

Imaging Large Airways

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STR 2008 Imaging of Large Airways

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Central Airway Abnormalities *NOT* a common clinical problem

- Direct referrals for central airway imaging are rare unless at dedicated center



Central Airway Abnormalities *NOT* a common clinical problem

- Often present with known diagnosis: eg. Kartagener, Cystic Fibrosis, mediastinal mass
- Often, CT findings are incidental or of uncertain clinical significance



Acute Bronchitis

- “Chest radiography is *NOT* indicated, given the absence of signs of pneumonia on physical examination”

NEJM Volume 355:2125-2130 November 16, 2006 Number 20 Clinical Practice



What we commonly see

- Bronchiectasis
- Goiters/extrinsic compression
- Incidental lesions (+/- important)
 - Calcified cartilages
 - tracheomalacia
- Saber sheath deformity
- Aspirated foreign bodies



Other Common Incidental Lesions

- Mild tracheal indentations from extrinsic tortuous vessels/traction from lung scarring
- Paratracheal air cysts
- Mucus



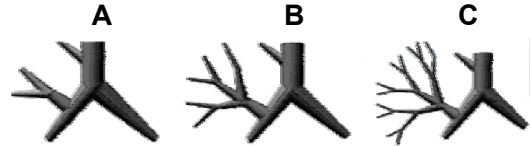
Tracheal Bronchus

- Rare developmental anomaly with several variations
 - Ectopic bronchus (RUL)
 - True supernumerary bronchus
- Almost exclusively on the right side, superiorly, and usually within 2 cm of the carina

Self assessment



Tracheal Bronchus



Variations of ectopic tracheal bronchus are schematically represented as:

- A) replaced segmental bronchus.
- B) replaced subsegmental bronchus.
- C) replaced subsubsegmental bronchus.

Reproduced from: Congenital Bronchial Abnormalities Revisited! Benoit Chays, MD, David Szapiro, MD, Jean-Marc Fanchamps, MD and Robert F. Dondelinger, MD Radiographics. 2001;21:1166-1173



Tracheobronchomegaly (Mounier-Kuhn Synd)

- Men >> women, 20:1
- Recurrent infections
- Obstructive airway disease from collapse of the trachea
- DDx Ehlers-Danlos, immune deficiency states



Bigger than normal trachea (Tracheomegaly)

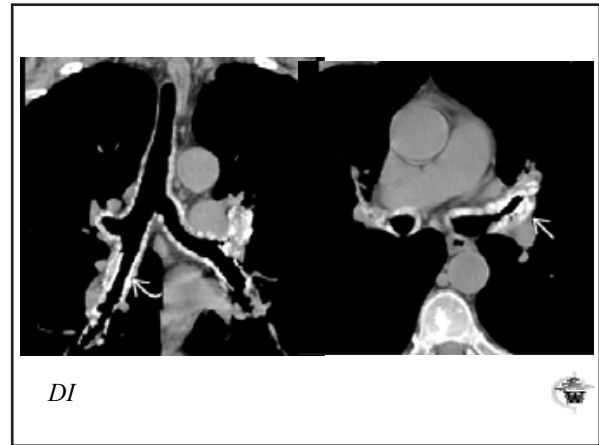
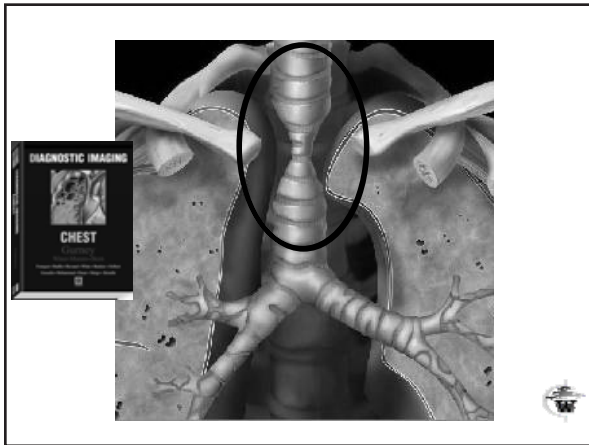
- >27 mm men
- >23mm women
- Imaging: Trachea as big or bigger than the vertebral body



