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A Pain in the Neck

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Objectives

- Develop an appropriate differential diagnosis for neck pain
- Recognize dangerous causes of neck pain
- Describe appropriate treatment for atypical neck pain

Non Traumatic Neck Pain

- Frequent complaint
- Usually musculoskeletal and benign
- A good differential diagnosis should maintain an index of suspicion for more dangerous causes, especially if the history does not suggest musculoskeletal causes.

Differential Diagnosis

- What lives where it hurts?
- "I need to do an inventory"
  - Infectious
  - Neoplastic
  - Trauma
  - Drugs
  - Anatomic
  - Inflammatory (autoimmune)

Illustrative Case

- 16 year old well appearing white male baseball player presents with some neck pain which is poorly localized, and pain with swallowing for the last 2 hours
- Sudden onset during game
- Not struck, did not start after swing or strain

A 16yo with neck pain

- Hit a double, then stole 3rd. Next batter struck out and inning over, was starting to feel pain in the throat.
- Also feeling some sharp CP with deep inspiration
- Finished 2 more innings until game over
  - Pain becoming more intense, especially with deep breathing

A 16yo with neck pain

- On way home complaining of some neck and chest pain so parents stop at ER
- Triaged to fast track for sore throat
  - Told nurse painful to swallow
- Last patient of the day
- Seen within 20 min of arrival
- Vitals
  - T 98 P108 R20 BP118/77 SaO2 99%RA

A 16yo with neck pain

- Physical Exam
  - Gen: WDWN WM mild discomfort wearing baseball uniform
  - Integ: No rashes, spotty irregular tenderness at the base of the neck and supraclavicular area
  - HEENT: WNL
  - Neck: some deep pain with ROM which is difficult for the patient to localize. Same pain with swallowing. Otherwise normal

A 16yo with neck pain

- Pulm: CTA bilat but shallow breaths because with deep inspiration patient has sharp severe substernal pain.
- Card: Tachy but no murmurs/rubs, no edema. Radial pulses full & equal.
- ABD: SNT, no HSM
- EXT: moves normally, no gross lesions
- Neuro: grossly non focal

Differential Diagnosis

- "What lives where it hurts"
  - Neck
    - Trachea
    - Esophagus
    - Carotid/jugular vessels
    - C spine
    - Spinal cord/CNS
    - lymphatics

Differential Diagnosis

- "What lives where it hurts"
  - Chest
    - Heart
    - Lung
    - Great vessels, aorta and pulmonary
    - Trachea
    - Esophagus
    - Diaphragm
    - T spine/cord

DDX

- Infectious
  - Infection/lymphadenopathy
  - Retropharyngeal/Epidural abscess
- Neoplastic
  - Thyroid CA or lymphoma
- Trauma
  - Esophageal rupture
  - Pneumomediasteinum
  - Vascular catastrophe/dissection

DDX

- Drugs
- Anatomic
  - Spondylosis
  - Vascular
- Inflammatory (autoimmune)
  - Cervical angina syndrome

Infection/ lymphadenopathy

- Strep Throat
  - Modified CENTOR criteria (one point ea)
    - Fever >100.4
    - OP Exudates
    - Lymphadenopathy
    - Absence of cough
    - Age 3-15 add one, over 44 subtract one
  - 1 point then no treatment, test or C&S
  - 2-3 points rapid antigen detection test (RADT), treat if +, C&S if neg.
  - >3 points treat empirically

Infection

- Acute Rheumatic Fever/Endocarditis
- Reactive lymph nodes known to cause neck pain
  - Usually superficial
  - Can be associated with torticollis, mono
- Zoster can cause pain prior to eruption
- Meningitis
- Retropharyngeal abscess
- Epidural abscess

Meningitis

- Less common in older kids now due to Prevnar and other vaccines
- Triad of fever, HA, and neck stiffness usually present (+/-vomiting)
- Etiology varies with age, but usually have ill appearance

Retropharyngeal abscess

- Where is that?
  - Behind OP, but in front of vertebral lig.
  - Laterally bordered by carotid sheaths
- More common in kids <6 but can be seen in adults
- Presentation is variable
- High mortality from airway compromise and sepsis

