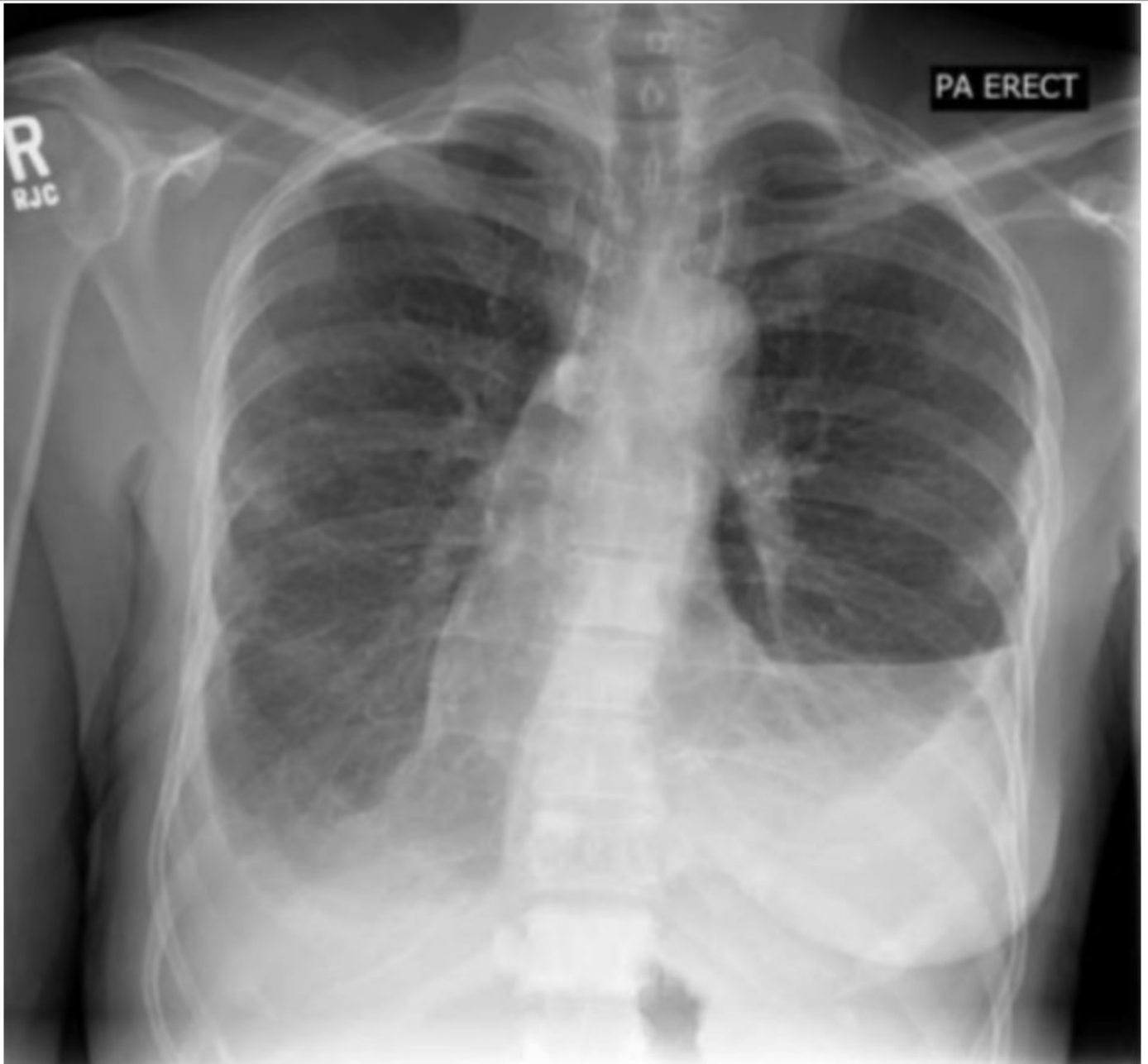


**Trigger :**

A 48 yo lady presents with dyspnoea on a background of recently diagnosed breast cancer.

**Task 1:** Interpret the CXR and identify the abnormalities.



Details and demographic	PA erect chest X-ray of a 63 yo lady presenting with dyspnoea take today at 0X00 hrs.
RIPE/Quality	Rotation : Some rotational artifact towards the left.
	Inspiration: Adequate inspiratory effort with 6 anterior ribs showing.
	Projection: PA
	Exposure: Adequate exposure
Airways and lung fields	Trachea is not equidistant between two clavicles, normally indicative of deviation however there is rotational artefact making this difficult to interpret.  Lung fields: <ul style="list-style-type: none"> <li>- Meniscus sign on L lower zone with an associated area of increased opacification. This is suggestive of a <b>pleural effusion</b>.</li> <li>- This is likely an <b>exudative</b> effusion as it is <b>unilateral</b>.</li> </ul>
Bones and soft tissue	No obvious deformities or fractures.
Cardo-mediastinum	Mediastinum appears to be midline and non-enlarged.  Right cardiac border can be visualised, left cardiac border cannot be clearly visualised secondary to opacification, therefore cardiac size is unable to be accurately assessed.
Diaphragm	Blunting of the right costophrenic angle consistent with small right effusion. Loss of left costophrenic angle secondary to dense opacification in left lower zone.
Everything else	No free gas under the diaphragm, no subcutaneous emphysema is noted.
Interpretation	This is the CXR of a 63yo lady with dyspnoea on a b/g of known breast cancer. There is a left sided pleural effusion indicated by the presence of the <u>meniscus sign</u> and dense opacification. The nature of the effusion is likely <u>exudative</u> due to the effusion being unilateral. I am most concerned about a <b>malignant effusion</b> but would also like to exclude an infective cause.  Note: in a patient with active cancer presenting with acute SOB, PE should also be ruled out.

