Management of the Draining Pressure Equalization Tube

CHAPTER 36

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Tympanostomy tube insertion is one of the most commonly performed surgical procedures in children. Otorrhea is a frequent complication of tympanostomy tubes, occurring in 6 to 68% some time after tube insertion.[1-5] Persistent or recurrent otorrhea is reported in approximately 3 to 38% of patients.[5,6] Otorrhea may occur during the immediate postoperative period, or later, and persist for weeks or months.

Measures useful in diminishing tympanostomy tube otorrhea are widely discussed and debated among otolaryngologists. The safety and effectiveness of these measures are controversial. Factors considered, at least by some physicians, to decrease the incidence of postoperative tympanostomy tube otorrhea include control of environmental and behavioral risk factors for otitis media, antiseptic preparation of the ear during tympanostomy tube insertion, tube material, topical antibiotics at tube insertion, and perhaps for a few days later, and "water precautions" (i.e., keeping water out of the ear).

Background

Astley Cooper, an Englishman born in 1768, promoted myringotomy for indications that would be acceptable today. However, the challenge was maintaining the patency of the myringotomy. Before the 1860s, when Politzer introduced a hard rubber eyelet to keep a myringotomy open, catgut string, fishbone plugs, and lead wires had been tried. These techniques were abandoned because of "the high failure rate coupled with a high infection rate."[7] Thus, postoperative otorrhea was a problem long before Armstrong reintroduced tympanostomy tubes in 1954.

Factors Related to Tympanostomy Tube Otorrhea

The development of otorrhea after tympanostomy tube insertion is probably of multifactorial etiology. These factors can be considered to overlap those for otorrhea in chronic otitis media patients. Preoperatively recognizable patient characteristics and comorbidities, the surgeon's operative findings, the surgeon's operative choices, and the postoperative management may all influence the development of drainage through the tube.

PATIENT CHARACTERISTICS, COMORBIDITIES, AND BEHAVIORS

There is little doubt that some patients with tympanostomy tubes are susceptible to otorrhea. But why do some patients, operated and managed in each practitioner's routine, have bothersome ear drainage, whereas other seemingly similar patients do remarkably well with their tympanostomy tubes?

Age of Patient

Infants have a greater propensity to develop post-tympanostomy otorrhea than do older children and adults. In addition, there may be a difference in the bacteriology of the otorrhea when comparing younger with older patients. Pathogens of acute otitis media seem to be more common in patients less than 3 years of age compared with those older than 3 years, where *Pseudomonas aeruginosa* and *Staphylococcus aureus* are more common.[2]

Cleft Palate

Tympanostomy tube otorrhea in cleft palate children is such a problem (68% of patients with open clefts; otorrhea of at least 1 month's duration in 38% of patients[5]) that some authorities prefer to ignore the otitis and delay tympanostomy tube placement until the cleft has been repaired.[8] Even after palate repair, in comparison with noncleft "normal" children, these patients have an increased rate and severity of tympanostomy tube otorrhea.

Tympanostomy tube placement is often done at age 2 or 3 months, with the intention of improved hearing and better speech and language development.[9] Conversely, some advocate delaying the insertion of tympanostomy tubes until a few months after palate closure, arguing that (1) after cleft palate closure, the otitis may resolve so that tympanostomy tubes are not needed; and (2) those who receive tympanostomy tubes have less otorrhea.[8]

Immune Deficiency

Immune problems, both congenital and acquired, humoral and T-cell mediated, are associated with an increased occurrence of tympanostomy tube otorrhea. Masin et al.[10] report that in children who received tympanostomy tube placement because of recurrent otitis media, those with isolated IgG2 deficiency have a threefold increase in occurrences of otorrhea, in contrast to IgG2-competent controls. Anecdotal information supports the idea that patients with immotile cilia syndrome (e.g., Kartagener syndrome), or acquired immunodeficiency syndrome (AIDS), or who have had radiation to the ear, have a worse problem with tympanostomy tube otorrhea than do immune-competent patients.