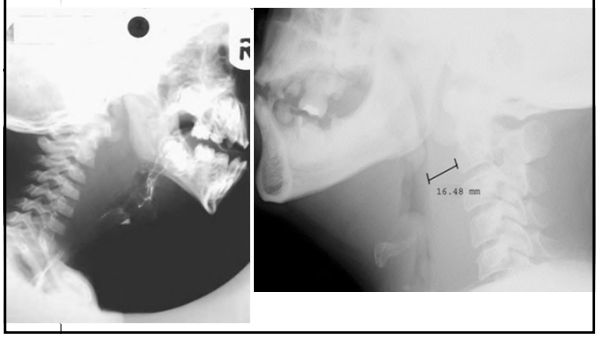
Retropharyngeal abscess

- Localized symptoms of dysphagia, voice changes (duck quacking sound), odynophagia, trismus, and neck/jaw pain.
  - Pain with side to side movement of thyroid cartilage
- Fever, chills, and loss of appetite common but not universal
- Stridor, shortness of breath, drooling, cervical lymphadenopathy, and bulging of the pharyngeal wall common.

Retropharyngeal abscess

- Lateral radiographs will manifest with pre-vertebral air/fluid levels or abnormal widening of the pre-vertebral soft tissue
  - normally 5 – 7 mm wide at the level of the second cervical vertebrae
- If strongly suspicious but films normal consider contrast CT neck

Pre-vertebral soft tissue swelling



Epidural abscess

- Infection of the posterior space between dura and overlying venous plexus/fat
- Most common in T spine
- Clinical triad of fever, back or neck pain, and neurologic deficit is <u>not</u> present in most patients
  - Know the RED FLAGS
- ESR is usually markedly elevated
- Post void residual of <50-100mL has negative predictive value of 99% for cord compression.

Cervical Epidural abscess

- RARE
- HA and neck pain most common sx in cervical lesions
- Nuchal stiffness or rigidity may be present
- Should be considered in a patient with neck stiffness, paresthesias, and/or radicular pain who has risk factors

DDX: Infectious causes

- No fever, vomiting or HA
- Neck moves normally
- Relatively sudden onset
- No lymph nodes
- Throat normal exam, no trismus
- Probably not infectious…
  - But could consider ESR or lateral neck films

Neoplastic

- Thyroid CA or lymphoma most common causes of isolated neck pain
- Usually have palpable masses
- May have hoarseness
- Not much role for workup with sudden onset of symptoms and no masses

DDX: Traumatic Causes

- No penetrating trauma
  - Anything that penetrates the platysma warrants CT and/or surgical consult
- No history of recent instrumentation
- Questionable blunt trauma

Esophageal rupture

- Usually caused by instrumentation during EGD
- In non-iatrogenic cases are usually related to retching.
  - Boerhaave syndome
- Mackler Triad
  - Vomiting, CP, subcutaneous emphysema
- CXR is diagnostic in 90% of cases

Pneumomediastinum

- Mediastinum communicates with
  - Retropharyngeal space
  - Submandibular space
  - Vascular sheaths within the neck
  - Peritoneum/retroperitoneum
- Can be spontaneous or due to trauma
- Trauma associated with rupture of the tracheobronchial tree or alveoli
- Hammans Crunch (systolic)
- Usually have subcutaneous emphysema

DDX: Drugs

- Patient denies illicit drug use
- Not taking any medications.
- Probably not a factor in this case
- Dystonic reactions would be in the differential but usually have obvious presentation.

DDX: Anatomic

- Most anatomic abnormalities have a presentation early in life
- Occult lesions can present later or under stress
  - Vascular
- Bony abnormalities can be congenital or develop with age related arthritic changes

Vascular catastrophe/dissection

- Vertebrobasilar arteries
  - Usually complication of atherosclerosis
  - Can dissect or thrombose
  - Vertiginous, vasomotor/brainstem sx
- Carotid artery dissection
  - Spontaneous or traumatic
  - May be a progression from aortic dissection
  - Usually have dramatic neurologic presentation
- Marfans with aneurysm

Spondylosis

- DJD of the C spine
- Spurlings vertex compression test
- Pain is usually chronic and worse with motion or certain positions
- May have radicular symptoms
- Risk for developing vertebrobasilar insufficiency as lumen narrows in transverse processes.

Cervical angina syndrome

- Anginal type pain that originates from cervical spondylosis
- Can exactly mimic ACS but workup will be negative
  - CP, diaphoresis, nausea etc
  - Worse with positional change in neck
- Sensory, motor and autonomic nerve roots to anterior chest leave cord C5-T1.