Smaller than normal trachea

- *Focal narrowing*
- Common
 - post-traumatic or iatrogenic
 - Tuberculosis or fungal infection
 - Wegeners
- *Uncommon*
 - primary tracheal neoplasm
 - TBO





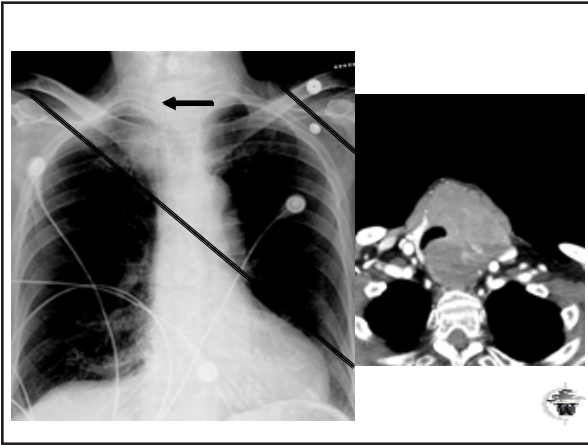
Saber Sheath Trachea

- Common condition with COPD
- Instead of the normal round or elliptical shape in cross section, the sagittal diameter of trachea is typically twice that of the coronal diameter
- Only involves the INTRAthoracic trachea



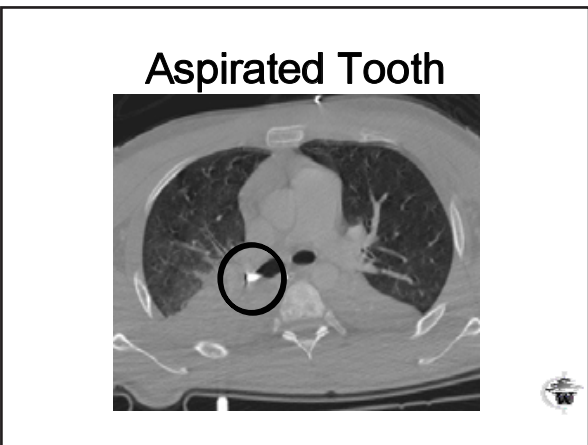
Extrinsic Compression of Trachea

- Normally trachea is straight, midline, tubular structure
- When surrounding structures become enlarged, from a variety of pathologic causes, it may be displaced



Intra-luminal tracheal disease

- Foreign bodies
 - Food, teeth, coins, other
- Tumors
- Mucus



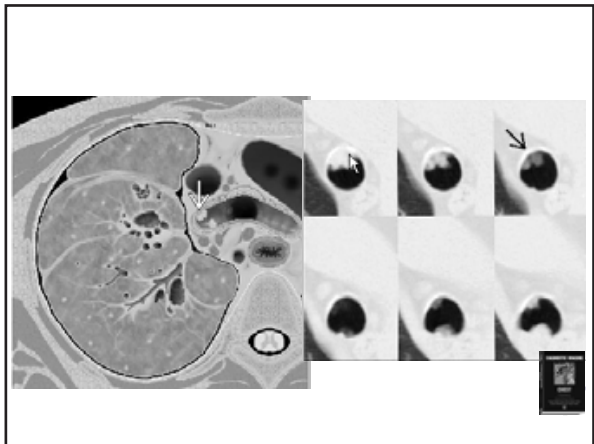
Aspirated Tooth

Laryngeal Papillomatosis

- Laryngeal nodules due to human papilloma virus
- Less than 1% seed the lung
- Lung nodules grow very slowly (decades)

