Primer on Asthma for the Otolaryngologist

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Differential diagnosis: 30% of patients thought to have refractory asthma may actually have paradoxical vocal fold dysfunction (PVFD); to distinguish between asthma and PVFD, ask whether difficulty greater when breathing in or out; asthma characterized by end-expiratory wheezing; symptoms of asthma usually worse at night; most prevalent in industrialized world; can be controlled but not cured; pulmonary function tests not required unless symptoms not controlled; if patient only has occasional shortness of breath with end-expiratory wheezing, testing not needed

Implications for surgeon: many patients with inflammation of paranasal sinuses also have inflammation of lower airway; intubation may be difficult in patient with uncontrolled asthma; elective surgery should not be performed when patient’s asthma out of control; patients with asthma may be put on prophylactic steroids for 5 days before surgery (continue postoperatively); irritation of lower airway from postoperative drainage more likely in patients with asthma; patient who needs short-acting bronchodilator more than twice weekly not in good control

Controlling asthma: control may be achieved with short-acting bronchodilator and corticosteroids; ciclesonide metabolized by epithelial cells, so less likely to cause thrush than other inhaled steroids; hydration important; some patients do well on leukotriene modifier such as montelukast and do not require other medications; patient without sufficient relief from inhaled corticosteroid needs more potent steroid; immunotherapy may be used to prevent triggering; desensitization requires careful management; 95% of patients who die from allergen immunotherapy have asthma

Summary: shortness of breath upon inhalation not asthma; surgeon should not operate on patient with uncontrolled asthma; perioperative steroids advisable

Sinus Surgery for Treatment of Asthma

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Chronic rhinosinusitis (CRS) and quality of life: annual expenditures for CRS ≈$6 billion; in study, patients with CRS had significantly decreased scores on 36-Item Short Form Health Survey (SF-36); quality of life returned to normal 3 yr after CRS treated with surgery and ongoing medical therapy; subjective and objective evaluation of outcomes of endoscopic sinus surgery may not be congruent; outcome measures should include endoscopic findings

Comprehensive assessment: series of 126 surgical patients underwent endoscopic follow-up at mean of 1.5 yr and completed questionnaire at 8 yr; many had multiple surgeries; outcomes based on findings on computed tomography (CT) and rigorous endoscopic examination

Endoscopic outcomes: endoscopic outcomes depended on findings on preoperative CT; 80% of patients without polyps on CT had normal endoscopic findings at 1.5 yr; however, only 23% of patients with diffuse polyps at baseline had normal sinus cavity on follow-up; preoperative staging by CT predicts ultimate endoscopic appearance

Findings: symptomatic improvement universal, but greatest improvement reported by patients with most diffuse polyposis; however, based on endoscopic findings, patients with diffuse disease had more persistent inflammation; allergy, previous surgery, and aspirin-exacerbated respiratory disease (AERD) did not influence outcomes, but study included few patients with AERD; patients with asthma and severe disease had somewhat worse outcomes; long-term results — symptomatic improvement maintained to 8 yr and improved slightly over period of study, but 18% of patients had revision surgery; use of medication decreased slightly between 1.5 yr and 8 yr postoperatively; percentage of patients with decrease in symptoms and degree of improvement in specific symptoms significant and maintained to 8 yr; conclusions — endoscopic score (but not symptom score) at 1.5 yr predicted need for revision surgery; when nasal cavity restored to normal or near-normal state, revision surgery not required; aggressive management of inflammation during early postoperative period helps to prevent recurrence

Influence on asthma: patients with asthma significantly improved at 1.5 yr and 8 yr based on symptom scores and decreased use of oral steroids and inhalers; at 8 yr, 90% of patients reported decrease in severity of asthma and in number of attacks; adequate management of upper airway improves outcomes in lower airway

Other studies: in Canadian study, significant decrease in clinic visits for asthma and costs observed in first year after functional endoscopic sinus surgery (FESS); in another small study, 4. Categorize the levels of risk for bleeding and thrombosis in a patient on an anticoagulant who needs surgery.

