

Viewing Time

The program will take up to one hour to complete.

Target Audience

This program is designed for primary care physicians.

Other health care professionals working with patients and their families may also find this program of interest.

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Case Presentation: "17-Year-Old with Shortness of Breath"

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Case Presentation: "17-Year-Old with Shortness of Breath"

A lecture presenting a case that was seen in a local primary care clinic, discussing the workup and diagnosis of the case and reviewing the literature pertinent to the discussion.

Program Objectives

Upon completion of this program, participants should be able to:

- Inform participants of unusual presentations of common pediatric problems.
- Identify specific difficulties in the diagnosis of specific problems.
- Discuss potential difficulties in the management of pediatric problems.

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Receiving CME Credit

To receive CME credit you must view the entire program and complete the evaluation form at the end.

Grand Rounds

Jennifer Koziol, MD
March 4, 2008

Primary Care Clinic

- CC: 17 yo M with back pain
- HPI: Sx began 2 weeks ago. Pain is located to left mid back
 - + difficulty sleeping secondary to pain
 - Advil provides minimal help
 - Wisdom tooth extraction yesterday- Vicodin has helped back pain somewhat
 - Possible etiologies: weight lifting, band camp

Primary Care Clinic

- PMH
 - Born at 41wga via C/S for failure to progress
 - ADHD-concerta
 - 2 seizures (ages 2 and 7)
- FH
 - Strong maternal history of seizures including mother
 - MGM: "blood cancer"
 - Paternal: Heart disease
- SH
 - 11th grade, good grades, All State Orchestra
 - +seat belts and bike helmets
 - No tobacco exposure
 - 2 dogs
 - Mom is an ICU nurse

Primary Care Clinic

- ROS
 - + sleep disturbance
 - + shortness of breath-difficulty taking deep breath
 - - numbness, tingling, limp, skin changes, or fever

Primary Care Clinic: PE

- Vitals: wt=199 lbs BMI=26.3 T=95.5 (ear)
- Gen: active, alert, no distress, cooperative
- Musculo: left mid/upper thoracic area just above latissimus dorsi is tender to palpation, no bony tenderness
- Neuro: Good strength and tone, equal movements, no focal findings
- GU: Male

?????????

PCC: Assessment and Plan

- Assessment: Back sprain NOS
- Plan:
 - Percocet 5-325mg po q6h prn
 - Flexeril 10mg po tid
 - PT referral
 - Return if any problems

1 week later: Physical Therapy Note

- S/O: 17 yo M referred for back strain
 - Pain is now reported as "much worse"
 - Now over T6 and T7, radiating around the left side of back to axilla
- A: Concerning for slipped thoracic disk
- P: Return to clinic, recommend MRI

PCC: 2 weeks later

- History reviewed: 17 yo M with back pain, difficulty taking deep breath
 - Sx onset began after weight training/band camp
 - Pain began on anterior left side of chest, moved to the back
 - PT began last week
 - Flexeril/Percocet minimal help

PCC: 2 weeks later

- Interim History: "Pain is now radiating to left shoulder, breathing has gotten worse"

PCC: Physical Exam

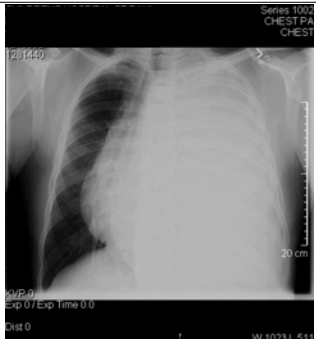
- Vitals: T-98.9 Weight-88.98 kg BMI-25.9
- General: Appears ill
- Head/Neck: Normocephalic with sutures and shape appropriate for age, neck supple with intact clavicle, no thyromegaly
- Eyes: PERRLA, conjunctiva clear
- Ears: TM's clear
- Nose: normal septum, mucosa, turbinates
- Throat: Tonsils appropriate size, no erythema or exudate
- CV: S1/S2, no murmur, RRR, normal pulses
- Chest: Diffuse decreased breath sounds left side
- Abdomen: Soft, NT/ND, no masses
- Skin/Hair: normal
- Msk: no deformity, full strength and ROM at all joints, hips without dislocation, no sacral dimple
- Neuro: Good strength and tone, equal movements, no focal findings

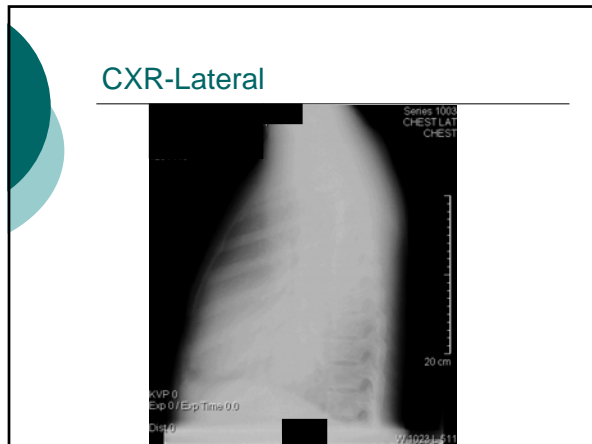
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PCC: Assessment/Plan

- A: Chest pain NOS
- P: CXR

CXR





- ### CXR: Impression
- Complete opacification of L hemithorax with pronounced rightward shift of the mediastinum, CT with contrast recommended
 - Plate like atelectasis in right lung base
 - No thoracic cage destruction identified

What is on your differential???

