Preoperative phase: endoscopy key component of preoperative examination; surgeon should evaluate high-risk structures on computed tomography (CT), including assessment of anatomy and slope of skull base, maxillary-to-ethmoid ratio, ethmoid artery, lamina papryracea, optic nerve, and signs of intracranial hypertension; medications associated with poor outcomes after ESS include aspirin, clopidogrel (Plavix), vitamin E, fish oil, and flaxseed oil; α1-blockers interfere with decongestants; physician should document discussion of procedures, alternatives, risks, and expected outcomes

Intraoperative practices: ergonomics — placing patient at 90° angle allows surgeon to stand upright and reduces fatigue; instruments — should be reviewed with scrub nurse; equipment should be presented to surgeon in order of use so that suction line, scope, cautery, and microdebrider do not become entangled; prevention of bleeding — series of injections placed around middle turbinate (MT) behind lacrimal canal; oxy-metazoline (eg. Afrin, Dristan, Sinex), epinephrine, or cocaine used as decongestant; throrbim may be used; elevating head of bed reduces blood loss; anesthesia — intravenous agents offer no advantage over inhaled agents; irrigation — hot saline (<125°F) may reduce blood loss if surgery prolonged

Anatomic considerations: uncinate process — may obscure maxillary ostium; wider inferiorly, so greater portion must be removed inferiorly; uncinate process removed with seeker, backbiter, and microdebrider; anterior ethmoid — ethmoid bulla should be identified bilaterally on CT; may be removed with curette and microdebrider; basal lamella separating anterior and posterior ethmoids should be identified and penetrated in safe location; using curette, surgeon should identify roof of maxillary sinus, planes of basal lamella, and transition of MT from coronal face to oblique or horizontal face; best to penetrate basal lamella at junction of roof of maxillary sinus and most medial aspect of basal lamella; using this method, procedure carried out superior to sphenopalatine artery and its branches, and stability of MT preserved; posterior ethmoid — superior turbinate (ST) should be identified but not necessarily removed; sphenoid — elevating ST and moving it laterally reveals ostium of sphenoid; posterior ethmoids vary in number and do not provide consistent landmarks; vasculature around sphenoid may be problematic; injury to vascular branches may cause brisk bleeding intra- or postoperatively; to enter sphenoid, lower part of ST removed (lower and medial quadrant of Bolger box safest entry point); ideally, entry through natural opening used; this technique avoids optic nerve and carotid artery; to enter sphenoid from nose without traversing ethmoids, surgeon should recall that sinus ≈7 cm from nose, 30° upward, and ≈2 cm from floor of nasal cavity; probe used to measure distance

High-risk steps: sphenoidotomy — posterior ethmoid artery may be in skull base or suspended below it; injury may cause significant bleeding; bleeding into sinus not problematic, but vessel may retract or bleed into orbit; frontal — anterior ethmoid artery should be identified in skull base, slightly below it, or suspended in mesentery below skull base; artery large in caliper and may cause perioseal and intraorbital bleeding if cut close to orbit; immediate recognition of these complications critical; after passing ethmoidal artery, surgeon should locate frontal sinus; superior portions of ethmoid bulla in agger nasi (upper portion of uncinate process); insertions of these structures should be identified on CT; in patient with polyops and bony attenuation, cells in ethmoids and frontal recess may be difficult to see; agger nasi must be removed to establish drainage of frontal sinus; critical structures in frontal sinus upper parts of uncinate process, recessus terminalis (where uncinate process inserts on orbit), and frontal recess cells

Frontal sinusotomy: includes removal of upper part of uncinate and part of agger nasi

Polysonmographic Interpretation for the Otolaryngologist

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Presentation: patients may be referred for snoring, witnessed apnea, or observation of apnea by anesthesiologist during another surgery; patient who awakens gasping and choking likely to have nocturnal reflux rather than apnea; daytime sleepiness common presentation; morning headaches more common in women and secondary to cerebrovascular dilation; headache similar to hangover

Indications for sleep study: Epworth Sleepiness Scale validated and accepted by insurance companies as indication; patients most likely to need sleep study include those with hypertension, heart failure, obesity, new-onset atrial fibrillation, recent stroke, or pulmonary hypertension

