APPROACH TO PLEURAL EFFUSIONS

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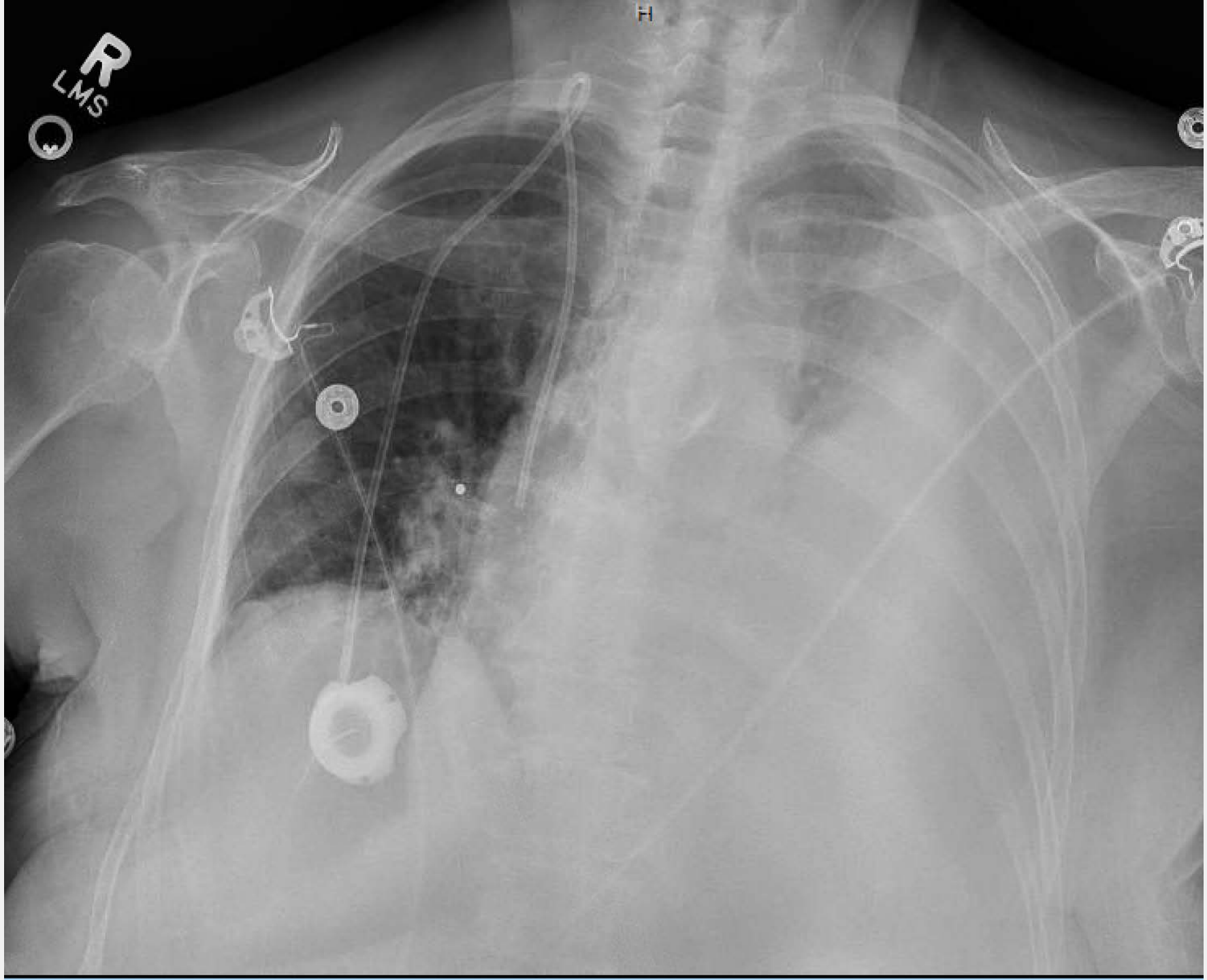
CASE

- 65-year-old woman with H/O breast cancer presented with a 1 week H/O progressively worsening exersional dyspnea.
- Physical exam:
  - Diminished breath sounds left base
  - Dullness to percussion left base

- What is you next step in evaluating this patient?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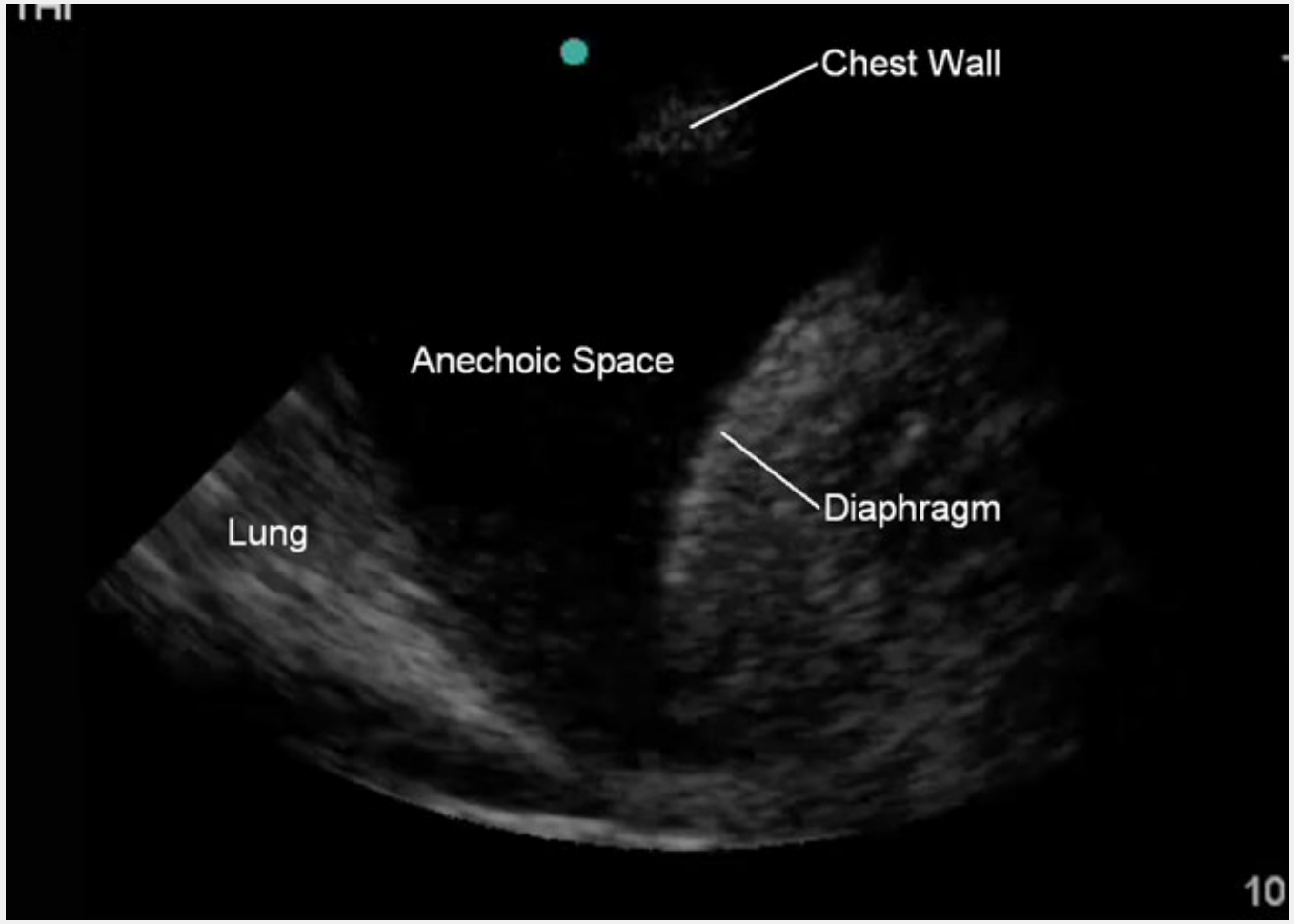
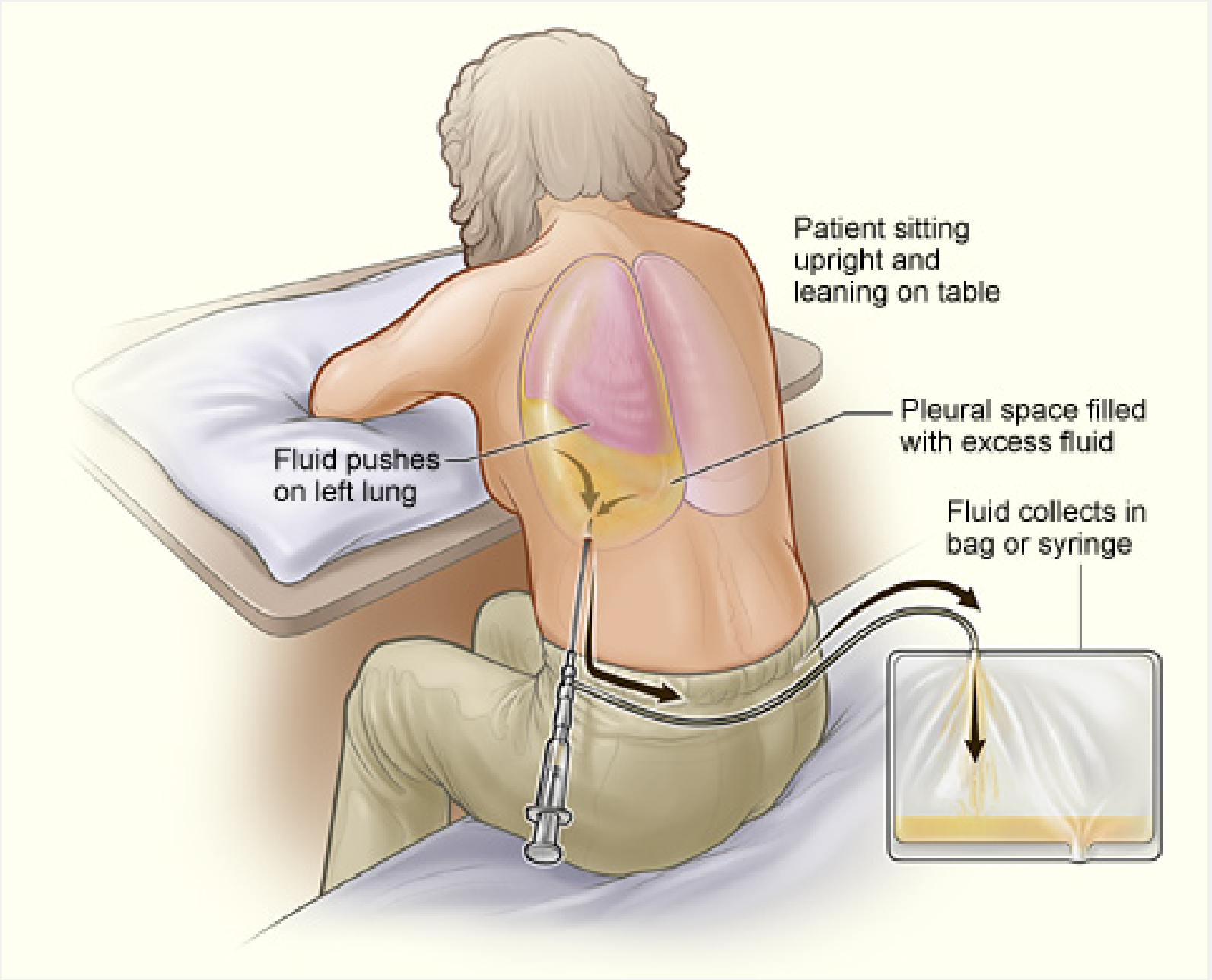
LMS


