. Evidence based medicine: Socratic dissent. *BMJ* 1995;**310**:1126–7
10 What is evidence based medicine? In: http://www.medicine.ox.ac.uk/bandolier/painres/download/whatis/ebm.pdf [24 May 2015]
11 Rovers M, Black N, Browning G, Maw R, Zielhuis G, Haggard M. Grommets in otitis media with effusion: an individual patient data meta-analysis. *Arch Dis Child* 2005;**90**:480–5
12 The use and abuse of Evidence Based Medicine. Towards Knowledge Based Medicine. In: http://www.entkent.com/EBM-fairley-hore-v3-ws.html#008 [24 May 2015]
13 Richards SD, Jebreel A, Capper R. Otoplasty: a review of the surgical techniques. *Clin Otolaryngol* 2005;**30**:2–8
14 Lous J. Which children would benefit most from tympanostomy tubes (grommets)? A personal evidence-based review. *Int J Pediatr Otorhinolaryngol* 2008;**72**:731–6
15 McDonald S, Langton Hewer CD, Nunez DA. Grommets (ventilation tubes) for recurrent acute otitis media in children. *Cochrane Database Syst Rev* 2008;(**8**):CD004741
16 Mason J, Freemantle N, Browning G. Impact of effective health care bulletin on treatment of persistent glue ear in children: time series analysis. *BMJ* 2001;**10**:1096–7
17 Navigating the Shoals of Surgical Treatment Decisions in OME. Some highlights including new findings as summarised in a presentation on the TARGET Trial to BAPO, 2009. In: http://www.bapo.org.uk/TARGET%208%20points.htm [24 May 2015]
18 Hellier WP, Corbridge RJ, Watters G, Freeland AP. Grommets and patient satisfaction: an audit. *Ann R Coll Surg Engl* 1997; **79**:428–31
19 van Cauwenberge PV, Watelet J-B, Dhooge I. Uncommon and unusual complications of otitis media with effusion. *Int J Pediatr Otorhinolaryngol* 1999;**49**(suppl 1):S119–25
20 Chalmers D, Stewart I, Silva P, Mulversa A. *Otitis Media with Effusion in Children - The Dunedin Study*. London: MacKeith Press, 1989
21 Maw R, Wilks J, Harvey I, Peters TJ, Golding J. Early surgery compared with watchful waiting for glue ear and effect on language development in preschool children: a randomized controlled trial. *Lancet* 1999;**353**:960–3
22 DeBeer B, Schilder AG, Ingels K, Snik AF, Zielhuis GA, Graamans K, Hearing loss in young adults who had ventilation tube insertion in childhood. *Ann Otol Rhinol Laryngol* 2004; **113**:438–44
23 Lock C, Wilson J, Steen N, Eccles M, Brittain K, Carrie S *et al*. Childhood tonsillectomy: who is referred and what treatment choices are made? Baseline findings from the North of England and Scotland Study of Tonsillectomy and Adenotonsillectomy in Children (NESSTAC). *Arch Dis Child* 2010;**95**: 203–8
24 Patient.co.uk. Tonsillitis. In: http://www.patient.co.uk/doctor/Tonsillitis-(Acute-and-Chronic).htm [24 May 2015]
25 National Institute for Clinical Excellence. *Referral Advice. A Guide to Appropriate Referral from General to Specialist Services*. London: NICE, 2001
26 Blakley BW, Magit A. The role of tonsillectomy in reducing recurrent pharyngitis: a systematic review. *Otolaryngol Head Neck Surg* 2009;**140**:291–7
27 Bhattacharyya N, Kepnes LJ, Shapiro J. Efficacy and quality-of-life impact of adult tonsillectomy. *Arch Otolaryngol Head Neck Surg* 2001;**127**:1347–50
28 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
29 Goldstein NA, Fatima M, Campbell TF, Rosenfeld RM. Child behavior and quality of life before and after tonsillectomy and adenoidectomy. *Arch Otolaryngol Head Neck Surg* 2002;**128**: 770–5
30 Erickson BK, Larson DR, St Sauver JL, Meverden RA, Orvidas LJ. Changes in incidence and indications of tonsillectomy and adenotonsillectomy, 1970-2005. *Otolaryngol Head Neck Surg* 2009;**140**:894–901
31 Goldstein NA, Post JC, Rosenfeld RM, Campbell TF. Impact of tonsillectomy and adenoidectomy on child behavior. *Arch Otolaryngol Head Neck Surg* 2000;**126**:494–8
32 Guyuron B, Uzzo CD, Scull H. A practical classification of septonasal deviation and an effective guide to septal surgery. *Plast Reconstr Surg* 1999;**104**:2202–9
33 Dinis PB, Haider H. Septoplasty: long-term evaluation of results. *Am J Otolaryngol* 2002;**23**:85–90
34 Friedman M, Tanyeri H, Lim JW, Landsberg R, Vaidyanathan K, Caldarelli D. Effect of improved nasal breathing on

https://doi.org/10.1017/S0022215115001474 Published online by Cambridge University Press

obstructive sleep apnea. *Otolaryngol Head Neck Surg* 2000;**122**: 71–4
35 Stewart MG, Smith TL, Weaver EM, Witsell DL, Yueh B, Hannley MT *et al*. Outcomes after nasal septoplasty: results from the Nasal Obstruction Septoplasty Effectiveness (NOSE) study. *Otolaryngol Head Neck Surg* 2004;**130**:283–90

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