

**Surgery Represents the Failure of Medical Management of
Conditions of the Ear, Nose, Throat, Head and Neck**

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1.) Introduction

Surgery has been carried out ever since man first learnt to make and handle tools with evidence that trepanation (surgically created holes in the skull) was skilfully performed in Neolithic times, over 7000 years ago (Alt *et al*, 1997). However, until the 18th and 19th centuries surgery was limited by the problems of pain, bleeding and infection. The advent of anaesthesia and antisepsis has transformed surgery from a risky art into a highly sophisticated scientific discipline capable of treating a huge variety of diseases and conditions. Before the advent of modern anaesthesia and sterile techniques, surgery was considered a last resort that represented the failure of medical management however, its potential to heal conditions on which pharmacotherapeutic agents have no effect have long been recognised. The 16th century French surgeon Ambroise Paré stated that there were five reasons to perform surgery: “to eliminate that which is superfluous, restore that which has been dislocated, separate that which has been united, join that which has been divided and repair the defects of nature” which are just as valid today (Bishop, 1995). Modern surgical techniques permit surgical interventions in areas of intricate human anatomy such as the ear, nose, throat, head and neck for the same reasons that Paré outlined for pathologies for which medical management is not as effective as surgical intervention.

Despite the advances in surgery that have transformed operations from life lotteries to routine procedures, surgical intervention remains a highly invasive treatment option that is accompanied by negative psychological sequelae. When a condition can be successfully medically managed then a surgeon is rarely sought. Does surgery thus represent the failure of medical management? Does surgery have a role in the management of conditions of the ear, nose and throat other than as a last resort when the drugs have failed to work? The roles of medicine and surgery in the treatment of otorhinolaryngological conditions will be assessed to ascertain if surgical intervention represents anything more than the failure of medical management.

2.) Changing Times

The speciality of otorhinolaryngology was formed in the early 20th century by the union of otology and laryngology. Otology was a surgical specialty but laryngologists were physicians concerned with pathologies of the nose and chest thus, otorhinolaryngology has its roots in both medicine and surgery (Weir, 2000). In this era, before antibiotics and antisepsis, surgery on the delicate structures of the head and neck was most definitely a last resort. Although, Eustachian tube catheterisation, myringotomy and mastoidectomy were successfully carried out as early as the 18th and 19th centuries, few such procedures would have been undertaken before first trying a less traumatic therapeutic option (Weir, 2000). In the 20th century advances in medical treatment and our understanding of

pathology dramatically changed the otorhinolaryngologists work load. Antibiotics effectively saw an end to acute mastoiditis and the major complications of otitis media and were responsible for a decline in tonsillectomy and adenoidectomy procedures (Weir, 2000). In the sphere of rhinology, advancements in the knowledge of rhinitis and the functions of the nose led to more conservative surgery. However, it has been in the last three decades that the specialty has developed rapidly. New technology in endoscopy, lasers, microsurgery, flap reconstruction and cytotoxic drugs has made surgery on the ear, nose, throat, head and neck minimally invasive, safe and able to achieve excellent results. Are these advances and technologies simply employed to succeed where medical therapy has failed or do they offer advantages over medical therapy in the treatment of conditions of the ear, nose, throat, head and neck?

3.) The Role of Surgery in the Management of Common Otorhinolaryngological Conditions

3.1. Otitis Media

Otitis media (OM) is one of the commonest childhood infections and the most frequent reason for children's doctors visits (Rovers *et al*, 2004). It's also the most common reason children take antibiotics or undergo surgery in the developed world (Liebethal *et al*, 2008). The cost of OM is estimated to be between \$3 and \$5 billion in the USA although indirect costs are likely to make the real figure far higher (Liebethal *et al*, 2008). The majority of cases of acute OM resolve spontaneously thus, the best initial treatment is neither medical nor surgical but is a case of watchful waiting. However, if the infection persists or the child suffers from recurrent infections complications such as mastoiditis and hearing loss can ensue. Hearing loss as a result of OM can lead to behavioural changes and delay to communicative development making correct treatment of the infection and its complications imperative (Rovers *et al*, 2004).