Chest Wall
Anechoic Space
Diaphragm
Lung
10


Patient sitting
upright and
leaning on table
Pleural space filled
with excess fluid
Fluid pushes
on left lung
Fluid collects in
bag or syringe

PLEURAL FLUID ANALYSIS

- Straw colored clear fluid
- pH: 7.3
- Protein: 2g/dl
- LDH: 50
- Gm stain: No organisms
- AFB: No organisms
- No malignant cells

LIGHT'S CRITERIA

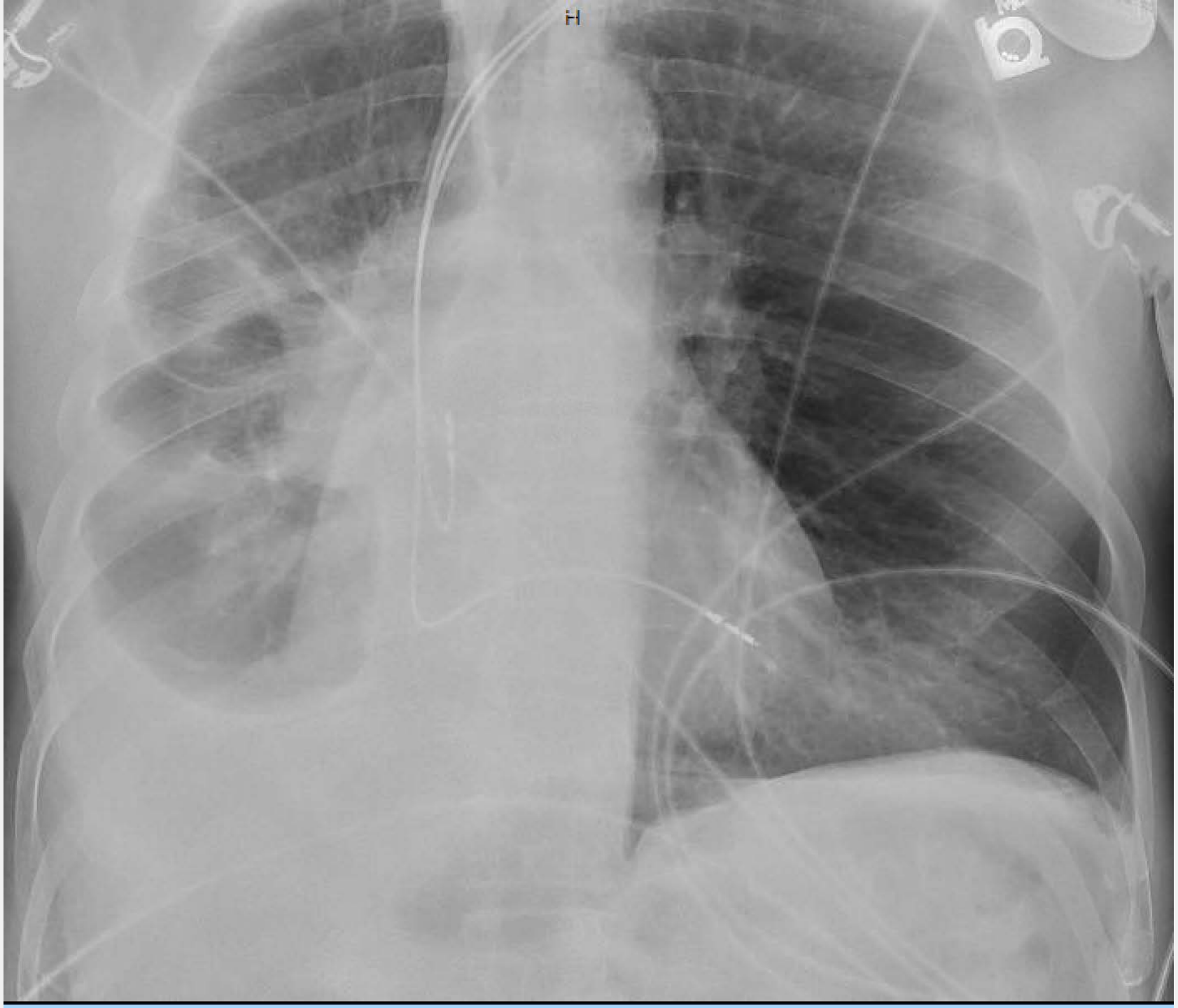
- Pleural fluid protein divided by serum protein is greater than 0.5.
- Pleural fluid LDH divided by serum LDH is greater than 0.6.
- Pleural fluid LDH is greater than two-thirds the upper limit of
- normal for the serum LDH.
- If none of these criteria is met, the patient has a transudative pleural effusion