- ### PCC: New plan
- Admit to hospital for CT and Chest tube placement

- ### Hospital Admission
- History Reviewed: 17yo M with L shoulder and back pain as well as shortness of breath
 - Pain began while weight lifting
 - Ibuprofen/Vicodin/Flexeril minimal relief
 - Pain has been increasing in intensity
 - Gradual onset of exercise intolerance
 - Worsening significantly over the past week-now SOB during rest

- ### Hospital Admission: Physical Exam
- Vitals: Wt-88.6kg T- 36.3 P-120 BP-156/105 RR-24 SpO2-96%
 - Gen: Awake, alert, in obvious discomfort
 - HEENT: NCAT, PERRLA, EOMI, TMs nl, MMM
 - Lungs: Absent breath sounds on the left
 - CV: RRR
 - Abdomen: soft, NT, no HSM, nl bowel sounds
 - Lymph: No LAD

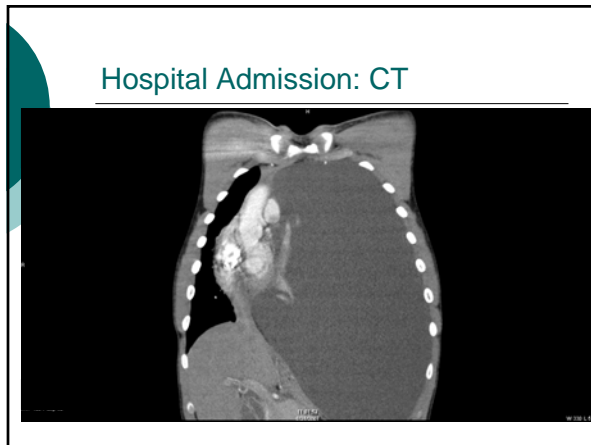
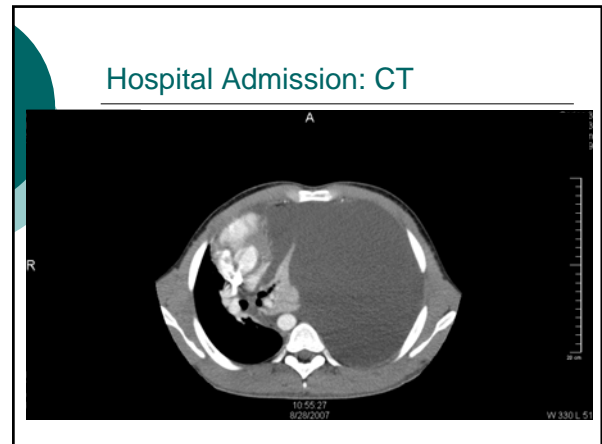
Hospital Admission: Labs

21.8	14	223	137	106	14	90
	91		4.3	20	1.0	

92N/5L/3M
 ANC: 20,240 k/uL
 Morphology: "White cells with slight toxic granulation"

LDH: 252 U/L

Ca = 4.1
 Anion Gap = 11



- ### Hospital Admission: CT
- Impression:
 - Massive left pleural effusion with marked rightward shift of the mediastinum and complete collapse of the left lung
 - No solid enhancing mass in left pleural space
 - No pleural enhancement
 - Minimal streaky atelectasis in the right lung

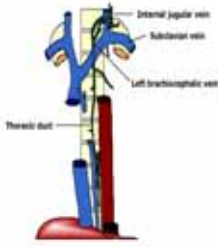
- ### Hospital Admission-Pleurocentesis
- 7L of pleural fluid returned via CT placement
 - Appearance: pale yellow & turbid
 - Glucose: 98 mg/dL
 - LDH: 149 U/L
 - Protein: 5 g/dL
 - WBC: 722/uL → 5%N/85%L/10%M/0%E
 - RBC: 278/uL
 - pH: 7.58
 - Cultures sent (bacterial, viral, fungal)
 - Cytology sent
 - Tg=1383 mg/dL

- ### Hospital Admission: Assessment
- 17yo M with large pleural effusion, likely chylothorax

Chylothorax

- Definition: The escape of Chyle into the mediastinum from a defective thoracic duct
- Chyle composition:
 - Conveys 75% of ingested fat from intestines to circulation
 - Triglycerides (chylomicrons)
 - Lymphocytes (mainly T)
 - Bacteriostatic
 - Protein/electrolytes
 - Immunoglobulins
 - All fat soluble vitamins

Thoracic Duct Anatomy



- Origin: cisterna chyli (at L2)
- Crosses vertebral column at T5
 - Below=Right Pleural effusion
 - Above=Left Pleural effusion

