

Dyspnea with Exertion
in a
65-Year-Old Man

History of Present Illness

- **Dyspnea on exertion over several weeks**
- **Orthopnea over several days**
- **Paroxysmal nocturnal dyspnea over the last 2 days**

Current Medications

- Furosemide 40 mg qd
- Spironolactone 25 mg BID
- Digoxin 0.25 mg qd
- Captopril 25 mg tid
- Atorvastatin 20 mg HS

Additional Pertinent History

- Remote myocardial infarction
- Hypertension
- Hypercholesterolemia

Physical Examination

- Increased work of breathing at rest
- BP=158/100, HR=100 and regular, RR=24, afebrile
- Chest: decreased bilateral expansion, decreased fremitus and breath sounds in bases, and basilar crackles
- Heart: S₃ gallop at apex
- Extremities: pre-tibial and ankle edema



FORMATION OF PLEURAL EFFUSION

- change in transpleural pressure balance (T)
 - CHF
- increase in capillary permeability (E)
 - pneumonia
- impairment in lymphatic drainage (E)
 - malignancy
- movement of fluid from extravascular spaces (T or E)
 - peritoneal dialysis

Pleural Fluid

Transudate v. Exudate

	Transudate	Exudate
Cells	<1000/uL	>1500/uL
Cell type	<5% PMN	Acute- PMN predominant Chronic-Mononuclear cell predominant
Protein (PF/S)	≤ 0.5	>0.5
LDH (PF/ULNS)	≤ 0.67 ≤ 0.82	>0.67 >0.82
pH	7.45-7.55	6.00-7.45
Albumin gradient (S-PF)	≥ 1.2	<1.2
Causes	Limited differential Normal pleura	Infection, malignancy, inflammation, decreased lymphatic drainage

Pleural Fluid Analysis

- Appearance: clear yellow fluid
- Protein: 2.8 g/dL (PF/S: 0.53)
- LDH: 75 IU/L (PF/ULNS: 0.32)
- Nucleated cells: 600/ μ L
 - 5% PMN, 68% Lymph, 10% Mac, 17% Meso
- Glucose: 95 mg/dL
- pH: 7.50

CAUSES OF TRANSUDATIVE PLEURAL EFFUSIONS

- CHF
- hepatic hydrothorax
- nephrotic syndrome
- peritoneal dialysis
- hypoalbuminemia
- urinothorax
- atelectasis
- constrictive pericarditis
- trapped lung
- duro-pleural fistula
- EVM of CVC
- SVC obstruction

PLEURAL EFFUSIONS IN CHF

- PFA not necessary with typical presentation
- PFA if:
 - fever
 - pleuritic chest pain
 - unilateral effusion
 - left > right effusion
 - effusions of disparate size
 - normal heart size
 - paO_2 inappropriately low

PLEURAL EFFUSIONS IN CHF

- incidence: 60%
- pathogenesis: pulm venous hypertension
- clinical: orthopnea, PND, crackles, S₃
- CXR: cardiomegaly, interstitial/alveolar infiltrates, bilateral effusions R>L
- PFA: transudate
- Dx: presumptive
- Rx: diuresis, ACE-I, spironolactone, digoxin
- resolution: after PE resolves