The CNMC Aerodigestive Clinic

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• Goals
• Case Presentation
• Symptoms warranting referral
• Management of conditions commonly evaluated
  – Reactive airway disease
  – Eosinophilic esophagitis
  – Chronic sinusitis
Aerodigestive Team

- Otolaryngology
- Pulmonology
- Residents/Fellows
- Gastroenterology
- Speech Pathology
- Administrative Support
Optimize care of pediatric patients with chronic, recalcitrant conditions of the aerodigestive tract who see multiple specialists
Case Report
Aerodigestive Clinic
Typical Symptoms/Conditions Evaluated

- Chronic cough
- Chronic rhinorrhea/sinusitis
- Aspiration/dysphagia
- Recurrent pneumonia/bronchitis
- Exercise induced stridor/wheezing
- Vomiting
Potential Etiologies

• Gastroesophageal or extraesophageal reflux disease
• Eosinophilic esophagitis (EoE)
• Environmental allergies
• Reactive airway disease
• Immune deficiency
• Chronic bacterial colonization of lungs
• Immotile ciliary syndrome
• Laryngeal/tracheal esophageal cleft
• Cystic fibrosis escaping newborn detection
Eosinophilic Esophagitis

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Gastrointestinal eosinophils

Normal peak eosinophil values, per high power field (hpf):

- Esophagus (0)
- Gastric antrum (10)
- Duodenum (20-30)
- Colon - Right (50-60);
  - Left (30-45)

Average accepted values
Clinicopathological diagnosis

- Clinical symptoms related to esophageal dysfunction
  - Feeding difficulty, vomiting, dysphagia, abdominal pain, heartburn,

- Isolated esophageal eosinophilia
  - 15 or more eosinophils per high power field

- Exclusion of other GI disorder
  - Lack of response to PPI therapy and normal pH probe
Clinical features

- Male predominance (3:1)

- 50-90% have atopy - food allergies, asthma, allergic rhinitis, atopic dermatitis

- 75% family history of atopy

- Chronic condition
EoE presentation by age

- Feeding Disorder: 13%
- Vomiting: 26%
- Abdominal Pain: 26%
- Dysphagia: 27%
- Food Impaction: 7%
Endoscopic findings
Complications

Stricture in distal esophagus

Small Caliber esophagus
Histopathology

Normal esophagus

EoE
Treatment

- Diet
  - Elemental diet
    - amino acid based
  - Elimination diet
    - milk, soy, egg, peanut, wheat, fish, meats
    - react to 4-5 foods
Allergy testing
Treatment

- **Steroids**
  - topical fluticasone, prednisone, liquid budesonide
  - candidal overgrowth
  - indefinite therapy

- **Other treatments**
  - Biologics - anti IL-5 antibodies
  - Mast cell stabilizers - cromolyn sodium, ketotifen
  - Leukotriene receptor antagonist - monteleukast

- **Proton pump inhibitors**
  - useful for making diagnosis of EoE
  - treating GERD symptoms associated with EoE
Take Home Message

• Suspect EoE –
  - GERD patient has atopy
  - History of dysphagia
  - Not responding to PPI
  - History of impaction
Chronic Cough and Reactive Airway Disease (RAD)

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Complex Common Chronic Disorder of the Airways Characterized by

**Figure 2-1. The Interplay and Interaction Between Airway Inflammation and the Clinical Symptoms and Pathophysiology of Asthma**

- Inflammation
- Airway Hyperresponsiveness
- Clinical Symptoms
- Airway Obstruction
Interaction of these features determines

- clinical manifestations
- severity of asthma
- response to treatment.
Presenting Symptoms

• One of the most common causes of **persistent cough** in children
• Suspect when **cough** improves with bronchodilator treatment
• Upper respiratory infection – with prolonged **cough** after infection resolves
• Recurrent episodes of cough and/or wheezing that resolve with steroid treatment
Diagnostic Criteria - Signs & Symptoms

- Recurrent wheezing
- **Cough, especially worse or awakening patient at night**
- Recurrent difficulty breathing or shortness of breath
- Recurrent chest tightness

**Triggers:**

- Allergen
- Viruses
- Exercise
- Air pollution
- Cold air
- Foods/additives
- Emotional stress
- Drugs
- Occupational factors
Diagnostic Work Up
Spirometry

• Mechanical properties of the respiratory system by measuring **expiratory volumes** and **flow rates**

• Basic, quick & easy test

• Measures rate of change of lung volumes during forced breathing maneuvers

• Inhale to maximum lung capacity & forcefully exhale to RV
SPIROMETRY

VOLUME TIME CURVE

- Pre Bronchodilator
  - Pre FEV1 2.71 L
  - Post FEV1 3.07 L (13% increase)

- Post Bronchodilator

FLOW VOLUME CURVES

- Pre Bronchodilator
- Post Bronchodilator
  - Post FEV1 3.07 L (13% increase)
**Cough Variant Asthma**

- Cough in young children - may be the principal or only manifestation of asthma

- Nonproductive cough
- TRIGGERS - exercise, cold air or environmental triggers
- Pulmonary Function tests or Methacholine inhalation challenge, may be helpful in diagnosis - to clarify whether there is bronchial hyperresponsiveness consistent with asthma,

- Diagnosis - confirmed positive response to asthma medication
- Treatment - stepwise approach to long-term management of asthma.