Laryngeal Papillomatosis

- DDx metastases, Wegeners
- Imaging
 - Multiple solid and cystic nodules with dorsal distribution (gravity)



Tracheal tumors

- <1% thoracic malignancies
- 80-90% malignant
- Most smokers
- Risk for lung and head/neck cancer
- Squamous cell carcinoma and adenoid cystic carcinoma (salivary glands) most common
- Always consider local extension from other organs

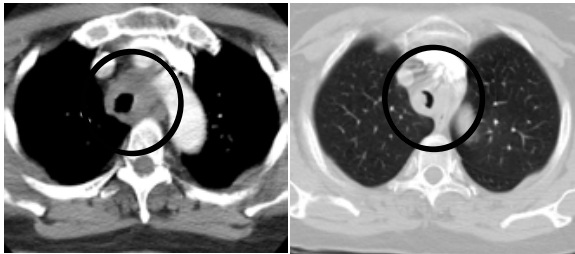


Malignant Tracheal Tumors

- Most common in the lower 1/3
- Clinically silent until 75% of lumen compromised
- Present with dyspnea, cough, hemoptysis, wheezing, stridor



Adenoid Cystic Ca



Adenoid cystic ca (l) Tx with XRT
recurrence 5 years later (r)



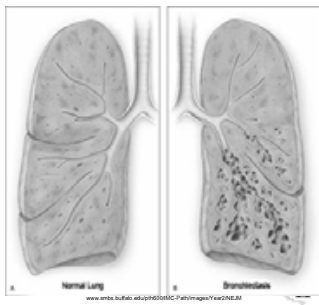
Benign tracheal tumors

- Mesenchymal tumors
 - leiomyoma
 - lipoma
 - hamartoma
- Squamous papilloma (HPV)



Bronchiectasis

- *Permanent* dilation
- Sxs: infections, sputum, cough, hemoptysis
- Reid Classification
 - Cylindrical
 - Varicoid
 - Cystic



Bronchiectasis

- Not a specific disease
- One of end results of insult(s) to airways



Bronchiectasis

- Clinical
 - Cough and sputum production
 - Hemoptysis
- Imaging
 - Thickened cystic airways/air fluid levels
 - Tram tracks
 - Signet ring and finger-in-glove signs

CT Criteria

- Lack of tapering
- Peripheral location
- +/- Wall thickening



Conveniently, Bronchiectasis!

- | | |
|---|---|
| <ul style="list-style-type: none">• Broncholith• Retraction of parenchyma (fibrosis)• Obstruction by foreign body• Neoplastic obstruction• Cartilage deficiency (Williams-Campbell syndrome)• Cilia syndrome (Kartagener syndrome)• Host defenses down (agammaglobulinemia) | <ul style="list-style-type: none">• Infection• Emphysema• Cystic fibrosis• Chronic granulomatous disease• Tuberculosis• Allergic bronchopulmonary aspergillosis• Swyer-James syndrome• Inhalation injury (ammonia, gastric acid)• Sarcoidosis |
|---|---|

Common Etiologies of Bronchiectasis

- Chronic aspiration
- Postinfection
 - Mycobacterial disease (typical and atypical)
 - Fungal infections
 - Bacterial and viral infections
- Pulmonary fibrosis
- Cystic fibrosis

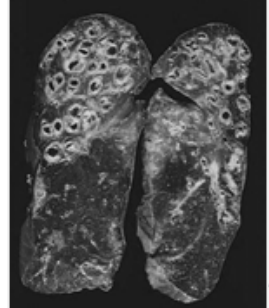
DDx for bronchiectasis

- Pneumonia (so-called reversible bronchiectasis)
- Chronic bronchitis
- Cystic lung disease
- Bronchial atresia



Distribution

- Upper Bilateral
 - Cystic Fibrosis
 - ABPA (Central)
- Upper Unilateral
 - Prior TB infection
- Lower
 - Childhood viral infection



Cartier et al AJR 1999