Dermatitis of External Ear Canal

Eczematoid dermatitis involving the external ear canal is associated with such problematic tympanostomy tube otorrhea that

many otolaryngologists prefer to manage the effusion with the combination of observation and amplification not requiring an ear mold (e.g., auditory trainer assistive listening device, or bone oscillator hearing aid).

Bottle Feeding, Especially in the Supine Position

The observation of middle ear fluid that resembles carbonated strawberry soda pop is convincing evidence of reflux from pharynx through the eustachian tube into the middle ear when the patient's mother proceeds to exhibit a baby bottle containing such soda pop. Presumably the eustachian tube architecture that allows such reflux in noncleft palate patients is the same architecture that permits reflux in cleft patients.

Day Care

Children in day care are at increased risk of needing tympanostomy tube insertion (and reinsertion).[11] This may be related to increased exposure to viral and bacterial pathogens. That children in day care have an increased occurrence of tympanostomy tube otorrhea is anecdotal.

Mastoid Opacification

Valtonen et al.[12] report that in children aged 5 to 16 months, early postoperative otorrhea correlates more ($P < 0.001$) with radiographically determined opacification of the mastoid air cell system than with finding a pathogenic bacteria ($P < 0.01$). As the mesotympanum connects via the epitympanum to the mastoid air cell system, radiographically normal mastoids are to be expected in patients with rather minimal otitis media.

OPERATIVE FINDINGS

Middle Ear Fluid

The presence of middle ear fluid and the type of effusion at tympanostomy may be indicative of whether postoperative otorrhea will develop.[3,12] Patients with effusions of any type seem to have a higher rate of postoperative otorrhea than do those with dry middle ears, 21.1% vs 6%.[12] Patients with mucoid and purulent effusions at surgery seem to have an even higher rate of otorrhea during the early postoperative period than that of patients with serous fluid.[13-15]

Middle Ear Mucosa

The intraoperative findings of edematous or granular middle ear mucosa are probably important in predicting postoperative otorrhea.[3,15] Although an increased proportion of patients with inflamed middle ear mucosa have bacterial pathogens in the middle ear fluid, Giebink[3] found inflamed mucosa and mesotympanic pathogens independently to increase the risk of postoperative otorrhea approximately twofold.

Eustachian Tube Caliber

The caliber (internal diameter) of the eustachian tube can be measured intraoperatively by sounding with increasingly larger bougies through the myringotomy into the eustachian tube. Ears with bougie-determined large caliber eustachian tube lumens (i.e., ≥ 4 Fr) are more likely to have persistent otitis. The bougie-determined caliber of a normal eustachian tube is 2 Fr (0.67 mm). Otitis patients have calibers as large as 6 Fr (2.0 mm). Eustachian calibers are bilaterally symmetric and apparently do not change with patient age or growth. Intraoperative bouginage of the eustachian tube may provide useful information.[16]

OPERATIVE CHOICES OF THE SURGEON

Antiseptic Preparation of the Ear Canal

It has been suggested that bacteria within the ear canal may contribute to postoperative otorrhea. Antiseptic preparation of the external ear canal has been advocated to decrease postoperative otorrhea. Baldwin and Aland[15] reviewed 111 children who underwent canal preparation of one ear, with the contralateral ear acting as a control. Postoperative otorrhea (by report on postoperative days 3 through 6 and by otolaryngologist's observation on day 7) developed in 6.3% of the treated ears and in 10% of the control ears—not a statistically significant difference. These investigators concluded that preparing the ear canal with povidone-iodine had no demonstrable effect on early postoperative otorrhea.[15] Interestingly, all patients with otorrhea had had either mucoid or purulent fluid in the middle ear: 19% who had mucoid fluid, 29% who had pus. None of the patients who had dry middle ears or serous fluid had otorrhea. Giebink et al.[3] performed a prospective study preparing the ear canal with 70% alcohol or povidone-iodine and found again that there was no difference in early postoperative otorrhea. Scott and Strunk[17] similarly reported no difference in early postoperative otorrhea in children with and without canal preparation with povidine-iodine and alcohol.