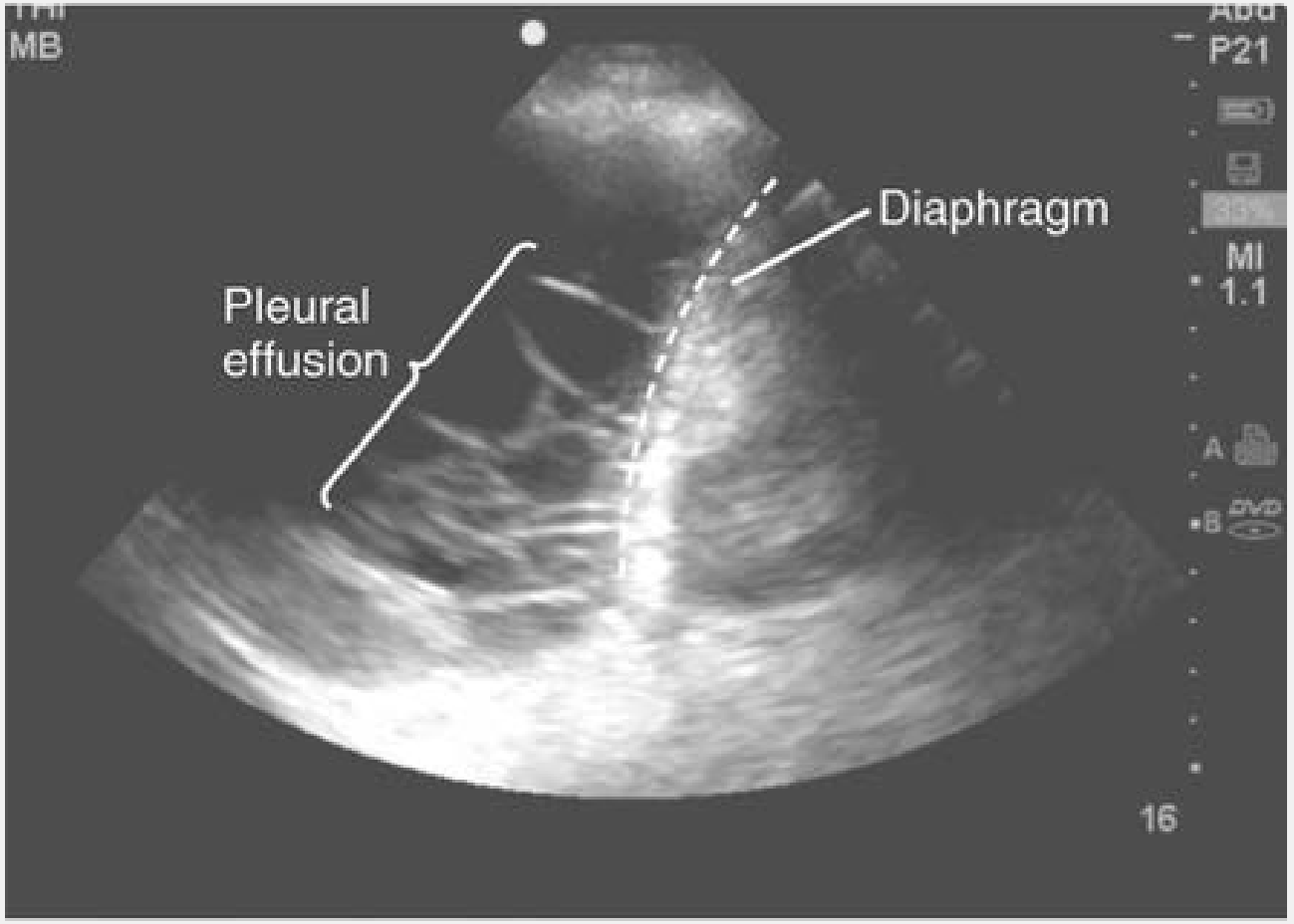
CAUSES OF TRANSUDATE

- Congestive heart failure
- SVC syndrome
- Liver disease
- Kidney disease

CASE

- 70-year-old man presented with a 5 day H/O fever, productive cough and shortness of breath.
- Exam: T: 102, HR 95, RR 30, BP 100/40
- Lungs: Diminished breath sounds right base, dullness to percussion
- CV: Tachycardia
- Abdomen: Normal




MB
P21
MI
1.1
Diaphragm
Pleural
effusion
16

PLEURAL FLUID ANALYSIS

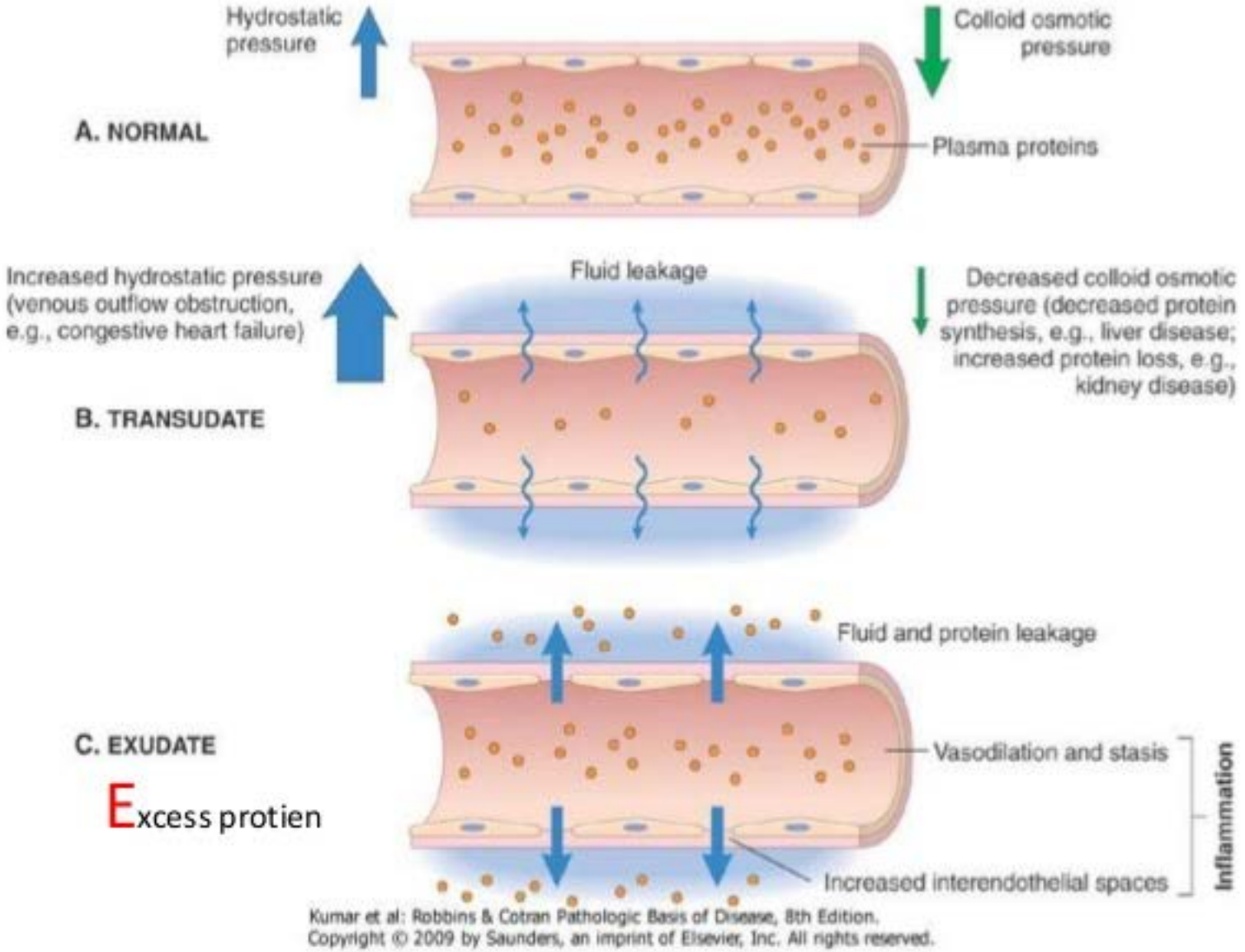
- Cloudy fluid
- pH: 7.1
- Protein: 3.5g/dl
- LDH: 195
- Cell count: predominate neutrophils
- No malignant cells