If the infection does not resolve after a few days then antibiotic therapy, usually with amoxicillin is indicated. Candidacy for surgery is considered based on the child's symptoms, developmental risk and chance that the associated middle ear effusion (MEE) will resolve spontaneously (Rovers *et al*, 2004). It used to be thought that physical obstruction of the Eustachian tube due to the *ex vacuo* theory of negative middle ear pressure and fluid transudation caused the MEE. Recent, more complex theories however suggest that good Eustachian ventilator, protective and clearance functions reduce the risk of a MEE and are essential for a healthy middle ear. (Rovers *et al*, 2004). Antibiotic therapy has no effect on Eustachian tube function and only marginally reduces the chance of development of a MEE. The prescription of antibiotics to prevent a MEE is not recommended as it is thought that the risk of adverse effects and antibiotic resistance outweigh any marginal benefits (Koopman *et al*, 2008). Thus, the decision whether to

precede to surgery (typanostomy tube placement initially, followed by adenoidectomy if necessary) is not based on whether medical therapy has failed but on the patients' individual circumstances (Rovers *et al*, 2004). No medical therapy is able to relieve an existing MEE thus surgical intervention can help to prevent any adverse sequelae of OM (e.g. hearing loss and its effects on communicative development) whilst antibiotics treat the infection. In the case of OM one can argue that surgery does not represent the failure of medical treatment but rather that medical *and* surgical treatment are often *both* needed to treat a case of OM successfully.

3.2. Sinusitis and nasal polyposis

Sinusitis (also known as rhinosinusitis due to the regular involvement of the nasal cavity) is one of the most common upper respiratory tract infections that carries a significant socioeconomic burden. Nasal polyposis, often associated with sinusitis also represents a significant healthcare burden due to the high rate of recurrence (Gilbert, 1989; Bonfils, 2007). In the USA sinusitis occurs in 15% of the population and the frequency of diagnosis has increased by 18% over the past decade (Bachert *et al*, 2003). Nasal polyposis is estimated to affect 4% of the population in developed countries and presents a challenge to the otorhinolaryngologist due to their chronicity and severity (Bonfils, 2007). Most cases of sinusitis resolve spontaneously and the only treatment required is for the alleviation of symptoms. However, estimates suggest that 5-13% of viral upper respiratory tract infections are complicated by bacterial sinusitis of which 5-10% will not respond to antibiotic therapy (Steele, 2005). Several pathological mechanisms have been attributed to the development of a chronic sinusitis including mucociliary dysfunction, mucostasis, immunodeficiency and anatomical abnormalities (Bachert *et al*, 2003; Steele, 2005).

Medical therapies are the first-line treatment for sinusitis with decongestants, topical and systemic corticosteroids, antihistamines, bacterial lysates and antibiotics tried before consideration for surgery (Bachert *et al*, 2003; Skadding *et al*, 2007). Medical treatment for nasal polyps is usually attempted with topical and systemic corticosteroids before surgery is suggested (Skadding *et al*, 2007). However, although medical therapy is given preference over surgery, endoscopic sinus surgery offers the highest short-term improvement of all treatment approaches with studies suggesting that 75-90% of patients benefit (Steele, 2005). Surgical techniques are constantly being improved with navigated and powered surgery reducing tissue trauma and perioperative morbidity (Bachert *et al*, 2003). Despite these advancements one could deduce from current treatment strategies that surgery for sinusitis and nasal polyposis represents the failure of medical treatment. This is true to an extent in that medical therapies need to be exhausted or intolerated for surgery to be considered. However, unlike the treatment of OM we are not able to select at an early stage which patients with sinusitis and nasal polyps are likely to benefit from

surgical intervention. One could argue therefore that surgery to treat sinusitis and nasal polyposis does not represent the failure of medical treatment but rather medical treatment is needed to select which patients are likely to benefit from surgery.

3.3. Tonsillitis

Tonsillitis is a common infection that produces a sore throat and fever. 75% of tonsillitis is viral and will usually resolve spontaneously after several days and treatment (if any) takes the form of simple analgesia and antipyretics. A minority of patients presenting with tonsillitis in general practice will have recurrent tonsillitis requiring ENT referral with estimates suggesting that 12% of the population will suffer recurrent tonsillitis at some stage in their lives (Little, 2007). Bacterial tonsillitis requires treatment or can persist for long periods. Recurrent episodes of tonsillitis have an effect on quality of life and also carry a heavy socioeconomic burden due to absence from work or school (Goldstein *et al*, 2008).