DDX: Inflammatory

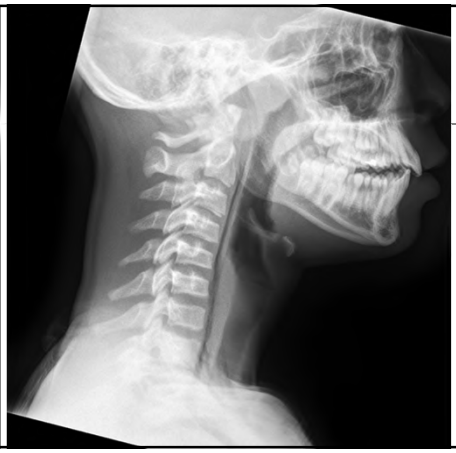
- Mostly rheumatologic diseases which tend not to have a sudden onset
- MS can present with almost any variety of neurologic symptoms including pain
- Endocarditis
  - Duke Criteria
- Rheumatic Heart Disease
  - Jones Criteria

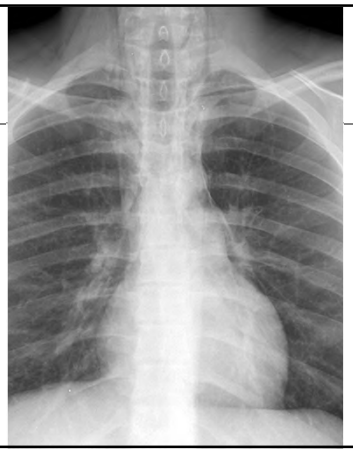
Revised DDX

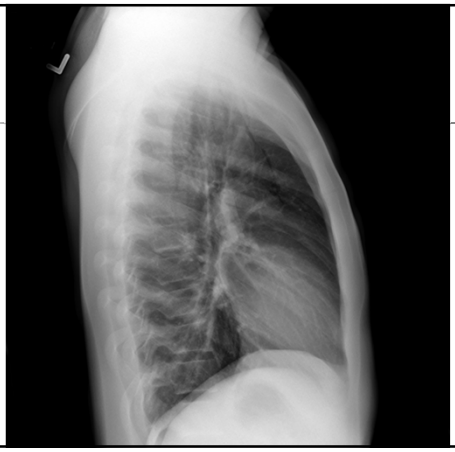
- Infectious
  - Retropharyngeal or CNS
- Traumatic
  - Musculoskeletal pain
  - Pneumomediastinum
- Anatomic
  - Vascular ectasia
  - Congenital spondylosis with radicular sx to chest

A 16yo with neck pain

- Orders?
  - Patient is stable
  - DDx/What lives where it hurts?
- 3v C-Spine
- CXR
- Hydrocodone/APAP 5/325 PO







Case reviewed with SP

- PA looked at XR and decided to consult SP in main ED
- X-rays reviewed together
  - No radiologic over-read avail for 24 hours
  - Loss of lordosis noted on C spine C/W spasm
  - CXR normal
- Plan to send home with symptomatic treatment, re-check ED AM, sooner if any new or worsening SX

Next?

- Re-exam after consult with SP shows comfortable well appearing patient
- Symptoms unchanged with hydrocodone
  - Deep neck pain unrelated to motion
  - Sharp substernal CP with deep breath
- Subcutaneous emphysema at base of neck/supraclavicular area now noted with patient in gown

What is going on??

- If the clinical picture at discharge doesn't make sense, start over
- History reviewed
  - Pt dove to steal 3rd base
  - Took a deep breath just prior to dive
  - Landed on chest instead of hands and arms while holding breath
  - Immediate sharp CP but resolved quickly
  - Same pain recurred on deep breathing with gradual worsening

Pneumomediastinum

- Signs/Symptoms
  - Chest pain
  - Dyspnea
  - Throat or jaw pain
  - Dysphagia
  - Hammans sign
    - Precordial crunch/crepitation in systole
  - Subcutaneous emphysema common
- Not usually hypoxic