5. Manage perioperative anticoagulants and antithrombotics.

Educational Objectives

The goals of this program are to improve diagnosis and treatment of asthma, the development of quality measures for otolaryngologists, and the care of patients on anticoagulants who undergo surgery. After hearing and assimilating this program, the clinician will be better able to:

1. Recommend appropriate treatment and timing of surgery for a patient with asthma.

2. Illustrate the correlations between preoperative factors and objective and subjective outcomes in patients undergoing functional endoscopic sinus surgery.

3. Make recommendations for the development of quality and efficiency metrics for otolaryngologists.

Faculty Disclosure

In adherence to ACCME Standards for Commercial Support, Audio Digest requires all faculty and members of the planning committee to disclose relevant financial relationships within the past 12 months that might create any personal conflicts of interest. Any identified conflicts were resolved to ensure that this educational activity promotes quality in health care and not a proprietary business or commercial interest. For this program, members of the faculty and planning committee reported nothing to disclose. In her lecture, Dr. Ferguson presents information that is related to the off-label or investigational use of a therapy, product, or device.
70% of patients able to decrease use of steroids; forced expiratory volume in 1 sec (FEV₁) improved, except in patients with AERD; in study of 27 patients, asthma symptoms improved at 1 and 3 yr, but no change reported in medications for asthma or FEV₁; another study showed significant reduction in asthma after FESS and slight improvement between yr 1 and yr 3; in studies evaluating objective improvement of asthma, some showed significant improvement in FEV₁ and peak expiratory flow, (PEF) but others did not

**Summary:** excellent evidence shows that when combined with medical therapy, FESS improves symptoms, decreases use of medication, and decreases asthma attacks; moderate evidence suggests effect of treatment may increase over time; in some patients with AERD (Samter triad) followed for years, aspirin no longer associated with exacerbations of asthma; less robust evidence suggests FESS improves FEV₁ and PEF; for best outcomes surgeon should meticulously remove bony partitions, ensure that cavities smooth, preserve mucosa, and avoid exposed bone

**Insurance Company Quality Measures of Otolaryngology Providers**

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**National health care budget:** otolaryngology currently subjected to less scrutiny than some other specialties, but otolaryngologists should be aware of issues facing specialty; primary care changing, as evidenced by push toward patient-centered medical homes, more medical teams and access; Shared Savings Program, accountable care organizations (ACOs), gain sharing, transparent unit pricing, consumerism, high-deductible health plans, and growth of Medicaid and exchange products

**Roles of media and business:** mainstream media focusing on accountability and evidence-based practices; Consumer Assessment of Healthcare Providers and Systems (CAHPS) and Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) to influence payments to physicians; costs and quality assessed using outcomes such as death, readmission, and infection; businesses pushing reference-based pricing

**Role of government:** Centers for Medicare and Medicaid Services (CMS) largest driver of change; Affordable Care Act leading to Medicare Shared Savings Program, Bundled Payments for Care Improvement, no-pay conditions, and ACOs; challenges include coding using Hierarchical Condition Categories (HCCs), star ratings, and Physician Quality Reporting System (PQRS)

**Objectives:** health care payers seek value, ie, higher quality of care at lower cost; otolaryngology dominated by high-volume, low-acute, outpatient procedures; design of benefits likely to employ reference pricing and tools related to medical episodic grouping to stratify providers according to efficiency (consideration of both cost and quality); market demand forcing smaller networks; patients to be steered toward practices providing higher quality of care; bundling unlikely for otolaryngologists, who primarily care for outpatients; physicians to be assessed based on appropriate use, volume of services, and rates of complications; episodic software likely to be centered on diagnoses rather than procedures; health care systems likely to use expected costs per episode and rates of complications to assign efficiency scores; assessments attribute outcomes to correct specialist and normalize for regional costs

**Role of specialty societies:** evidence-based guidelines needed by payers to differentiate physicians by efficiency; metrics must be reliable and scalable; claims data represent best source for information needed; focusing on value likely to benefit many otolaryngologists; medical malpractice not useful as measure of quality; specialty societies need to work with National Quality Forum (NQF) to develop quality metrics; 400 to 500 metrics now evaluated for scalability and reliability; otolaryngologists have opportunity to create and refine metrics; measures of quality should be easily collectible and based on patient outcomes rather than on current practices