Tonsillectomy for recurrent tonsillitis is a commonly performed but controversial procedure in otorhinolaryngology with its necessity and benefit recently questioned (Hsu *et al*, 2007). Thresholds for tonsillectomy vary between countries but in the UK 7 episodes of acute tonsillitis in 1 year or 5 episodes per year for 2 years would warrant surgical referral (Lee, 2006). Recent evidence suggests that tonsillectomy both improves the quality of life for the patient and has economic benefits for the healthcare provider. A randomised controlled trial by Alho and colleagues found that tonsillectomy significantly reduced the rate of recurrence of streptococcal pharyngitis (Alho *et al*, 2007). Another study examining quality of life in children before and after tonsillectomy found that disease-specific and global quality of life markers were significantly improved after the procedure (Goldstein *et al*, 2008). A study into the cost-effectiveness of tonsillectomy found that the overall economic costs of the procedure were recovered 1.6 years after tonsillectomy in children and 2.5 years in adults indicating the procedure to be an economically beneficial treatment for recurrent tonsillitis (Fujihara *et al*, 2006). Although medical treatment is usually attempted for the first few episodes of tonsillitis surgery does not represent the failure of medical therapy. Medical therapy can successfully treat an episode of bacterial tonsillitis but surgical intervention is needed to stop its repeated recurrence and the negative impact that has on quality of life. Surgery in the form of tonsillectomy represents the best prophylactic treatment for recurrent tonsillitis as prophylactic antibiotic therapy would carry a high risk of antibiotic resistance.

4.) When Only Surgery Will Do

Whilst many conditions of the ear, nose, throat, head and neck require both medical and surgical input in their management there are several conditions encountered regularly by otorhinolaryngologists for which surgery represents the only treatment option.

4.1. Cholesteatoma

Cholesteatoma, the ingrowth of squamous epithelium into middle ear compartments poses a challenge to the otorhinolaryngologist through its ability to erode bone and destroy middle ear tissues coupled with a lack of effective medical management techniques (Jahnke, 2000). Left untreated, cholesteatoma can cause meningitis and cerebral abscesses thus accurate diagnosis and effective treatment is essential (Martin, 2007). Before the 1900s radical mastoidectomy was the only treatment option, performed to prevent intracranial complications but resulted in profound hearing loss (Ho & Kveton, 2003). In the early 20th century emphasis was placed on trying to retain hearing after cholesteatoma removal and by the 1950s the method of tympanoplasty combined with radical mastoidectomy became widely accepted. Current cholesteatoma surgery can be broadly divided into two categories:

- 1.) The canal-wall-up procedure (posterior tympanotomy approach)
- 2.) The canal-wall-down procedure (modified radical mastoidectomy)

The technique performed depends on the location, extent of the disease and personal experience of the surgeon (Jahnke, 2000). There is controversy as to which of the two procedures allow the best visualisation of different locations in the middle ear. A recent randomised study of the two procedures by Hulka and McElveen found that canal-wall-down typanomastoidectomy permitted superior viewing and the three locations examined in the study (sinus tympanic, posterior crus of stapes and lateral at the tympanum) (Hulka and McElveen, 1998). The better visualisation obtained by the canal-wall-down technique makes this technique more suitable when there is extensive disease, poor pneumatisation and tubal dysfunction whilst the closed (canal-wall-up) technique may be more suitable for younger patients with normal Eustachian tube function (Jahnke, 2000).

Cholesteatoma is an excellent example of an otorhinolaryngological condition for which surgery represents the best (and the only effective) management strategy. Surgery for the condition is constantly being improved by advances in surgical technique and through the use of new technology. Endoscopic techniques are now gaining acceptance as an adjunct to microscopic surgery that allows for minimally invasive, treatment and surveillance of cholesteatoma whilst achieving similar long term results to postauricular methods (Tarabichi, 2000).