Benefits other than perhaps reducing early postoperative tympanostomy tube otorrhea may prompt antiseptic preparation of the ear canal. These benefits may include (1) a better view of the tympanum to identify vexations (e.g., cholesteatoma, retraction pocket, dehiscent jugular bulb); (2) minimizing the dilemma of deciding whether a microorganism identified at culture was of external ear canal origin; and (3) minimizing the question of iatrogenic infection.

Middle Ear Irrigation

Middle ear irrigation with saline at tympanostomy tube insertion reduces postintubation otorrhea by one-half.[18] The irrigation presumably decreases the microbial burden in the mesotympanum.

Intraoperative Cultures

There are conflicting data in the literature regarding the usefulness of intraoperative culture results and postoperative otorrhea.

The overall incidence of positive cultures at surgery is probably 20%[13] to 35%.[3] Reports are contradictory as to whether patients with positive middle ear cultures at tube insertion do not[13] or do[3,12,19] have a higher rate of immediate postoperative otorrhea. These reports are not comparable due to differing durations of otitis, ages of patients, external ear canal preparations, and topical antimicrobial prophylaxis. The early postoperative otorrhea rates, for patients with middle ear pathogens versus sterile ear cultures, ranged from 5.4% versus 2.9%[19] to 37 versus 17%.[12]

Choice of Tube Material

A wide variety of tympanostomy tubes are available for insertion. Tubes for short-term and long-term use are manufactured from various biocompatible materials, including stainless steel, titanium, plastics such as silicon elastomer (Silastic), polytetrafluoroethylene (Teflon), and hydroxyapatite.

The type of tympanostomy tube chosen may influence postoperative otorrhea. A study of the scanning electron microscopic characteristics of fluorocarbon versus silicon tubes showed that fluorocarbon tubes had a smoother surface and a lower rate of early postoperative otorrhea.[20] Hester et al.[14] report that of five tympanostomy tubes (Reuter Bobbin, Paparella, Armstrong, T, and Shepard), the incidence of postoperative otorrhea was highest with the Shepard and lowest with the Reuter Bobbin tubes, but the difference was not statistically significant. Recently, silver oxide-coated tubes have been developed with the premise of lowering postoperative otorrhea. Analysis of 125 patients by Chole and Hubbell[21] demonstrated a significant decrease in otorrhea, between 1 week and 1 year postoperatively, in ears with silver oxide-impregnated tubes compared with plain Silastic tubes.

Large-bore tympanostomy tubes and long-term tubes tend to have a higher rate of otorrhea. Rates as high as 40 to 70% are reported.[1] However, this high rate of otorrhea may be a function of the disease process, rather than of the tube itself (patients with more severe and/or recalcitrant disease generally get the larger tubes, that reside longer) or of the larger surface area of the larger tubes.

Nontouch Technique

That this intuitively appealing technique makes no difference in the occurrence of postintubation otorrhea is intriguing. The premise of this technique is to avoid contacting the tympanostomy tube with the gloved hand. The rationale is that, "unless the operative field is sterilized and the patient, surgeon and microscope are fully draped," the glove itself may contaminate the tube.[22]

Contrast the nontouch technique with a maneuver sometimes used to clear the debris-filled tympanostomy tube: push the plug of debris into the mesotympanum. Interestingly, acute otitis is an uncommon aftermath. These reports lend further support to the idea that early postoperative otorrhea is most related to the patient's middle ear status.

Prophylactic Topical Antibiotics

The use of prophylactic antibiotic drops at the time of tympanostomy tube insertion is widely debated. The possible benefit of topically applied antibiotic drops must be weighed against the practical risks of ototoxicity (cochlea and vestibular, i.e., hearing and balance), allergic reaction, and direct monetary costs. It seems inherently counterintuitive to administer ototoxic drugs topically in the vicinity of the oval and round window membranes. The type of ototopical preparation, the duration of therapy, and the effectiveness of the therapy are debated.