MECHANISMS THAT MAY PLAY A ROLE IN THE FORMATION OF PLEURAL EFFUSION

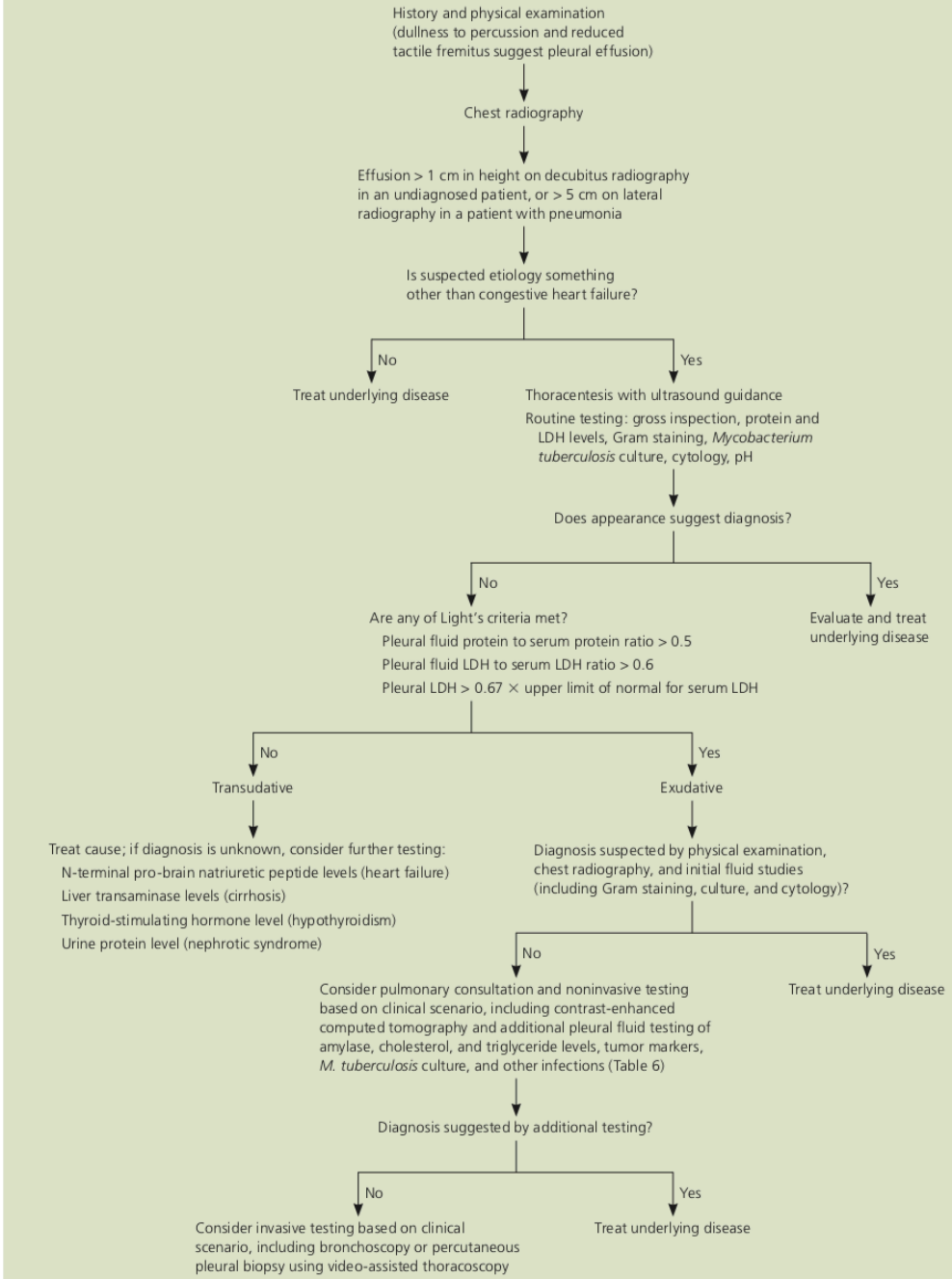
- Altered permeability of the pleural membranes (eg, inflammation, malignancy, PE)
- Reduction in intravascular oncotic pressure
- Increased capillary permeability or vascular disruption (eg, trauma, malignancy, inflammation, infection, pulmonary infarction, drug hypersensitivity, uremia, pancreatitis)
- Increased capillary hydrostatic pressure in the systemic and/or pulmonary circulation (CHF, SVC syndrome)
- Reduction of pressure in the pleural space (ie, due to an inability of the lung to fully expand during inspiration); this is known as "trapped lung”

MECHANISMS THAT MAY PLAY A ROLE IN THE FORMATION OF PLEURAL EFFUSION

- Decreased lymphatic drainage or complete lymphatic vessel blockage, including thoracic duct obstruction or rupture (eg, malignancy, trauma)
- Increased peritoneal fluid with microperforated extravasation across the diaphragm via lymphatics or microstructural diaphragmatic defects
- Movement of fluid from pulmonary edema across the visceral pleura
- Persistent increase in pleural fluid oncotic pressure from an existing pleural effusion, causing further fluid accumulation

