Cough and the Upper Aerodigestive Tract

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Anatomy and physiology of Cough

- Three phases to cough, Inspiratory, Compressive, Expiratory
- Receptors in the larynx, trachea, and others
- Mechanical receptors in the EAC, sinuses, pharynx,pleura, pericardium
- Afferent fibers in the vagus nerve, central medulla, efferent fibers vagus, phrenic, spinal motor

Causes of Cough

- Upper airway cough syndrome
- Hypersensitivity Syndrome
- Gerd/LPR direct or indirect
- Lower Respiratory cause

Upper airway cough syndrome (UACS)

- Defined as a chronic cough related to an upper airway abnormality
- Including post nasal drip, allergy, chronic rhinosinusitis, URI
- Difficult to diagnose, no objective test, nonspecific symptoms
- Due to either drainage of secretions into the lower throat and direct irritation of cough receptors or inflamation of cough receptors in the upper airway
- Symptoms include cough usually non productive, > 8 weeks, globus or mucous sensation, sensation of PND, frequent throat clearing
- Difficult to differentiate from Gerd or LPR symptoms

Investigation UACS

- Allergy assessment/ immune globulin levels
- Nasal examination including endoscopy
- Laryngeal examination, vocal cord, pharynx
- Imaging, usually CT Scan
- Respiratory work up(bronchopulmonary reflux)

Treatment UACS

- Treatment is based on the underlying disease
- Treatment often empiric
- Empiric treatment used as a diagnostic tool

Treatment of UACS

- Allergy avoidance based on allergy testing
- Nasal steroids and antihistamines
- Treatment of concomitant infections
- Correction of sinonasal anatomical abnormaities
- If no underlying abnormality detected empiric treatment often helpful in diagnosing UACS

Treatment UACS

- Empiric treatment may include antihistamine, decongestant, nasal steroid, antireflux measures
- Length of treatment may be several weeks
- If no response to above then sinus endoscopy/imaging, allergy testing, Ig levels

ACE Inhibitors

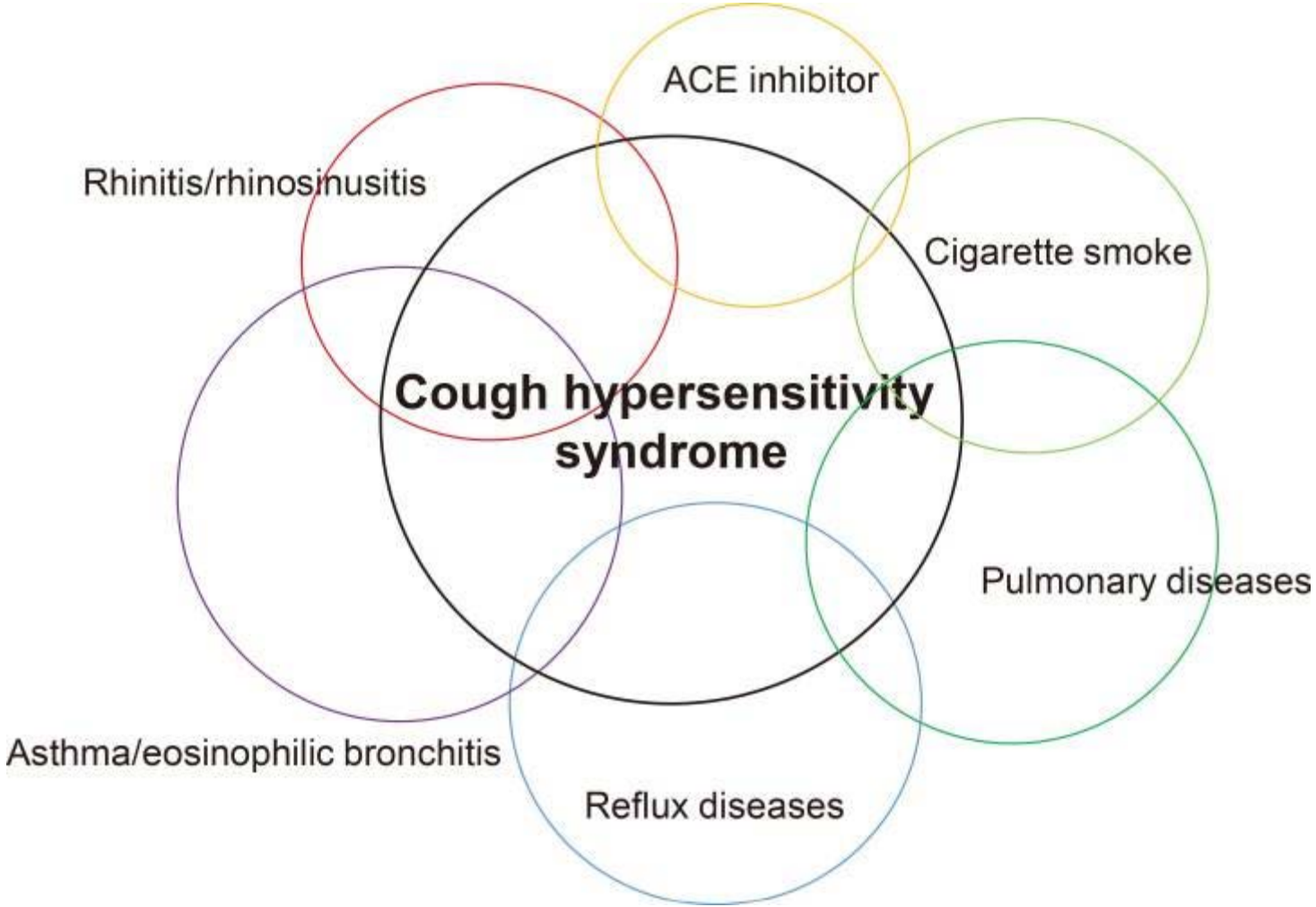
- Non productive cough
- Up to 15% of users
- Pathogenesis -acumulation of bradykinens normally degraded by the AC enzyme
- Stimulate C-fibers
- Consider switching to a different class antihypertensive