**Conclusions:** fee for service disappearing; otolaryngologists need to partner more closely with, eg, primary care physicians; good physicians likely to thrive; physicians should not cede “moral high ground” to lawyers, politicians, or government entities; must focus on safety, cost, access, and accountability to maintain credibility

**Anticoagulants and Otolaryngologic Surgery**

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**Anticoagulants:** warfarin prevents activation of factors II, VII, IX, and X and proteins C and S; novel anticoagulants include rivaroxaban and apixaban, which directly inhibit factor Xa, and dabigatran, which inhibits thrombin

**Clinical indications for anticoagulants:** warfarin used for patients with atrial fibrillation (AF) and mechanical heart valves; dabigatran and apixaban used for nonvalvular AF; rivaroxaban approved for nonvalvular AF, deep venous thrombosis (DVT), and pulmonary embolism

**Antiplatelet agents:** aspirin inhibits cyclooxygenase-1; clopidogrel, prasugrel, and ticagrelor inhibit adenosine diphosphate (ADP) receptor

**Clinical indications for antiplatelet agents:** aspirin used for secondary prevention after acute coronary syndrome and cardiovascular accident and for primary prevention; aspirin/dipyridamole (Aggrenox) used for reduction of risk after stroke or transient ischemic attack; dipyridamole inhibits phosphodiesterase; ADP receptor inhibitors often used in patients with stents; clopidogrel used for acute myocardial infarction

**Management of patients on anticoagulants:** 2013 study stratified patients into low, medium, and high categories for thrombosis based on risk factors; low risk — <5% chance/yr of thrombotic event in patient not on therapy; CHADS₂ score based on congestive heart failure, hypertension, age >75 yr, diabetes, and history of stroke; patients with AF and CHADS₂ score of 0, 1, or 2 at low risk; category also includes patients with bileaflet aortic valve and no other risk factors and those with history of venous thromboembolism (VTE) >1 yr ago and no other risk factors; medium risk — 5% to 10% annual risk; patients with AF and CHADS₂ score of 3 or 4 at medium risk; category also includes patients with bileaflet aortic valve and history of AF, VTE within last 3 to 12 mo, or >1 episode of VTE; high risk — >10% annual risk for event; includes patients with higher scores on CHADS₂, stroke in past 3 mo, mechanical heart valve, replaced mitral valve, multiple replaced heart valves, valve replacement and history of stroke, VTE, history of DVT in past 3 mo, DVT in setting of thrombophilia, and patients undergoing treatment for cancer

**Coronary stents:** patients with stents often on dual antiplatelet therapy; for bare metal stents (BMS), risk for in-stent restenosis highest in first 1 mo to 6 wk; for drug-eluting stents (DES), risk highest in first 3 to 6 mo

**Procedure-related risk:** classified as high or low; low-risk procedure defined as <1.5% risk for bleeding causing hospital stay, additional procedure, or adverse event; low-risk procedures include fiberoptic laryngoscopy, nasopharyngoscopy, sinus endoscopy, fine needle aspiration, and vocal cord injection

**Management:** approach should be individualized; otolaryngologist should discuss anticoagulants with prescribing physician; elective procedures should be delayed until patient in lower category of risk; low-risk procedures — anticoagulant may be continued; for patients on warfarin (eg, Coumadin, Jantoven), international normalized ratio (INR) ideally in low therapeutic range (2-2.5); high-risk procedure in low-risk patient — may
consider discontinuing therapy with or without bridging with enoxaparin (Lovenox) or unfractionated heparin; high-risk procedure in high-risk patient — bridging needed if anticoagulant discontinued

**Individual risk for bleeding:** HAS-BLED calculator (hypertension, abnormal renal function, stroke, bleeding, labile INR, elderly, drugs) primarily used to determine safety of starting anticoagulant, but may also indicate likelihood of bleeding related to procedure

**Supporting literature:** few studies on risk for bleeding in otolaryngologic patients on anticoagulants; dermatologic literature shows that anticoagulants and antplatelet agents may be continued for most cutaneous surgeries and Mohs surgeries; retrospective study of 287 patients on antplatelet agents (aspirin and clopidogrel) found no differences in bleeding outcomes among microlaryngeal surgeries; findings suggest these procedures also may be safe in patients taking warfarin