4.2. Correction of congenital malformations

Congenital malformations such as ‘bat’ or prominent ears frequently have negative psychological effects for people affected. Teasing by other children is frequently reported and often prompts children or their parents to seek medical advice with regards to correction of the deformity (Cregg *et al*, 1996). Surgical correction by otoplasty (pinnaplasty) is the only treatment option and is an extremely successful operation with satisfaction rates over 95% reported in many centres (Richards *et al*, 2005). Prominent ears are a relatively common reason for ENT referral for which surgery represents the most effective management.

4.3. Laryngeal carcinoma

Laryngeal carcinoma, one of the commonest head and neck malignancies is another condition for which surgery can sometimes represent the most effective, first-line treatment strategy. The condition affects 4 per 100,000 people in the UK with a 70% male propensity (Lee, 2007). Which treatment modality is the most effective for the different types of laryngeal cancer is controversial however, regardless of treatment modality T1 and T2 laryngeal cancers have a 80-90% probability of cure (Marioni *et al*, 2006). Intermediate sized tumours are generally treated with function sparing surgical procedures e.g supraglottic laryngectomy for T2 and T3 supraglottic tumours. Radiotherapy and increasingly chemotherapy may be given as an adjunctive treatment (Marioni *et al*, 2006). For intermediate tumours surgery represents the first-line most effective treatment strategy which may be supplemented by medical therapy..

The role of surgery in advanced laryngeal carcinoma is more controversial. A study by the Department of Veterans Affairs Laryngeal Cancer Study Group compared a chemotherapy followed by radiotherapy treatment regime with laryngectomy and adjuvant radiotherapy. After two years survival rates were equal at 68% in both groups and no significant differences were seen between groups at ten years (The Department of Veterans Affairs Laryngeal Cancer Study Group, 1991). Whilst a later study by Richard *et al* produced less promising results (69% 2-year survival in the chemotherapy group compared to 84% in the non-chemotherapy group) laryngeal preservation remains an important consideration in the treatment of advanced head and neck cancer (Richard *et al*, 1998). Despite this controversy, it is worth noting that the current 5 year survival rates of 55-60% for all laryngeal carcinoma are achieved, to a great extent by timely surgical intervention. Surgery, often represents the most effective treatment for laryngeal malignancy rather than a failure of medical management.

5.) Conclusion

When considering the statement that “surgery represents the failure of medical management of conditions of the ear, nose, throat, head and neck” one has to consider how ENT surgery has evolved over the last few centuries. Gone are the days before sophisticated anaesthesia and antisepsis when the operating table was considered the lesser of two evils when medical management had failed (e.g. mastoidectomy to prevent the intracranial complications of an untreated cholesteatoma). Advances in our knowledge of otorhinlaryngological pathology, improvements in surgical technique and advances in technology have transformed ENT into one of the most sophisticated surgical specialties that can effectively treat a huge range of conditions.

As outlined in the conditions mentioned earlier, surgical intervention plays an integral role in the management of many common conditions that affect the ear, nose, throat, head and neck. Whilst it may not always constitute the first line intervention, surgery often accompanies medical management strategies to successfully treat common conditions and prevent their recurrence. Even for pathologies such as sinusitis and nasal polyposis where extensive medical therapies are trialled before proceeding to the operating theatre this does not mean that surgery merely represents the failure of medical management but rather that medical treatment is needed to identify which patients may benefit from surgery.

There are many conditions affecting the ear, nose, throat, head and neck for which the only treatment is surgical intervention and it is widely recognised that more distinct surgical procedures are carried out in ENT than most other surgical specialties (Najim and Powell, 2007). Ambroise Paré would be astounded about how successfully we are now able, “to eliminate that which is superfluous, restore that which has been dislocated, separate that which has been united, join that which has been divided and repair the defects of nature” and success in carrying out such interventions is particularly prominent with regards to otorhinolaryngological conditions in which surgery plays an integral role. To this observer surgery represents far more than the failure of medical management. From the child, teased at school due to their protruding ears to a patient threatened with cholesteatoma or laryngeal malignancy there is often no treatment that is more effective than the skill of a surgeon’s hand.

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