Cough Hypersensitivity Syndrome

- Also known as neuropathic cough
- Typically present for several months
- Often triggered by trivial environmental stimuli
- Perfume,cold air,exercise, singing or loud talking
- Cough remains after meticulous diagnostic protocol
- Can be up to 12-40% of cough patients

Cough Hypersensivity Syndrome

- Often associated with other possible irritants, ie rhinosinusitis, reflux,allergy,cough variant asthma
- Despite treatment of above cough persists
- Patient describes cough related to mild irritation,tickle in throat, urge to cough


ACE inhibitor
Rhinitis/rhinosinusitis
Cigarette smoke
Cough hypersensitivity syndrome
Pulmonary diseases
Asthma/eosinophilic bronchitis
Reflux diseases

Cough Hypersensitivity Syndrome

- Theory: dysregulation of sensory neural pathways and central processing inhibition of cough reflex
- Chronic stimulation related to viral/allergy/reflux and reactive airway disease
- Upregulate and changes to the afferent receptors, ie more sensitive
- Central neural pathways upregulate and loss of inhibitory response to cough
- Viral neuritis and synkinesis

Table 1

Evidences for neuropathology in cough hypersensitivity

Category	Characteristics
Clinical profile	Cough triggered by trivial stimuli such as cold air, perfume, stress, exercise, singing, or talking (allotussia)
	Urge-to-cough sensation
	More coughs evoked by tussigen inhalation (hypertussia)
Sensory neural activation in the airways	Phenotypic switch of sensory neurons by respiratory virus infection, allergen, or air pollutant
	Increased neuropeptides in bronchoalveolar lavage fluids
	TRPV1 up-regulation in bronchial epithelial nerves
Central neural alterations in cough processing	Increased activation of midbrain areas (presumably related to descending modulatory pathways)
	Decreased activation in brain areas implicated in cough suppression
Clinical trials	Proven efficacy of drugs with neuro-modulatory properties

TRPV1, transient receptor potential vanilloid-1.

Investigation HCS

- Rule out everythng else
- Tussigen inhalation, capcaisin like particles
- Measure cough per 24 hours, quality of life questionaires

Treatment of HCS

- Antitussive, Opioids, Guaifensin,Dextromethorphan
- Nortriptylne, Gabapentin, AF-219 antagonist (gefapixant)
- Speech Pathology