**Delay of elective procedure:** in high-risk patient with recent VTE, surgeon may consider delay of elective procedure, bridging therapy, or vascular consultation for placement of inferior vena cava filter; for patient with coronary stent, before withholding dual antiplatelet therapy for nonemergent procedures, advisable to wait 1 yr after placement of DES and 1 mo to 1 yr after BMS

**Timing of cessation and reinstitution of therapy:** warfarin — INR <1.5 within 5 days of withdrawal in 93% of patients; oral and intravenous vitamin K and fresh frozen plasma may be used for reversal; warfarin restarted 12 to 24 hr after surgery; dabigatran — time of last dose depends on creatinine clearance; normal partial thromboplastin time or ecarin clotting time suggests no therapeutic effect; use of prothrombin complex concentrate for reversal considered experimental; dabigatran reinitiated after ≥48 hr; rivaroxaban and apixaban managed similarly; antplatelet agents — aspirin held 7 to 10 days before procedure and restarted within 24 hr; normal platelet function assay suggests no therapeutic effect; aspirin/dipyridamole managed similarly; clopidogrel or ticagrelor stopped ≥5 days before surgery; prasugrel stopped 7 days before surgery; no assays available to monitor agents; platelet transfusion or desmopressin (DDAVP) may be used for reversal; clopidogrel restarted within 24 hr; prasugrel and ticagrelor may be reinitiated with caution in 1.5 to 2 days

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ASTHMA/QUALITY MEASURES/ANTICOAGULANTS

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1. Which of the following methods should the otolaryngologist use to distinguish between asthma and paradoxical vocal fold dysfunction?
   (A) Perform pulmonary function tests
   (B) Obtain history of timing of symptoms during respiratory cycle
   (C) Give trial of steroids

2. What is the best course of action when a patient with uncontrolled asthma is scheduled for elective surgery?
   (A) Start ciclesonide
   (B) Start short-acting bronchodilator twice weekly
   (C) Start course of steroids
   (D) Delay surgery until asthma in good control

3. In a series of 126 patients, postoperative endoscopic appearance after endoscopic sinus surgery was associated with:
   (A) Time since surgery
   (B) Number of previous surgeries
   (C) Preoperative severity of disease
   (D) Presence of aspirin-exacerbated respiratory disease

4. In patients with asthma, which of the following has the strongest evidence for improvement with functional endoscopic sinus surgery (FESS) plus medical therapy?
   (A) Number of asthma attacks
   (B) Forced expiratory volume in 1 second
   (C) Peak expiratory flow
   (D) Sensitivity to aspirin

5. The Centers for Medicare and Medicaid Services is the primary driver of the changes under way in the US health care system.
   (A) True
   (B) False

6. To obtain greater value from otolaryngology practices, payers are more likely to employ reference pricing and tools related to medical episodic grouping than bundling. This is primarily because:
   (A) Most otolaryngologic procedures are performed on outpatients
   (B) The health care market is demanding smaller networks and reference-based pricing
   (C) Otolaryngologists have lower rates of complications than, eg, orthopedic surgeons
   (D) Otolaryngology is under greater scrutiny than most other specialties

7. Which of the following is the most useful source of the type of information needed for developing guidelines for evidence-based practices?
   (A) Current practices
   (B) Claims data
   (C) Medical malpractice data

8. Rivaroxaban directly inhibits:
   (A) Protein C
   (B) Phosphodiesterase
   (C) Thrombin
   (D) Factor Xa

9. A patient with a history of a deep venous thrombosis 9 mo ago and no other risk factors for thrombosis has a ________ risk (5%-10%) for a thrombotic event when anticoagulated for a surgical procedure.
   (A) Low
   (B) Medium
   (C) High

10. When withheld for a surgical procedure, ticagrelor may be reinitiated _______ after surgery, but caution is advised.
    (A) 12 hr
    (B) 24 hr
    (C) 1.5 to 2 days
    (D) 7 days

Answers to Audio Digest Otolaryngology Volume 48, Issue 18: 1-B, 2-D, 3-C, 4-A, 5-C, 6-D, 7-A, 8-C, 9-B, 10-B