Types of studies: in-laboratory polysomnography time consuming; home studies do not include electromyography, sleep electrooculography, or electrocardiography; home in-laboratory studies include continuous oximetry; home studies do not include nasal and oral air flow, thoracic movements, or body position

Important parameters: minutes in bed — ≥300 min needed for adequate study; minutes of sleep — study not useful if sleep
Evidence-based medicine: defined as conscientious, judicious, explicit use of current best evidence in making decisions about care; uses mathematical models to predict benefit to patient from single treatment with single disease vs risks of treatment; data from large populations used to develop models; emphasizes large studies and meta-analyses; meta-analyses group heterogeneous populations.

Pittsburgh study: objective to determine whether children with effusions and difficulty hearing benefit from tympanostomy; 400 children randomized to early intervention with tubes vs observation for 6 to 9 mo; no differences seen between groups in language skills or neurocognitive indices; study concluded that prompt insertion does not improve outcomes.

Criticism of study: population — not all children in intervention group had bilateral continuous effusions; study enrolled children with multiple episodes of unilateral effusion or bilateral discontinuous effusions (such children expected to have better outcomes than children with bilateral continuous effusions); using current indications for tympanostomy, only 19% of children in study needed tubes; delayed intervention — many patients in intervention group did not receive tubes at randomization, and 40 never received tubes.

Clinical practice guidelines: in 2004, watchful waiting sanctioned for children with effusions for 3 mo; however, despite significant publicity and clinician awareness, new guideline had no influence on actions of pediatricians and otolaryngologists; other investigations have shown that clinicians in many fields not influenced by guidelines.

Cochrane reviews: associated with 3 major flaws; reviews take 30 months to complete, which raises issue of timeliness; few studies meet standards for evidence; failure to publish negative studies leads to bias.

Recent findings: during last 10 yr, studies in major journals have adhered to evidence-based paradigm; in long-term follow-up of children receiving tubes, 80% developed myringosclerosis and few decibels of hearing loss; meta-analyses document biofilms on tympanostomy tubes; quality of life improves after treatment for recurrent acute otitis media (AOM); water precautions ineffective in children with tubes; drops adequate for treating otitis media when combined with antibiotics; evidence-based medicine may stifle creativity by emphasizing evaluation of data from past.

2013 guidelines: when to treat — watchful waiting reasonable in some children with AOM; patient may be given prescription to fill in 48 hr if not improved; antibiotics speed recovery, decrease pain, and increase rate of cure; quality of life — in children with recurrent AOM, tubes associated with improved quality of life, fewer missed school days, fewer missed work days for parents, and shorter duration of effusions; new guidelines (American Academy of Pediatrics and American Academy of Otolaryngology) — state that clinicians should not place tubes in children with history of recurrent disease if examination normal; tubes may be placed in children with unilateral or bilateral disease for ≥3 mo and symptoms attributable to disease (eg, balance problems, school performance issues, behavioral problems, ear discomfort, reduced quality of life); summary — new guidelines do not rely solely on evidence but recognize need to adapt management to individual child; rigid reliance on evidence alone does not allow physician to adjust for comorbidities and individual circumstances; evidence-based medicine flawed and cannot be only set of principles used to care for patients.

E-Cigarettes: Considerations for the Otolaryngologist

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Electronic cigarettes: battery-operated devices that deliver nicotine-containing vapors to lungs via inhalation; resemble traditional cigarettes in appearance and satisfy oral urge associated with act of smoking; high concentration of nicotine delivered without risks associated with combustion of tobacco; cigarette contains rechargeable battery, cartridge with nicotine solution, and atomizing device that aerosolizes solution.

