GERD and Asthma in Children

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Acid contents of the stomach regurgitating into the oesophagus (US English: esophagus)
GERD is common in infants and usually out-grown it before the age of one.
240 years ago: Nicholas Rosen von Rosenstein, First Physician to the Swedish Majesty: ”The diseases of Children and their Remedies” described the symptoms of GERD in children.

1892: Sir William Osler “The Principles and Practice of Medicine” discuss the importance of eating related symptoms and its relations with asthma.
Prevalence of GERD in asthmatic adults

- Various studies found the relationship to be between 37% to 77%
- And what about children?
Gastroesophageal Reflux and Asthma in children: A Systematic Review.

Thakkar et al. 2010  Amer Academy Ped

20 Articles 5706 patients. Average prevalence of GERD 22.0% in asthmatics. 4.8% in controls. “methodological limitations of studies”
Prevalence of GERD in Asthmatic Children- other 2 studies

A significant number of asthmatic children experience GERD

25-75% have abnormal intra-oesophageal pH

Only 50% have oesophageal symptoms of GERD

- Pediatr Drugs 2005 7 177-186
- J Pediatr Gastroenterol Nutr 2001 32:S1
Does GERD cause Asthma? Does asthma cause GERD?

Coexistence seems to be more frequent than would be expected for a chance occurrence.
Does GERD Trigger Asthma?

Reflex Theory

Direct contact between gastric refluxate and lung tissues

Inflammation of the airway

Bronchial smooth muscle reactivity

Aspiration
Does GERD Trigger Asthma?

**Reflex Theory**

1. Esophagus and bronchial tree have identical embryological derivation
2. Share common innervation (via vagus nerve) and common reflexes
3. Stimulation of receptors in distal esophagus by refluxate
4. Leads to vagal reflux
5. Producing bronchial constriction and/or cough

*Moser et al, Gastroenterology 1991; 101: 1512
Tuchman et al, Gastroenterology 1984; 87: 872*
Vagal Reflex

The tracheobronchial tree and oesophagus share common embryonic foregut origins with autonomic innervation through the vagus nerve.

Canine studies showed oesophageal acid increased respiratory resistance, ablated with bilateral vagotomy. In human studies, oesophageal acid infusion caused a 10% increase in total respiratory resistance. Atropine premedication abolished this reflex.

The distal oesophagus site of this reflex.

Oesophageal acid also heightens the bronchial reactivity in asthmatics and in methacholine tests.
Other mechanisms of GERD aggravating asthma

- Micro-aspiration
- Oesophageal acid increases Minute Ventilation rate
- Oesophageal acid increases airway inflammation through the release of substance P by increasing airway mucosal oedema
Does Asthma Trigger GERD?
Proposed Mechanisms

Coughing → Increase Intraabdominal Pressure → Increasing Pressure Gradient Across The LES

Asthma Medications → Lower LES Pressure
Exercise Induced Asthma is common in asthmatics. Less exercise may mean increased likelihood of bigger body mass.

Increased body mass index (BMI) >29.7 kg/m² has increased prevalence of Asthma and nocturnal GER symptoms.

Asthma medications that increase GER:

- Theophylline,
- Systemic Beta-agonists (Lower oesophageal sphincter tone) and
- oral steroids
All chronic asthmatics should look out for co-existing GERD

Pointers:-

- Nocturnal asthma symptoms
- Asthma attacks after full food ingestion (especially high-fat meal, volume acid drinks)

Non-bronchial symptoms of asthmatics:

- Frequent laryngitis
- Sore throat
- Globus
- Post-nasal drip
- Hoarseness of voice
- Dental (acid erosion of dentine)
Does GERD Trigger Asthma and Asthma GERD?

- **Reflux theory**
  - Inhalation of acid droplets to the bronchial mucosa adds to the inflammatory stimulation of asthma
  - Direct response of bronchial smooth muscles to acid and/or particulate matter in the refluxate.

- **Asthma itself can increase GERD**
  - Air trapping in asthma pushes down the diaphragm and increase GERD, especially when the stomach is full

- **Coughing also causes increase transient intra-abdominal pressure and acid reflux**
Anti-asthma medication does not consistently improve lung function, asthma symptoms or need for prn treatment.

Approach to GERD treatment should be individualized

Selected subgroups of asthmatics benefit from anti-reflux medication
  • Cochrane systematic review
When to suspect GERD associated Asthma?

- Associated typical symptoms of GERD
- Nocturnal cough
- Unexpected dental enamel symptoms
- Difficult to control asthma
Treatment of Acid Reflux

- Antacids
  - Reduce Acid production
    - H-2-receptor blockers
    - Proton Pump inhibitors
- Sphincter strengthener
  - Baclofen
- Surgical
  - Nissen fundoplication
  - Linx device (insertion of magnetic titanium beans around sphincter)
- Lifestyle changes:
  - Weight control
  - Loosen your belt!
  - Sleep Posturing
Low stomach acidity and health Questions

- All mammals have strong acids in the stomach
- First portal of defence for bacteria in food – especially salmonella
- First line of defence against parasites that entered the gastrointestinal system:
  - Fresh water fish tape-worms
  - ? Other common tropical & subtropical GI worms
- Does intestinal parasites reduce other allergic diseases symptoms? (re Illingworth report on Ivory Coast)