### **Follow-up questions:**

**Question 1:** What is the criteria that can be used to differentiate between transudative and exudative pleural effusions?

**Question 2:** List 3 causes of transudative effusions and 3 causes of exudative effusions.

### **Answers: Q1**

**Light's criteria** can be used to differentiate between exudative and transudative pleural effusions when diagnostic pleurocentesis is performed. Exudative effusions have:

- Pleural fluid protein: serum protein ratio > 0.5
- Pleural fluid LDH : Serum LDH ratio > 0.6
- Pleural fluid LDH > 2/3 of the upper value for serum LDH

<b>Transudate Versus Exudate<sup>1,2</sup></b>	
Pleural Fluid Protein/Plasma Protein	<b>&gt;0.5</b>
Pleural Fluid LDH/Plasma LDH	<b>&gt;0.6</b>
Pleural Fluid LDH	<b>&gt;200 IU</b>

<sup>1</sup>In patients with **heart failure** on diuretics, Light's Criteria may misclassify a transudate as an exudate up to 25% of the time.

<sup>2</sup>In **heart failure** patients, a serum protein 3.1 g/dl higher than the pleural fluid, or a serum albumin 1.2 g/dl higher than the pleural fluid will help correctly identify a transudate.

## **Answers: Q2:**

Transudative effusions are caused by fluid leakage into the pleural space from increased pressure in blood vessels or a decreased protein count in the blood. Transudative effusions are typically bilateral. Common causes circled below.

**Table 1. Causes of Pleural Effusions.**

### Transudative effusions

Congestive heart failure	Trapped lung
Cirrhosis	Sarcoidosis
Nephrotic syndrome	Myxedema
Glomerulonephritis	Cerebrospinal fluid leak or ventriculopleural shunt
Peritoneal dialysis	Urinothorax
Hypoalbuminemia (typical serum albumin, <1.5 mg/dl)	Pulmonary arterial hypertension
Atelectasis	Pulmonary embolism
Superior vena cava obstruction	Pericardial disease
	Extravasacular migration of central venous catheter

## Answers: Q2 (cont.)

Exudative effusions are caused by inflammation, blocked blood or lymph vessels, lung injury or tumour and are characteristically unilateral. Most common causes circled below.

**Table 1. Causes of Pleural Effusions.**

### Exudative effusions

Infectious: bacterial, viral, tuberculosis-related, fungal, parasitic	Collagen vascular disease: rheumatoid arthritis, systemic lupus erythematosus, Sjögren's syndrome, familial Mediterranean fever, eosinophilic granulomatosis, granulomatosis with polyangiitis
Neoplastic: metastatic disease (e.g., lung cancer, breast cancer, lymphoma, myeloma, ovarian cancer, pancreatic cancer, cholangiocarcinoma), mesothelioma, primary body-cavity lymphoma	Medications: nitrofurantoin, dantrolene, methysergide, dasatinib, amiodarone, interleukin-2, procarbazine, methotrexate, clozapine, phenytoin, $\beta$ -blockers, ergot drugs
Paramalignant effusions: reactive pleuritis due to underlying lung cancer, airway obstruction or atelectasis, radiation-induced pleuritis	Hemothorax
Reactive: reactive pleuritis due to underlying pneumonia (i.e., parapneumonic)	Chylothorax (most commonly seen after trauma or in patients with lymphoma)
Embolic disease: pulmonary embolism	Sarcoidosis
Abdominal disease: pancreatitis, cholecystitis, hepatic or splenic abscess, esophageal perforation after esophageal varix sclerotherapy	Lymphoplasmacytic lymphoma
Cardiac or pericardial injury, including myocardial infarction (after coronary-artery bypass, cardiac surgery, or cardiac ablation procedures), pulmonary-vein stenosis	Cholesterol effusions (commonly seen in tuberculosis, rheumatoid effusions, and any other chronic pleural effusion)
Gynecologic: ovarian hyperstimulation, Meigs' syndrome, endometriosis, postpartum complications	Miscellaneous: benign asbestos pleural effusion, yellow nail syndrome, uremia, drowning, amyloidosis, electrical burns, iatrogenic effusion, capillary leak syndromes, extramedullary hematopoiesis