Some studies support intraoperative and/or postoperative use of topical antibiotic therapy. Hester et al.[14] performed a prospective study of 587 tubes, 10.2% had postoperative otorrhea. Ears with mucoid or purulent effusions had the highest rate of postoperative otorrhea. All ears that received a prophylactic single intraoperative dose of Cortisporin drops (polymyxin B, neomycin, hydrocortisone) had a decreased rate of postoperative otorrhea compared with controls. If the topical antibiotic was continued for 5 days, ears with mucoid or purulent effusion had a further decrease in postoperative otorrhea. However, Giebink et al.[3] report that prophylactic topical cortisporin drops applied intraoperatively and postoperatively did not significantly alter otorrhea rates.

A study of topical gentamicin prophylaxis showed no statistically significant difference in early postoperative otorrhea.[13] As others have found, patients with mucoid effusion had a higher rate of otorrhea. However, Salam and Cable[23] report early postoperative otorrhea rate of 8.6% when no antibiotic drops were given, significantly more ($P < 0.01$) than 1.85% when Betnesol-N (betamethasone and neomycin) was given for 3 days postoperatively.

Prophylactic Systemic Antimicrobial Agents

Although systemic antimicrobial agents in children with inflamed middle ear mucosa or middle ear effusion containing bacterial pathogens had been suggested to decrease the incidence of postoperative otorrhea,[3] this was not substantiated.[24]

POSTOPERATIVE MANAGEMENT

Early (within 2 Weeks) Postoperative Otorrhea

Early postoperative otorrhea may be the result of the middle ear disease itself or of contamination through the external ear canal occurring at the time of tube insertion.[24] The data usually reveal pathogens of acute otitis media (*Streptococcus pneumoniae*, *Hemophilus influenzae*, *Moraxella catarrhalis*, and *Streptococcus pyogenes*), suggesting that the microorganisms were not introduced with the operative procedure.

If mesotympanic fluid was found at the operative procedure, and Gram stain and culture and sensitivity data are available, the patient-specific evidence-based systemic management

is antimicrobial therapy, usually per os. Lacking such bacteriologic information, if the patient does not have systemic symptoms or signs of toxicity, or both (i.e., if the patient is not "sick"), some physicians only prescribe topical antimicrobial(s), and some treat both topically and systemically.

Late (More Than 2 Weeks) Postoperative Otorrhea

Delayed-onset otorrhea, defined by some[25] as more than 7 weeks postoperative, is reported to occur in 26.4%[25] to 68%[5] of cases. In general, children younger than 6 years of age have organisms typical of acute otitis media, whereas older patients have organisms typical of chronic otitis media. Late-onset post-tympanostomy otorrhea is increased during the summer months.[19] Mandel et al.,[2] who acquired specimens by swabbing the external ear canal, found pathogens of acute suppurative otitis to predominate, but *Pseudomonas aeruginosa* and *Staphylococcus aureus* were found more than in early-onset otorrhea. However, Brook et al.,[26] who demonstrate that specimens collected from the external auditory canal can be misleading, found 50% of ears to have only aerobes (mostly *Pseudomonas aeruginosa* or *Staphylococcus aureus*), 13% to have only anaerobes (mostly *Peptostreptococcus* sp.), and 36% to have both both aerobes and anaerobes. Only 26% of their patients had early-onset otorrhea. Thus, delayed-onset otorrhea is often related to microorganisms that enter from the external ear canal.

The spectrum of managements, often without benefit of patient-specific laboratory data, ranges from observation alone to systemic antimicrobial agents. Systemic antimicrobial agents are more often prescribed for younger children and for those with symptoms and signs of systemic toxicity.

Topical Therapy

The use of topical antibiotic therapy for chronic otorrhea is the cause of much rumination among otolaryngologists. The ruminations relate to efficacy and to untoward effects (ototoxicity, allergic reactions, and costs).