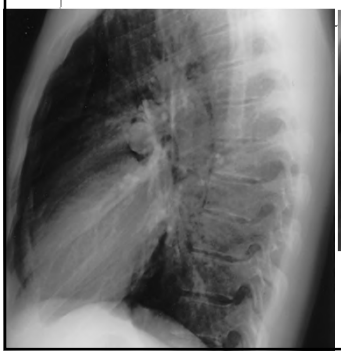
Pneumomediasteinum

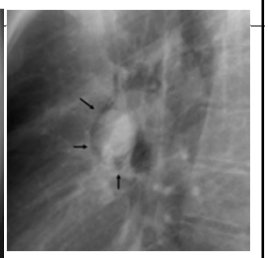
- Mortality related to cause
  - Esophageal rupture very high
  - Penetrating traumatic causes up to 50% mortality
  - Spontaneous rupture outcome is associated with location and amount of air leak, but generally has good prognosis
  - Almost zero mortality after laparoscopy

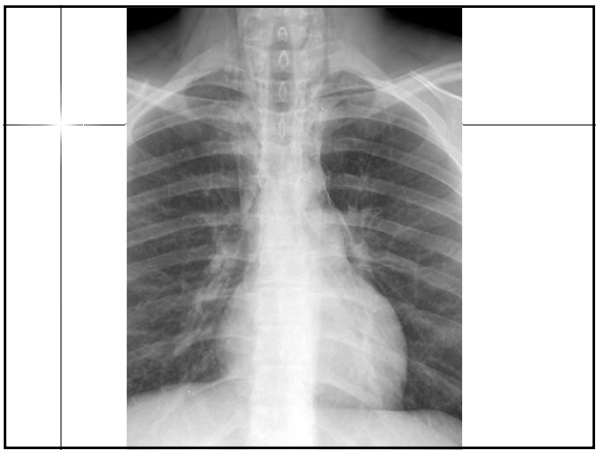
Pneumomediastinum

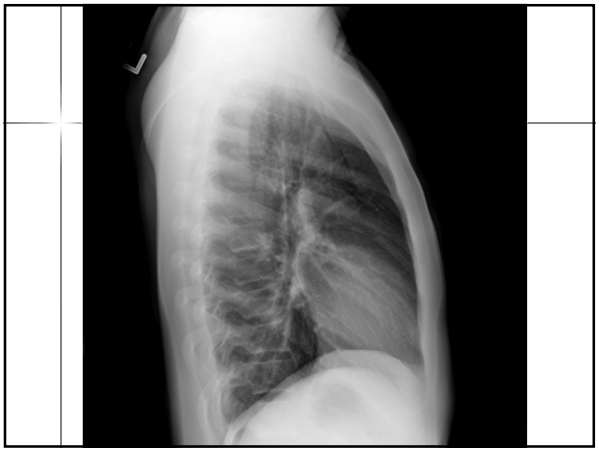
- Imaging
  - CXR almost always demonstrates abnormality
    - Seen best on lateral CXR
    - Ring around the artery sign
      - lucency surrounding the right pulmonary artery
    - Air in sub-cutaneous tissues, outlining mediastinal structures
  - Neck films may show retropharyngeal air
  - Non contrast CT is diagnostic if in doubt

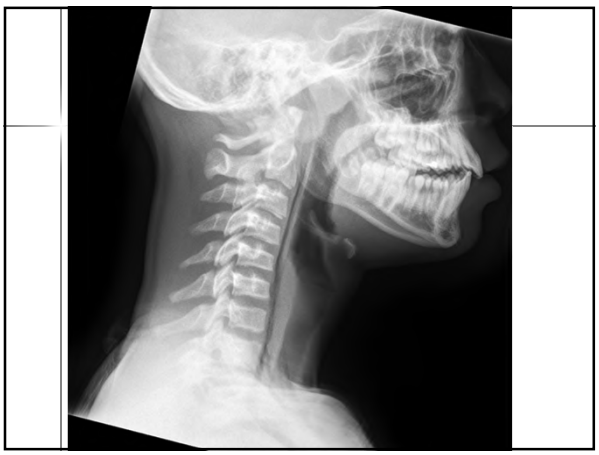
Ring Around the Artery Sign











Pneumomediastinum due to blunt trauma

- Patient remained stable, CT done
- Transferred to tertiary care center
- Observed overnight
  - Continued to have same symptoms but remained otherwise stable
  - Slow but persistent air leak from main stem bronchus
- Surgery next day to close leak
- Uneventful recovery

Take home points

- Undress the patient and do a good exam
- Most of the time neck pain follows established patterns
  - When symptoms do not fit the pattern broaden the differential to include more atypical causes
- Have a low threshold to obtain radiologic over-read if something doesn't look right
- Beware the "It's just a" syndrome, and the last patient of the day pitfall.

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