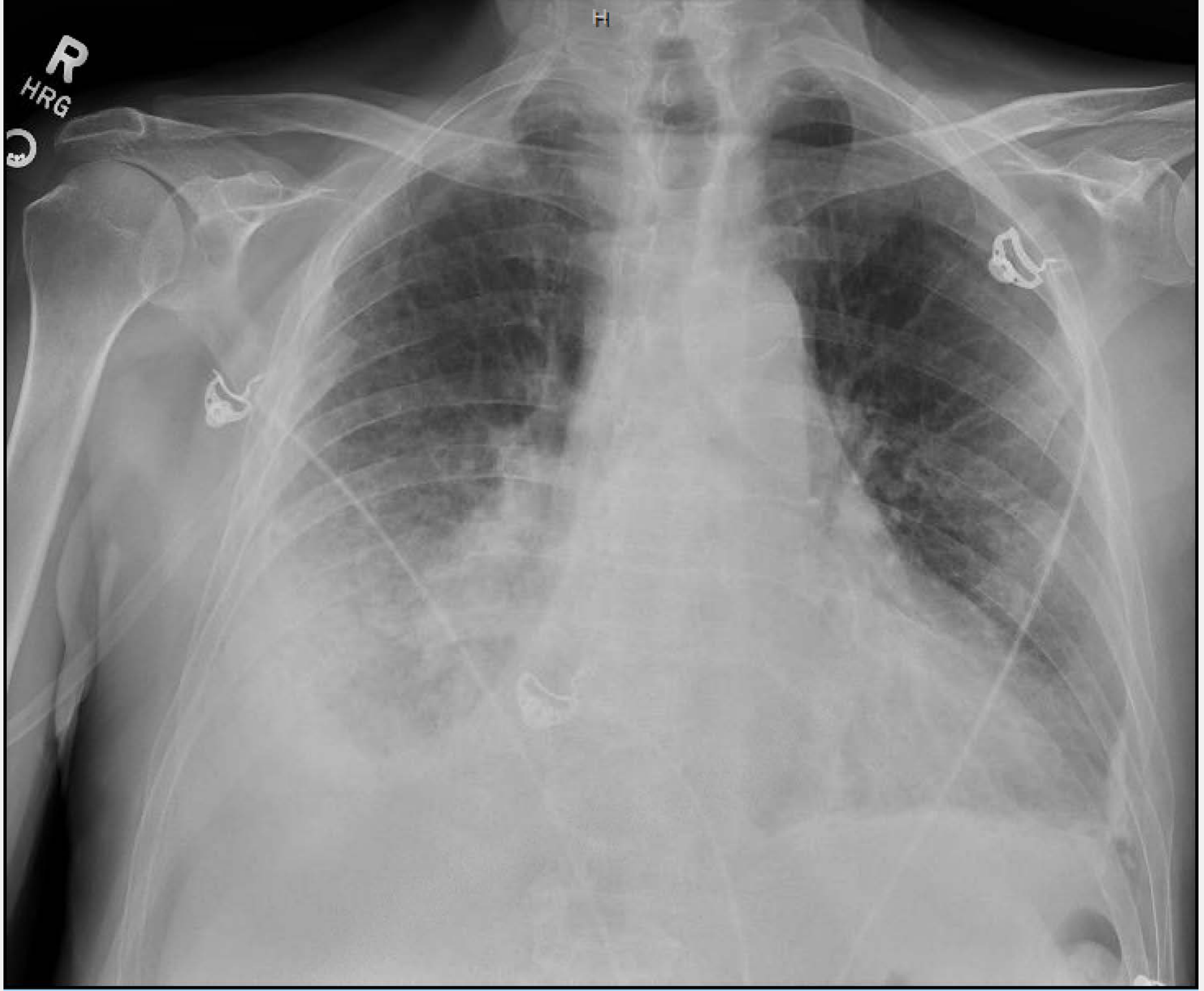


Evaluation of Pleural Effusion



CASE

- 81-year old man presented with hemoptysis and worsening dyspnea
- Exam – diminished sounds right base.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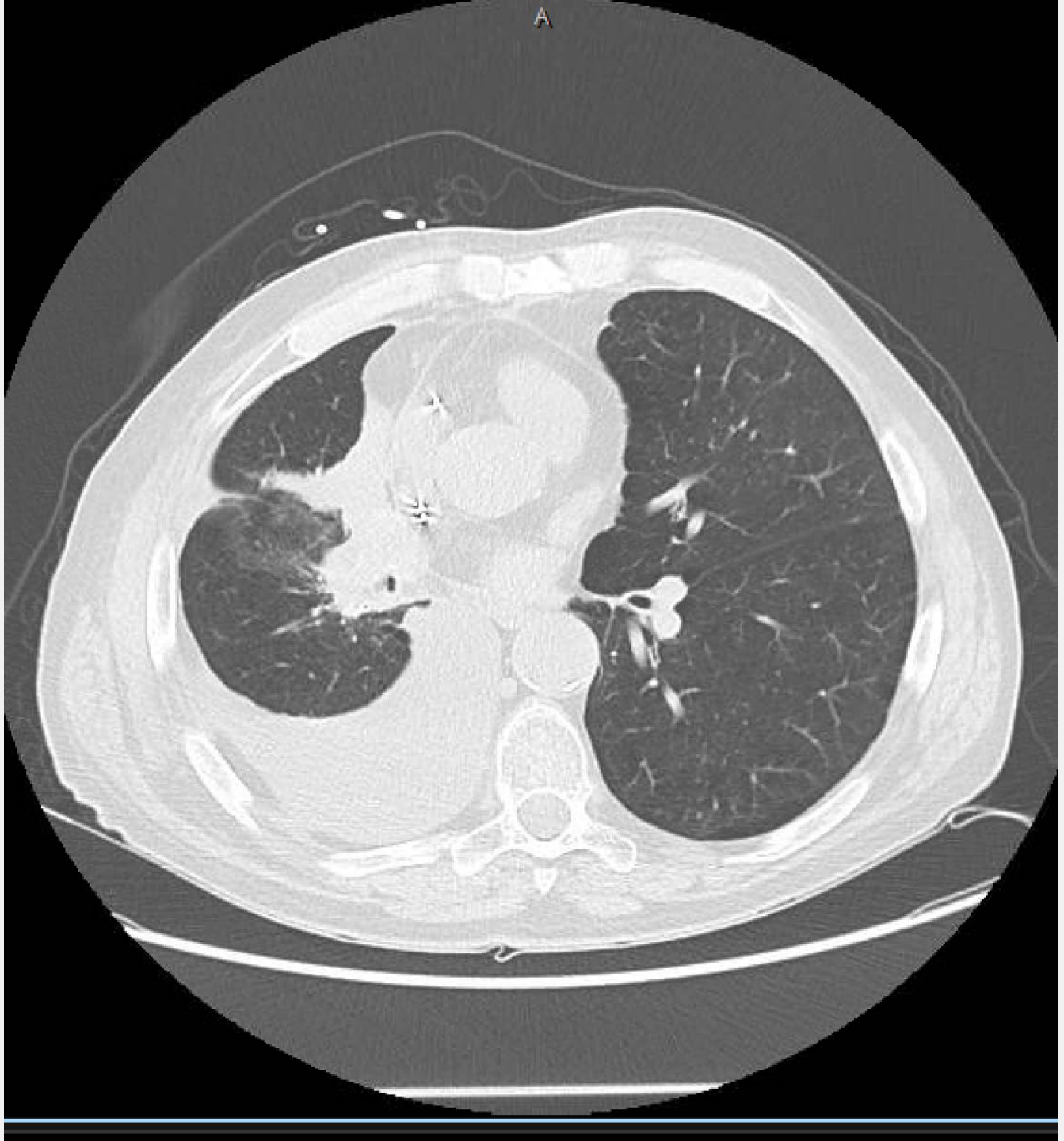
HRG


A

CASE

- CXR – Right pleural effusion.
- Bronch + EBUS-TBNA – Small cell lung ca.
- Effusion recurred after drainage.

MANAGEMENT OPTIONS

- Chemotherapy (Breast, Small call Lung ca)
- Radiation Therapy (mediastinal XRT in Lymphoma)
- Repeated Thoracentesis
- Chest tube drainage and talc pleurodesis
- Medical / Surgical Thoracoscopy and talc poudrage
- Pleurectomy/ Decortication
- Indwelling Pleural catheters

GOALS OF TREATMENT

- Relieve dyspnea
- Minimize morbidity and risk of mortality
- Maximize independence
  - Minimize hospitalization time
  - Minimize need for recurrent visits

THERAPEUTIC THORACENTESIS

- Usually the initial step in managing MPE
- Allows you to confirm that dyspnea is secondary to MPE
- Fluid and symptoms recur in over 90% within 30 days
- Repeated thoracentesis reasonable for:
  - Slowly reaccumulating effusions
  - Highly responsive malignancies
  - Severely debilitated patients
  - Fluid reaccumulation after pleurodesis
  - Patients with short life expectancy

PLEURODESIS

- Who should get pleurodesis?
  - Respiratory symptoms due to MPE (Relief with thoracentesis)
  - Complete rexpansion of lung after thoracentesis
  - Life expectancy more than 1-3 months

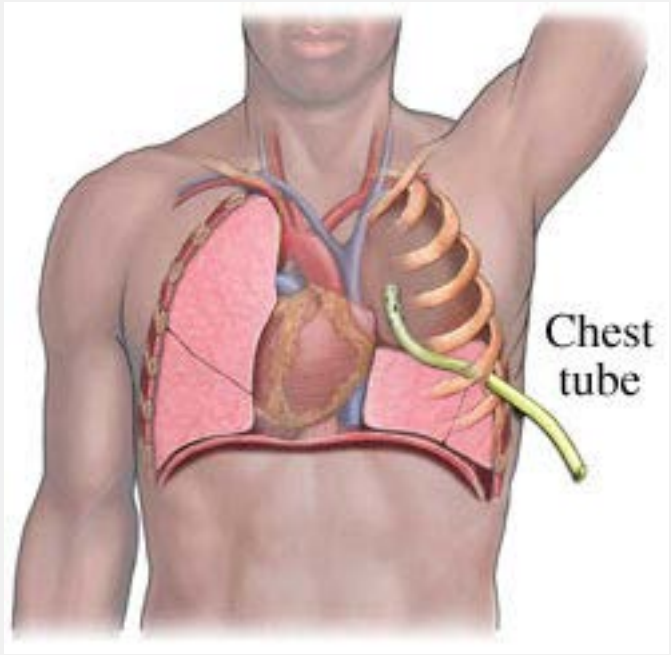
PLEURODESIS

- Pleurodesis is avoided in:
  - Presence of loculations
  - Trapped lung (Lack of expansion of lung after thoracentesis)
  - Large tumor masses in the Pleural space
  - Poor medical condition to tolerate procedure and or pain and discomfort associated with pleurodesis

HOW TO ACHIEVE PLEURODESIS?