The ototoxicity of topically applied drops containing aminoglycosides has been studied in various animal models, and in humans. In cats, cochlear damage was demonstrated by Smith and Myers,[27] in which penetration of perilymph with gentamicin and neomycin occurred across the round window membrane. Wright and Meyerhoff[28] reported hair cell and stria vascularis damage in chinchillas after application of cortisporin.

Whereas intratympanic and intravenous administration of aminoglycosides has been associated with ototoxicity in humans, there is little information documenting hearing loss from topical application of drops onto an open tympanostomy tube.[29] One would expect high-frequency hearing loss more commonly, as a result of round window penetration of an ototoxic drug and its effects on the basal turn of the cochlea (high-frequency hearing region). Insufficient evidence for ototoxicity may be the result of poor penetration of the drug through the tympanostomy tube into the middle ear, minimal drug getting into the cochlea because inflammation (e.g., edema of the middle ear mucosa and of the round window membrane) limits drug access, or inadequate audiometric testing to document the temporal relationship of dosing and hearing loss, or simply failure to report an untoward consequence of therapy. In a 1992 survey (response rate 30%) of 7463 otolaryngologists in the United States, 3.4% reported presumed inner ear damage from ototopical medications.[30] Merifield et al.[29] recorded pre- and post-treatment bone conduction thresholds at 3000, 4000, and 6000 Hz in 70 ears and found no difference in sensorineural hearing in any ear. Welling et al.[31] similarly recorded pre- and postoperative air and bone conduction and speech reception thresholds for patients who received one dose of topical cortisporin injected into the middle ear at tube insertion. Again, there was no statistically significant difference in any patient, regardless of the middle ear findings (dry vs effusion).[31]

In patients with chronic suppurative otitis media (open tympanic membrane, with otorrhea for at least 1 month), aminoglycosides (e.g., gentamicin, neomycin, and tobramycin) have been popular choices for topical therapy. These drugs are chosen to treat infection presumed to involve *Pseudomonas aeruginosa*. However, other topical preparations such as boric or acetic acid, as well as topical quinolones (ciprofloxacin and ofloxacin), are useful in treating such otorrhea. These preparations have no known ototoxic effects. Indeed, ofloxacin is the only antimicrobial-containing topical ear preparation that has package insert endorsement for use in the patient with an opening in the tympanic membrane. Nevertheless, the American Academy of Otolaryngology—Head and Neck Surgery in 1998 "recognizes the appropriateness of using currently available topical preparations, including those containing aminoglycosides, in the treatment of external and middle ear disorders."[32]

Allergic reactions to ototopicals are common, especially after chronic usage. More than one-half of chronic otorrhea patients may have allergy to topical medications.[33] The most common offending agent is neomycin, with polymyxin B and gentamicin less common offenders. Allergic reactions occur even to topical corticosteroids.[34]

Swimming and Water Getting into the Ears

Recommendations for water precautions after tympanostomy tube insertion are variable among otolaryngologists. Many advise avoidance of swimming and water exposure to the ears presumably to prevent middle ear contamination. The manufacturers' package insert with tympanostomy tubes used in the United States recommend avoidance of water exposure. If water exposure is anticipated at an intubated ear, many physicians recommend ear plugs. Some report that there is no difference in

the rate of otorrhea despite swimming.[35] In another in vitro study, Hebert et al.[36] concluded that water precautions are not necessary for surface (depth <60 cm) swimming. However, because soapy water has a surface tension lower than that of pool water, bath water may enter a tympanostomy tube more readily. An important limitation of the hydraulic study of Hebert et al.[36] is the assumption that all tympanostomy tube patients have eustachian tube lumens similar to that of an 18-gauge needle (i.e., about 0.7 mm), which is much more flow resistant than the 1- or 2-mm diameter lumens of otitis patients. As patients with more impressive otitis media often have functionally patulous (at least intermittently) eustachian tubes, they may be at greater risk of water entering through a tympanostomy tube than the patient with lesser disease that manifests just as recurring otitis media during infancy.

