Case studies of Patients with Pleural Effusions

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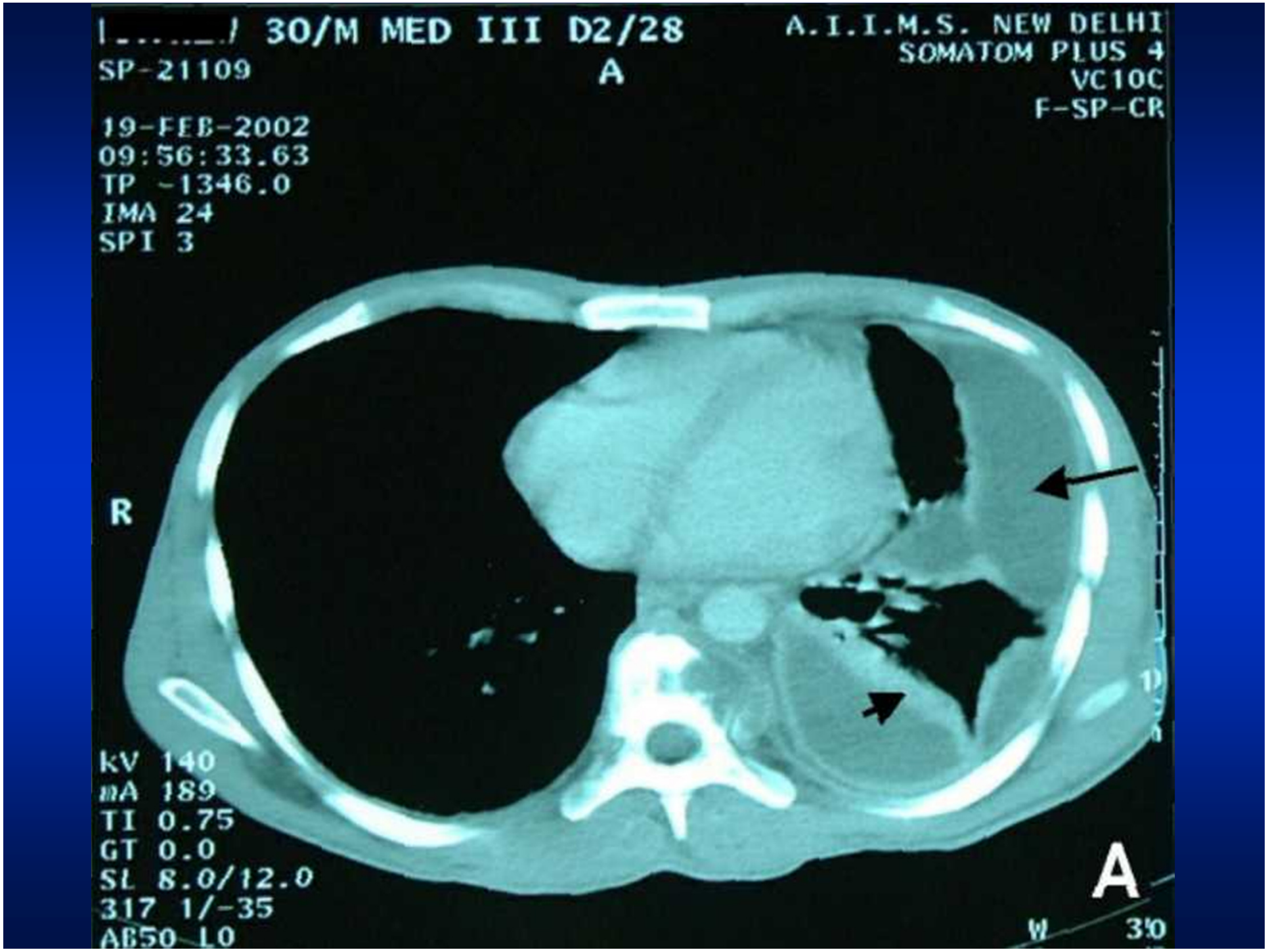
CASE 1

- 77 year old woman with hx of COPD
- 2 week history of URI symptoms
- Zpak and then 10 days antibiotics
- Hospitalized with 3 day history of fever to 39.0 ℃, shaking chills, nausea and large pleural effusion. Weight loss 15 lbs in one month
- PF is a transudate; culture negative

CASE 1 (continued)