Regulatory environment: no federal regulation covers e-cigarettes; under Tobacco Control Act of 2009, Food and Drug Administration (FDA) may regulate cigarettes and other products containing tobacco; however, e-cigarettes governed by state and local laws; many states restrict sales to minors, but public use and second-hand exposure to vapor not regulated; FDA proposed rules for e-cigarettes in 2014, including restriction on sales to minors, disclosure of ingredients and safety data, and warning labels on packaging; however, vapor exposure, flavoring, advertisement, and packaging not addressed.
Risks: content and delivery — vaporized liquid typically contains nicotine, propylene glycol, glycine, and water; nicotine content not regulated and varies among brands and within same brand; delivery of nicotine inconsistent due to variance in aerosolization; nonstandardized product compiles research on safety; nicotine — highly addictive; associated with adverse cognitive and behavioral outcomes in children and adolescents; places stress on cardiovascular system; poisoning — acute nicotine toxicity possible with e-cigarettes because of high content of nicotine in cartridges; poisoning may occur from inhalation, ingestion, or absorption through skin or mucous membranes; accidental exposure increases in children and adults; most acute toxicity limited to nausea, vomiting, or irritation of eyes; oral or inhaled use associated with suicide attempts and one successful suicide.

Use by minors: 80% of tobacco abusers began smoking at <18 yr of age; advertisements associated with increased use of tobacco by youth, but bans on advertising cigarettes do not apply to e-cigarettes; advertising common on internet and television; flavors appear to target young people.

Studies: Centers for Disease Control recently reported that 1 in 5 high school students uses tobacco; since 2011, percentage of high school students using e-cigarettes increased from 1.5% to 4.5%; data from National Youth Tobacco Survey show that use of e-cigarettes associated with ever smoking, current smoking, and lower rates of abstinence; in young adults, e-cigarettes may act as gateway to use of tobacco; pediatric otolaryngologists surveyed in 2008 had low levels of knowledge about exposure to second-hand smoke and used few counseling techniques within practices.

Interventions: physicians should counsel adolescents about cigarettes and follow emerging discoveries.

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1. When performing endoscopic sinus surgery (ESS), which of the following approaches is preferred for penetrating the basal lamella?
   (A) Superolateral   (C) Inferolateral
   (B) Superomedial   (D) Inferomedial

2. When performing ESS, the sphenoid sinus should be entered in the _______ quadrant of the Bolger box.
   (A) Superolateral   (C) Inferolateral
   (B) Superomedial   (D) Inferomedial

3. Which of the following symptoms is LEAST likely to be associated with obstructive sleep apnea (OSA)?
   (A) Daytime sleepiness   (C) Awakening with gasping and choking
   (B) Morning headache   (D) Apnea witnessed by bed partner

4. Which of the following parameters is available with home sleep studies?
   (A) Oximetry   (C) Oral air flow
   (B) Electrocardiography   (D) Body position

5. Which of the following stages of sleep are required for an adequate polysomnography?
   1. N1
   2. N2
   3. N3
   4. R
   (A) 1,2,3   (B) 2,3   (C) 2,4   (D) 4

6. A patient with which of the following would be considered a candidate for surgery to correct OSA?
   (A) Most severe apnea during dream sleep
   (B) Periodic limb movements associated with daytime sleepiness
   (C) Desaturation associated with atrial fibrillation
   (D) Large tongue

7. Which of the following treatments is appropriate for a patient with an arrhythmia and desaturation to 60% during sleep?
   (A) Continuous positive airway pressure   (C) Palatal surgery
   (B) Dental device   (D) Maxillomandibular procedures

8. Which of the following was the main conclusion of the Pittsburgh Tympanostomy Study?
   (A) Surgery is appropriate in children who require antibiotics
   (B) Bilateral disease is associated with language deficits in untreated children
   (C) Prompt insertion of tubes does not improve language or neurocognitive outcomes
   (D) Tubes improve quality of life but not neurocognitive function

9. Which of the following aspects of electronic cigarettes (e-cigarettes) has the Food and Drug Administration addressed in its proposed regulations?
   (A) Advertising   (C) Flavoring
   (B) Warning labels   (D) Secondhand exposure to vapor

10. Recent studies have found all the following, EXCEPT:
    (A) E-cigarettes may lead to smoking
    (B) 4.5% of high school students use tobacco
    (C) Pediatric laryngologists have limited knowledge about secondhand smoke
    (D) The proportion of high school students using e-cigarettes has tripled since 2011

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