Granulation Tissue

This pink-red vascularized connective tissue that forms granular projections on the surface of a wound, is especially common at a foreign body. When exuberant, it is often termed "proud flesh." (Confusingly, the term "granuloma" is sometimes used, provoking thoughts of "granulomatous" diseases, e.g., tuberculosis). Although anecdotally small granulations may be eradicated by topical antimicrobials or anti-inflammatory corticosteroids, in practice the control of granulation tissue necessitates the removal of the foreign body tympanostomy tube. The draining ear is often found to have granulation tissue in the mesotympanum.

Tube Removal

Removing the offending tympanostomy tube may be necessary to control otorrhea. Offenses occur in two ways that sometimes interrelate. One offense is to have microbes persisting on the surface, this is especially a problem, at least theoretically, with rough surfaces that involve pits and crevices. The other offense is for the tympanostomy tube to be a nidus for granulation tissue. In a report about operative removal of tympanostomy tubes, Cunningham et al.[37] removed 22% because of otorrhea, and 20% because of granulation tissue; one-third of these ears had both otorrhea and granulation tissue.

Recidivistic Otorrhea

Despite all the precautions and managements mentioned, some patients continue to have purulent otorrhea—even after the presumably offending tympanostomy tube has been removed. These perplexing problems are analogous to persistently active chronic suppurative otitis media. Some practitioners have advocated weeks of intravenous antimicrobial therapy based on laboratory bacteriologic data obtained from the purulent specimen that is presumably representative of the deeper infectious process. Others, mentioning the menagerie of problems including foreign body lost somewhere in the middle ear, tumor (rhabdomyosarcoma, granulocytic sarcoma, histocytosis X), osteomyelitis sequestered in the mastoid, unrecognized cholesteatoma, and mycobacterial or fungal infections, advocate mastoid and middle ear surgical exploration. Lastly, consider Munchausen's syndrome, including by proxy.

Authors' Perspective

We minimize the risks of tympanostomy tube otorrhea by (1) addressing patient characteristics, comorbidities, and behaviors; (2) considering practical ear characteristics (mesotympanic fluid and mucosa, and eustachian caliber); and (3) antiseptic ear cleansing, and irrigating until accessible mesotympanic fluid is cleared. In infants with cleft palate, assuming that behavioral audiometry has not revealed worse than a mild loss (in the better-hearing ear), we like to defer tympanostomy tube placement until the anesthetic at which the cleft is repaired, typically at 9 to 12 months of age. In acquired immunodeficiency syndrome (AIDS) patients, and in patients with immotile cilia syndrome, we try to avoid placing tympanostomy tubes; for persistent nonsuppurative fluid with clinically significant bilateral hearing loss, amplification seems appropriate. Bottle feeding in the supine position is discontinued before tympanostomy tube insertion. Graduation from the bottle by the first birthday is encouraged. The otitis-exaggerating effects of day care and smoke exposure are discussed with the family.

At tympanostomy tube placement, we like to obtain mesotympanic fluid for bacteriologic assessment (Gram stain, and culture and sensitivity). The data are not only a preemptive guide to the antimicrobial treatment of postoperative otorrhea, but also a measure of clinically significant respiratory bacteria in the community. For example, the finding of highly resistant *Streptococcus pneumoniae* in the mesotympanum in a generally healthy 18-month-old day care attendee may prompt a discussion of the risks versus benefits of the child being in that particular day care scenario. If the microbe burden in the mesotympanic fluid is low, as evidenced by absence of organisms on Gram stain, and the culture reveals *Hemophilis influenzae* or *Moraxella catarrhalis*, otorrhea usually does not manifest. By contrast, if Gram-positive diplococci are found in the smear, purulent otorrhea is likely, and antimicrobial treatment is advised.

We like to prepare the ear with povidone-iodine and rinse with sterile saline. We like to irrigate the mesotympanum with saline, until all available mucoid or purulent fluid is removed. Information on eustachian caliber is helpful in deciding which patients should avoid water into the ears, as well as prognostically.