Chylothorax: Etiology

- Spontaneous
 - Most commonly in newborns
 - Congenital anomaly in thoracic duct vs. trauma with delivery
 - Leading cause of pleural effusion in neonates
- Non-Traumatic
 - Obstructive
 - Malignancy, infectious
 - Increased pressure in Superior Vena Cava

Chylothorax: Etiology

- Traumatic
 - Iatrogenic
 - Repair of PDA, Coarctation, B-T shunts
 - Misplaced central venous catheters
 - Hyperextension of spine
 - Weightlifting, wrestling, high diving
 - Bearing down, yawning, coughing
 - Child abuse

Chylothorax: Pleural Fluid Analysis

- Color: Straw (fasting), milky (fed)
 - supernatant fails to clear after centrifugation
- Total fat >400mg/dL
- Tg>110mg/dL
 - <50mg/dL excludes
 - 50-110mg/dL-obtain lipoprotein analysis
 - Chylomicrons confirms diagnosis
- Protein >5g/dL
- Lymphocytes = 80-90% of total WBC
- pH 7.4-7.8

Hospital Admission: Plan

- FEN: IVF at maintenance, po ad lib, check BMP in am
- Pulmonary: Continue Chest Tube to suction, monitor output. Oxygen therapy to keep saturations >92%. CXR in am
- Heme/Onc: Await cytology results
- ID: Elevated WBC, await cultures from pleural fluid
- Pain: Morphine 10mg IV q2h prn

Management: Conservative

- Chest tube placement
- NPO + TPN vs. oral Medium Chain Triglycerides
- Leads to resolution in majority of cases

Hospital days 2-8

- FEN: started on very low fat diet on HD#2, changed to NPO on HD#4. TPN initiated without lipids
- Pleural culture returns: alpha hemolytic strep-started on cefotaxime, d/c'd after identification of s.viridans (3 doses)
- Persistent chylous drainage from chest tube: 525-1440 ml/day

Other thoughts??

- HD#8: Octreotide initiated at 50mcg subcutaneously q12h
- HD#11: Surgical consult obtained

Octreotide

- Long-acting Somatostatin analogue
 - Inhibits: GH, glucagon, insulin, release of LH, secretion of TSH
 - GI effects:
 - inhibits 5HT, gastrin, VIP, secretin, motilin, pancreatic polypeptide
 - Decreases splanchnic blood flow
 - Inhibits gallbladder contractility and decreases bile acid secretion
- **Decreases time of chylous fistula closure and cessation of chyle drainage**

HD#11: Surgery consult

- Assessment: 17yo M with chylothorax
- Plan:
 - Continue Octreotide
 - Continue conservative treatment for 5-7 more days
 - Consider ligation of thoracic duct/talc pleurodesis if unresponsive
 - Place Chest Tube to H2O seal

Management: Surgical

- Pleurodesis
- Pleurectomy
- Video Assisted Thoracoscopy (VATS)
- Oversewing duct disruption/collaterals
- Ligation of duct
- Closure of leak (sutures or fibrin glue)
- Pleuroperitoneal shunt

HD#12(1930): X-cover

- Called to evaluate for epigastric pain
 - Started on Ranitidine
- Overnight pain develops below left clavicle and over left side of back
 - CXR obtained

HD#13 CXR



- ICU attending notes that water seal chamber not filled on pleurovac container...

HD#13: Plan

- Place chest tube back to suction
- Monitor chamber to confirm air leak
- Re-check CXR x 1 hour

HD# 13-16

- Pneumothorax improves
- CT drainage 300ml-870ml/day
- Octreotide discontinued on HD#14
- HD#16: L talc pleurodesis
 - No obvious thoracic duct leakage source identified

HD#19: Surgical note

- CT drainage unchanged
 - 200ml in the past 8 hours
 - ?Reactive changes- would expect significant decrease over next 2 days
- Consider right thoracoscopy with formal thoracic duct ligation

HD#20

- CT output = >1000ml
- Parents voice increasing frustration

Chylothorax: Complications

- Immunosuppression
 - Use in transplant patients showed that clinical immunosuppression occurred within 14 days
- Malnutrition
- Coagulopathy

HD#23: Surgery

- Pt complaining of increased chest pain, shortness of breath
- Chest tube output has dramatically decreased (10 ml over past 8 hours, compared to 550ml in 24 hours yesterday)
- Per report...
 - CXR obtained: increase in pleural fluid
 - Transfer to outside facility with thoracic surgeon

HD#23-50: Summary

- HD#24: L talc pleurodesis and L thorascopic ligation
- HD#29: R thorascopic ligation of thoracic duct
- HD#39: L video assisted thorascopy and pleurodesis

HD#23-50 Summary (Continued)

- HD#43: L talc pleurodesis at bedside
- HD#48: L talc pleurodesis at bedside
- HD#49: CT output decreases to 20ml/24h, pt started on regular diet
- HD#50: Discharged home

3 months later...

- Patient is doing well, is asymptomatic
- Has regained 24 of the 33lbs lost
- Is hoping to be caught up in school by next month
- Is not currently weight lifting

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