Dicpinigaitis 2006
Treatment

Co-management with Primary care physician
Referral to a Specialist for Consultation or Co management

1. Patient has had life-threatening asthma exacerbation.
2. Patient not meeting the goals of asthma therapy after 3–6 months of treatment. An earlier referral or consultation if the physician concludes that the patient is unresponsive to therapy.
3. Atypical Signs and symptoms or problems in differential diagnosis.
4. Complicating conditions (e.g., sinusitis, nasal polyps, aspergillosis, severe rhinitis, VCD, GERD).
5. Additional diagnostic testing is indicated (e.g., allergy skin testing, rhinoscopy, complete pulmonary function studies, provocative challenge, bronchoscopy).
**FIGURE 4-1b. STEPWISE APPROACH FOR MANAGING ASTHMA IN CHILDREN 5–11 YEARS OF AGE**

**Intermittent Asthma**

Consult with asthma specialist if step 4 care or higher is required. Consider consultation at step 3.

**Step 1**

**Preferred:** Low-dose ICS

**Alternative:** Cromolyn, LTRA, Nedocromil, or Theophylline

**Step 2**

**Preferred:**
- Either: Low-dose ICS + either LABA, LTRA, or Theophylline
- OR Medium-dose ICS

**Step 3**

**Preferred:** High-dose ICS + LABA

**Alternative:** High-dose ICS + either LTRA or Theophylline

**Step 4**

**Preferred:** High-dose ICS + LABA + oral systemic corticosteroid

**Alternative:** High-dose ICS + either LTRA or Theophylline + oral systemic corticosteroid

**Step 5**

**Step 6**

Assess control

Step up if needed
(first, check adherence, inhaler technique, environmental control, and comorbid conditions)

Step down if possible
(and asthma is well controlled at least 3 months)

Each step: Patient education, environmental control, and management of comorbidities.

Steps 2–4: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma (see notes).

**Quick-Relief Medication for All Patients**

- SABA as needed for symptoms. Intensity of treatment depends on severity of symptoms: up to 3 treatments at 20-minute intervals as needed. Short course of oral systemic corticosteroids may be needed.
- Caution: Increasing use of SABA or use >2 days a week for symptom relief (not prevention of EIB) generally indicates inadequate control and the need to step up treatment.
Chronic Sinusitis
Without Polyposis

• Diagnosis
• Evaluation
• Management
  – Medical
  – Surgical
Chronic Sinusitis
Diagnosis

• 2 or more symptoms present ≥ 12 weeks
  • Nasal congestion
  • Nasal discharge (anterior or posterior)
  • Cough
  • Facial pain/pressure

• No diagnostic tool that differentiates chronic adenoiditis from chronic rhinosinusitis

• Diagnosis is based on symptoms – NOT imaging
  – CT scan should NOT be obtained for diagnostic purposes.

EPOS, 2012 Rhinology 1:1-312
Chronic Rhinosinusitis
Predisposing Factors

• Frequent upper respiratory tract infections
• Second hand cigarette smoke
• Environmental allergies
• Perhaps GERD/EoE
Chronic Rhinosinusitis
Medical Therapy

• Antibiotics – >21 days minimum
  – Culture middle meatus (difficult)
  – Empirically treat
    • Organisms of acute otitis media
      – H. flu
      – S. pneumo
      – M. cat
    • Anaerobes
    • S. Aureus
• Nasal steroid sprays
  – Instruct on proper and regular use for maximal efficacy
• Saline Irrigation
• Oral steroids  5-7 days
• Antihistamines
  – Only if environmental allergies present
Persistent Symptoms Despite Maximal Medical Therapy

- Surgical intervention considered
- CT scan
  - obtain at surgical facility so that image guidance can be used intraoperatively if surgery indicated
Surgical Intervention

• Phase 1
  – Adenoidectomy
    • Meta analysis improves symptoms in 69% or more patients
      – Remove bacterial reservoir for sinuses versus
      – Treats recurrent adenoiditis
  – Sinus lavage
    • Often combined with adenoidectomy
      – Adds therapeutic advantage to adenoidectomy alone
  – Ballon sinuplasty
    – Unclear whether this imparts advantage over adenoidectomy and lavage alone
Surgical Intervention

• Phase 2
  – Endoscopic sinus surgery
    • Lack of prospective randomized series
    • Meta analysis successful in 85% of patients
      – 15% require revision surgery for adhesions, recurrent disease
        » 25% of patients undergoing revision surgery have disease
           in originally non infected sinuses.
    • Predisposing to failures males, allergic rhinitis, polyposis
CRSsNP in young children management scheme for (ENT-) specialists

2 symptoms: one of which should be nasal obstruction or discoloured discharge
+/- frontal pain, headache
+/- cough
ENT examination including endoscopy
consider CT scan
check for allergy
consider diagnosis and treatment of co-morbidities

mild VAS 0-3
nasal irrigation
nasal steroids

follow-up + nasal irrigation topical steroids

failure after 3 months

moderate - severe VAS >3-10
+ consider culture
+ consider long term antibiotics

CT scan
consider adenoidectomy and sinus irrigation
consider FESS

follow-up + nasal irrigation topical steroids
consider long term antibiotics

urgent investigation and intervention

consider other diagnosis
unilateral symptoms
bleeding
crusting
cacosmia

orbital symptoms:
peri-orbital oedema/erythema
displaced globe
double or reduced vision
ophthalmoplegia

severe frontal headache
frontal swelling
signs of meningitis
neurological signs