- Modality
  - Chest tube + sclerosant
  - Pleuroscopy + sclerosant
  - VATS
  - Tunneled pleural catheter

CHEST TUBE



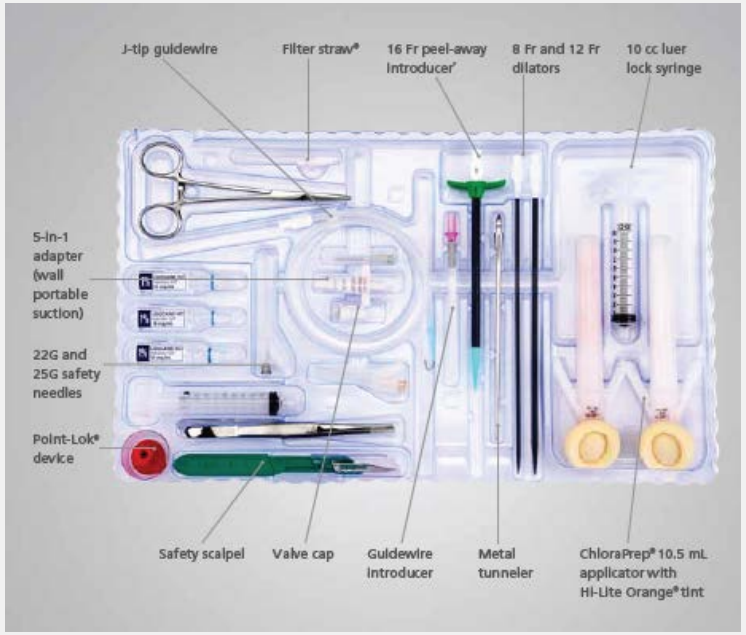
CHEST TUBE DRAINAGE AND CHEMICAL PLEURODESIS

- 80%- 90% success
- Inpatient, 5-7 days
- Discomfort (fever, pain, immobility)
- Cost

CHEST TUBE DRAINAGE AND CHEMICAL PLEURODESIS

- Small bore catheters are just as good as large bore catheters
- Patient rotation does not make any difference in talc and tetracycline derivatives pleurodesis (Lung Cancer
- 2002, Chest 1993)
- Avoidance of steroids and non-steroidal anti- inflammatory agents (AJRCCM 1999)
- Rapid pleurodesis within 24 hours showed satisfactory results. (Spiegler PA et al. Chest 2003;123:1895-8)

INDWELLING PLEURAL CATHETER



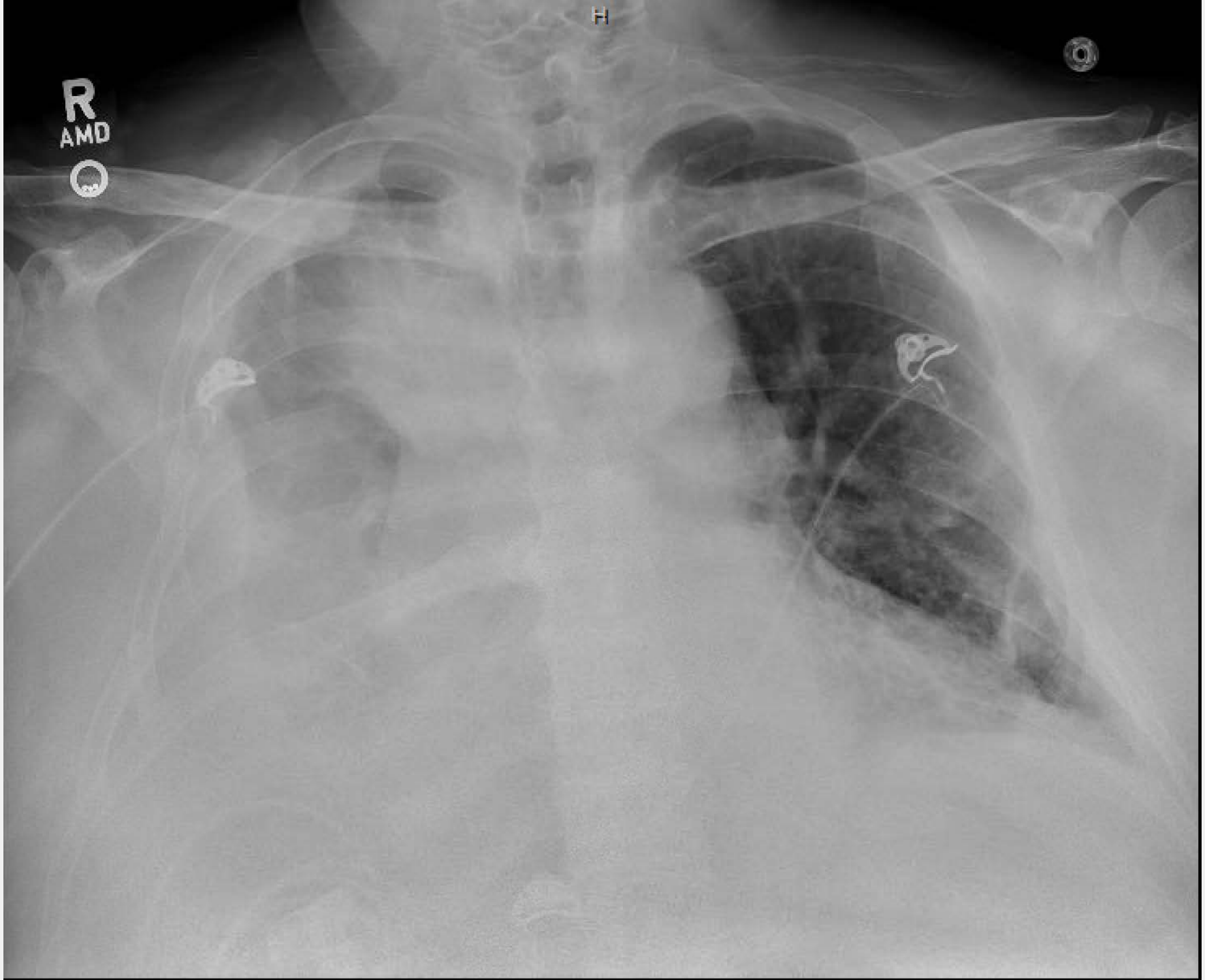
THORACOSCOPY

- Both a diagnositic as well as a therapeutic modality
- Diagnostic:
  - To examine the visceral and parietal pleura
  - Pleural Biopsy
  - Lung Biopsy
  - Fluid analysis

- Medical thoracoscopy (pleuroscopy)
- Video assisted thoracoscopic surgery (VATS)