If otorrhea occurs, we prefer to examine the patient, perform aural suctioning while viewing with a microscope, and obtain a specimen (through the tympanostomy tube[26]) for Gram stain, culture, and sensitivity. The ear is examined for a malpositioned tube, granulation tissue, cholesteatoma, and

smoldering mastoiditis. A hydrocellulose wick is placed and expanded with nonototoxic nonallergenic Domeboro otic drops. Domeboro otic solution is well tolerated onto a wick. We advise 4 gtts q.i.d. for 4 days. By day 4, bacteriologic data are available: if *Streptococcus pneumoniae* are found, an appropriate antimicrobial is prescribed by mouth, and Domeboro gtts continued an additional 4 days. If the bacteriologic data are negative, or show other microorganisms, the parent removes the wick on day 4, stops the Domeboro gtts, and keeps water and Q-tips out of the ear. The wick serves three purposes: (1) assists in delivery of the pH-normalizing medication into the ear; (2) helps calm the often-concomitant inflammation of the external ear canal; and (3) prevents the patient from placing fingers or other objects into the ear.

A practical alternative to seeing the patient is to prescribe ofloxacin drops; we typically do this for the otherwise healthy patient. We avoid topical aminoglycosides, unless the case is recalcitrant and bacteriologic data endorse their use.

Conclusion

A stepwise approach, graded or balanced in reference to the severity, risks, and costs of the otorrhea problem, is advised. Typically, the initial management includes topical and/or oral medications directed at likely pathogens. In recalcitrant cases, antimicrobial therapy guided by Gram stain, culture, and sensitivity data acquired from a representative specimen obtained through the lumen of the tympanostomy tube is helpful. If otorrhea persists for several weeks despite these usual treatment measures, additional causative factors should be considered. Such additional factors include resistant or unusual microorganisms, susceptible microorganisms sequestered in a reservoir (e.g., smoldering mastoiditis, or a previously placed unwittingly retained tympanostomy tube) not accessible to topical or systematically administered drugs, granulation tissue, eustachian tube reflux, immunodeficiency, cholesteatoma, and systemic or neoplastic disorders.

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Controversies in Otolaryngology

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Book Review

Controversies in Otolaryngology Edited by: Myles L. Pensak, M.D. Thieme Publishers, New York, NY, February 2001. $139.00.

This 1st edition effort was inspired by Dr. James Snow's text by the same name, which was published in 1983. Dr. Pensak found this open approach to controversial issues to be most helpful toward building the infrastructure of his otolaryngologic knowledge base. Readers of this text will also, no doubt, appreciate the learning experience gained having all relevant aspects of an issue are presented and reviewed in a critical manner.

Its 460 pages are divided into 28 sections, and each section has 2 or 3 chapters, by different authors, on a given controversial topic. This text is not intended to be a comprehensive overview of otolaryngology.

Twelve of the sections are devoted to otology, six to head and neck oncology, and four to facial plastic surgery. Topics include established controversies, such as perilymph fistula, surgical management of Ménière's Disease, and cholesteatoma, as well as new topics that may be notable more for the variety of approaches to their management (e.g., post-tympanostomy otorrhea or otosclerosis) rather than major disagreements between the authors.

Authors include many widely-recognized proponents of the various perspectives. Occasionally, the choice of authors left some viewpoints under represented. For example, all of the chapters on the management of the N0 neck were written by head and neck surgeons. The role of radiotherapy may have been more forcefully presented by a radiation oncologist. Fortunately, such concerns are relatively few. For example, both microsurgical resection and stereotactic radiation receive balanced presentations as treatment options for small acoustic neuromas.

As one might expect, the authors typically cover the same key information and pivotal studies. Though truly novel information is less common, this information is richly contrasted against the shared information, thereby helping the reader to draw independent conclusions on the topic.

In summary, I found this text to be enjoyable and educational. Learning through this presentation format is second only to engaging the best of one's peers in an open forum on each of these topics. Readers from the most experienced practitioners to the greenest students will find this text to be a useful reference source.

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