CASE

- 61 year old man diagnosed with prostate cancer.
- Persistent dyspnea.
- Exam – diminished breath sounds on the right with some ronchi.
- CXR – right pleural effusion.
- Thoracentesis consistent with exudate – no malignancy.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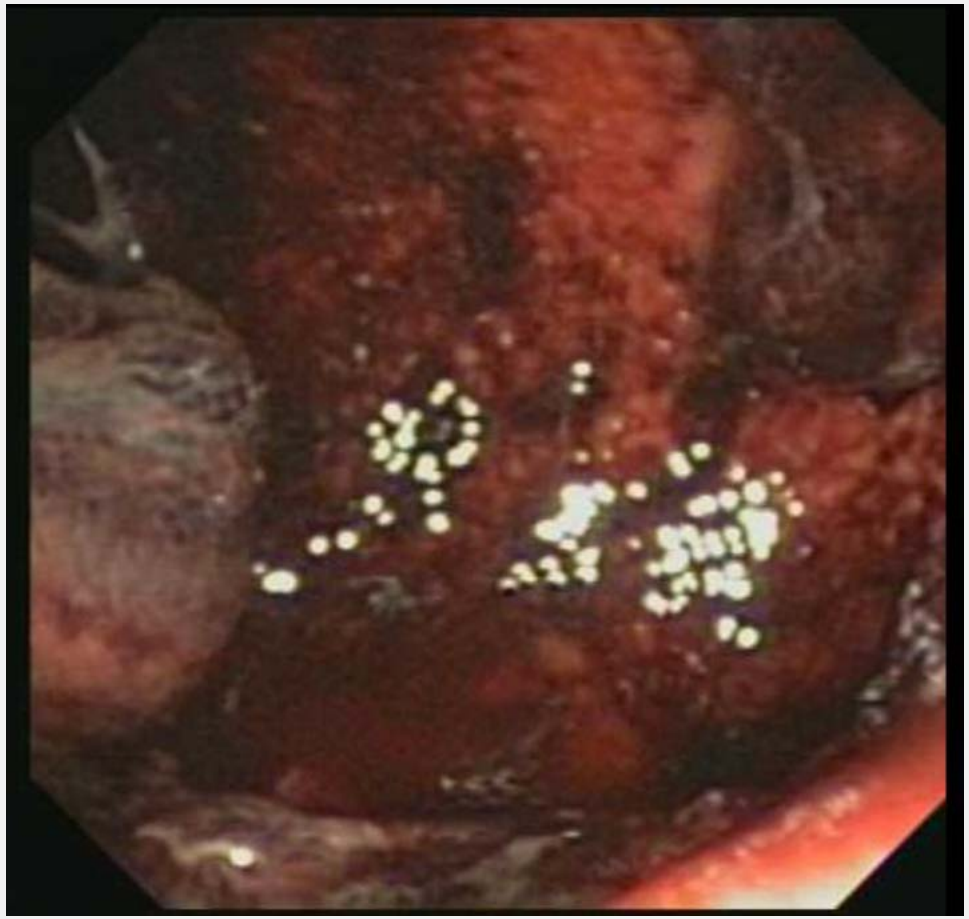
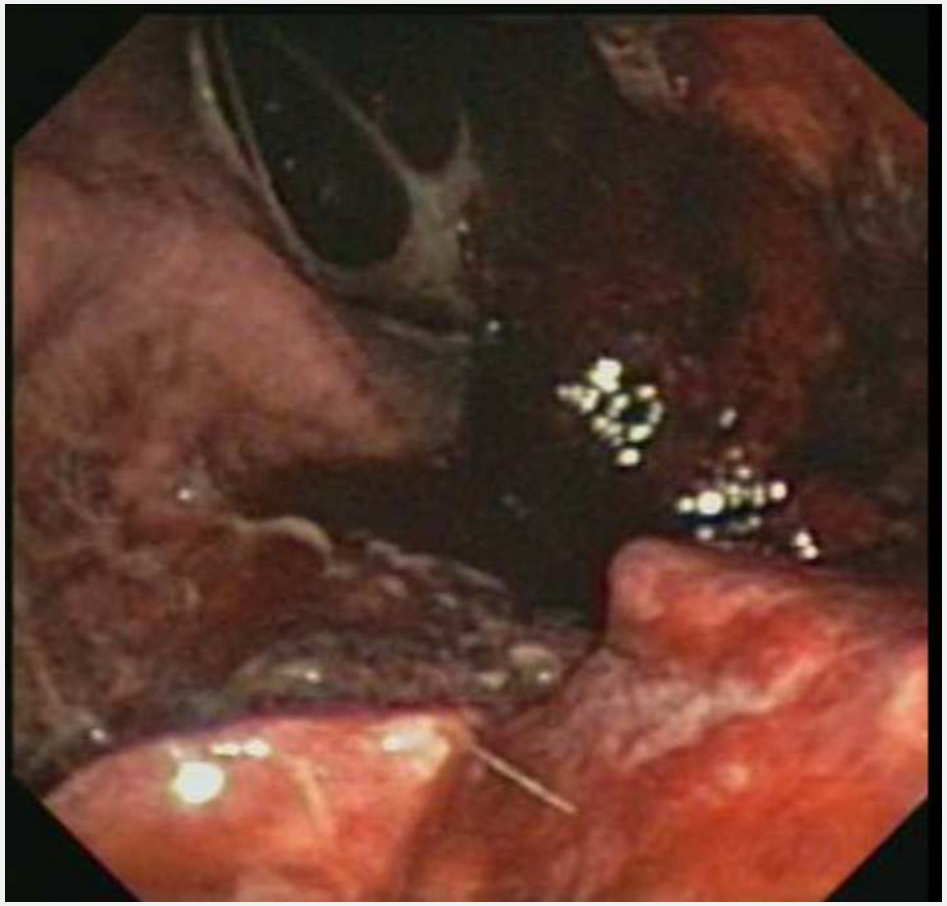
PLEURAL FLUID

- Diagnostic yield of the pleural fluid depends on
  - extent of the tumor
  - nature of the primary tumor
- Yield of first thoracentesis ranges from 60-90% (Johnston WW, cancer 1985, 56)
- Second tap can increase the yield by 10 to 20 %





Pleura mets from prostate

CASE

- 81 year old woman with worsening dyspnea and chest tightness.
- Physical exam – diminished breath sounds on the left side.
- CXR showed a worsening left pleural effusion/ mass like opacity.
- Had thoracentesis in the past which showed lymphocyte predominant exudate.

Fibrous tumor of the mediastinum

Management of a malignant pleural effusion: British Thoracic Society pleural disease guideline 2010

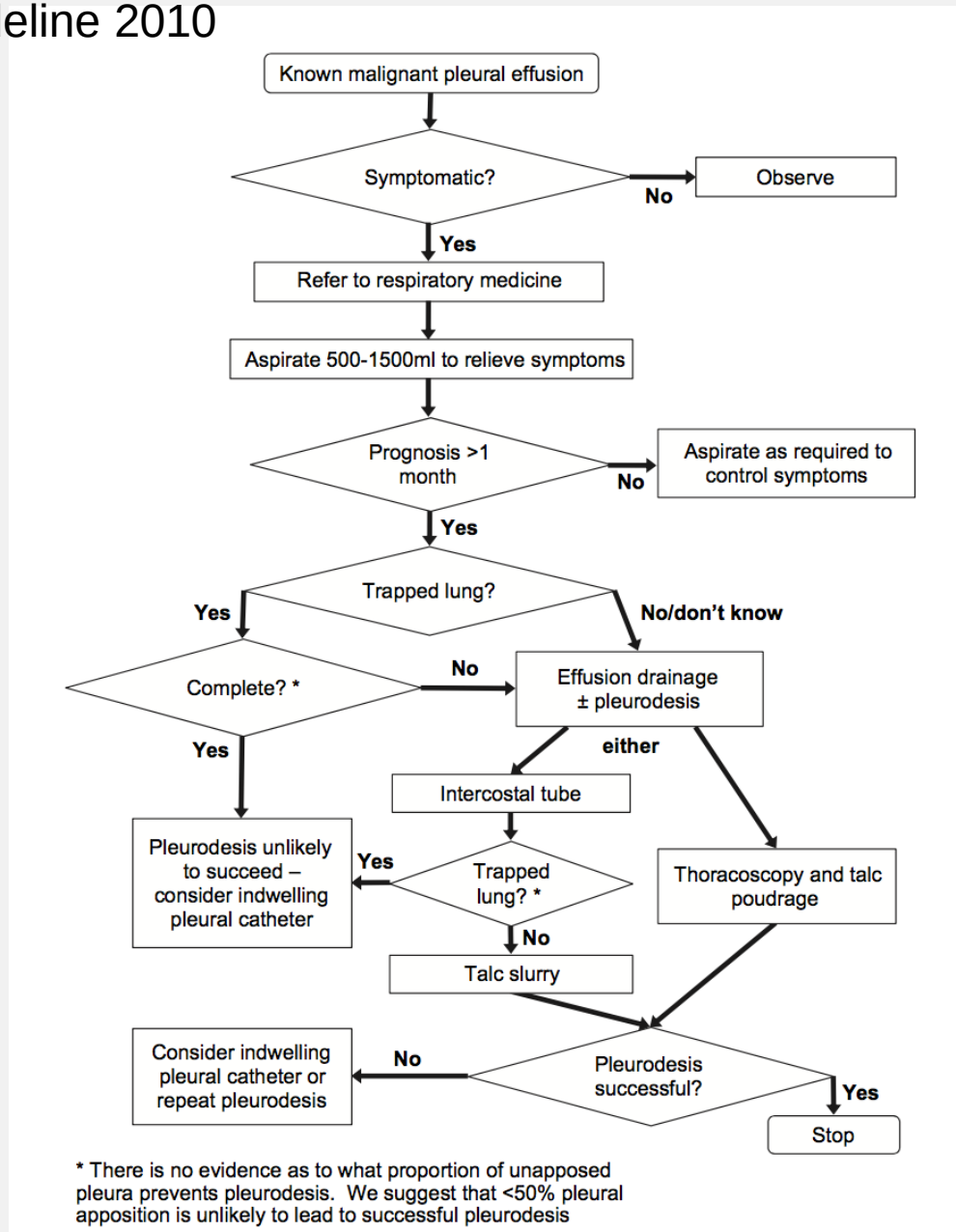
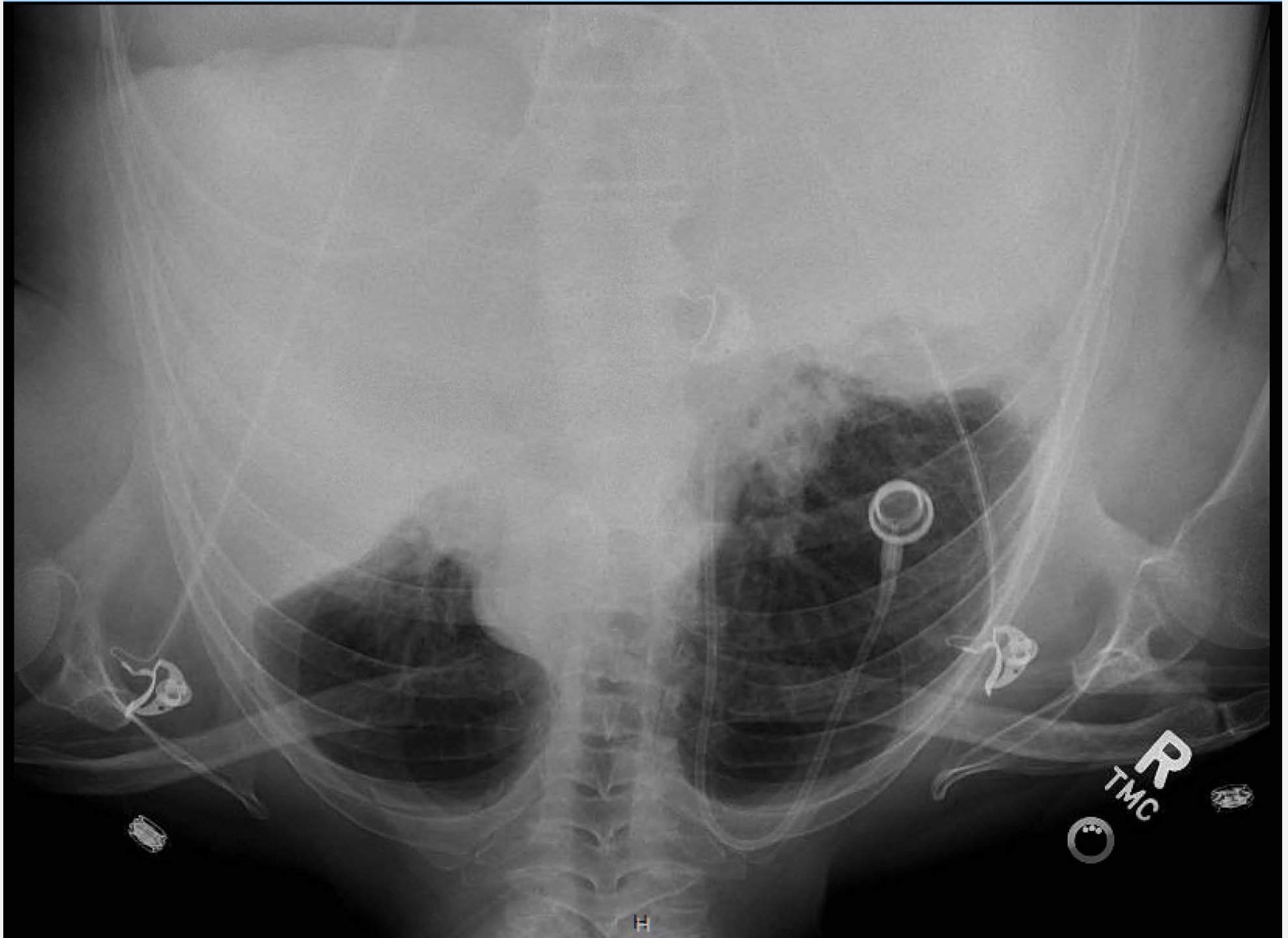


Figure 1 Management algorithm for malignant pleural effusion.

Thorax 2010;65 (suppl 2):ii32-40

CASE

- 63-year-old woman with worsening dyspnea.
- New diagnosis of breast cancer.
- Exam – diminished breath sounds bilaterally.
- CXR – bilateral pleural effusion.
- Thoracentesis – exudate – metastatic adenocarcinoma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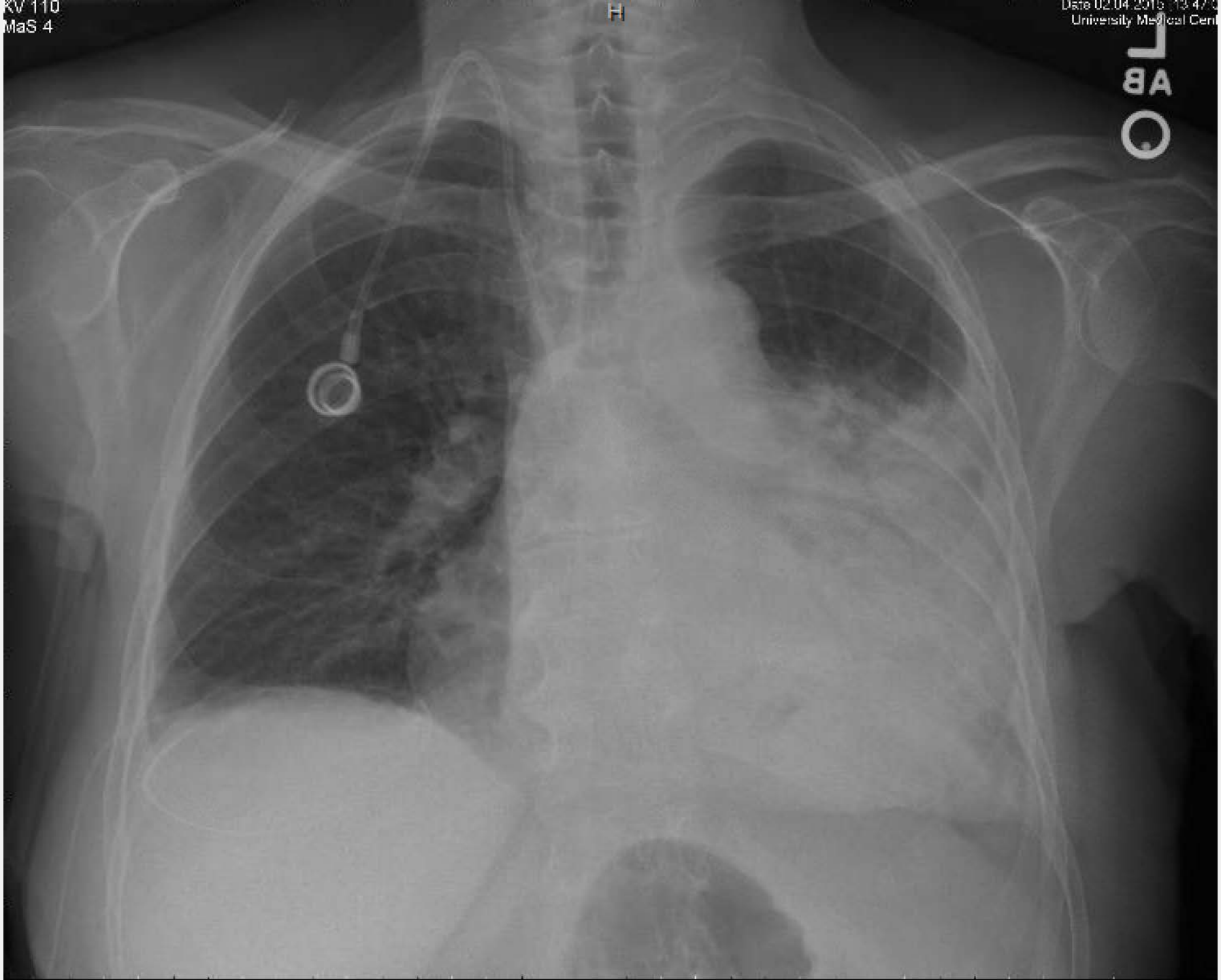
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University Medical Cen
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