- **Transfer to WMC with presumed Pulmonary Embolus**
- **Repeat thoracentesis of 1 liter of cloudy pleural fluid. Severe pain during thoracentesis**
- **Pleural fluid cell count: WBC 9817 86%PMN/14% Mono, RBC 1458**
- **Pleural fluid chemistry: glucose<20, LDH 3208 (serum 426), protein 4.5, amylase<30, PH 6.8**
- **Gram stain positive for organisms**
- **PF culture: strep intermedius**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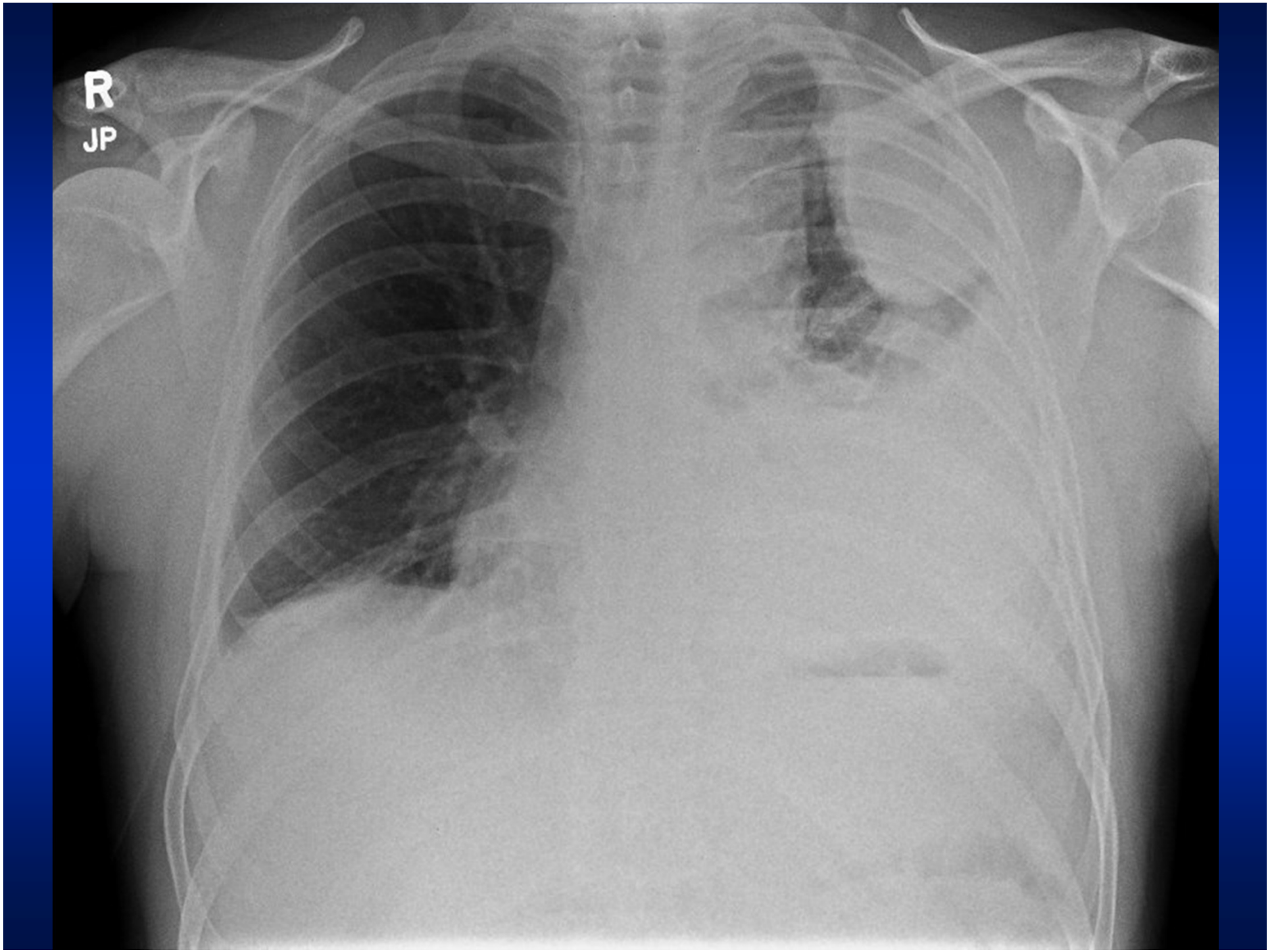
F-SP-CR
19-FEB-2002
09:56:33.63
TP -1346.0
IMA 24
SPI 3
R
kV 140
mA 189
TI 0.75
GT 0.0
SL 8.0/12.0
317 1/-35
AB50 LO
A
W 310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CASE 1 (continued)

- **CT placed under CT guidance**
- **Fluid partially loculated**
- **WBC 44 K, Fever 39.9℃, Na 128**
- **3 days of intrapleural TPA given**
- **CXR shows no resolution of Pleural effusion**
- **Day 5 decortication via VATS**

Light's criteria for Exudates

- PF protein/serum protein is >0.5
- PF LDH/serum LDH is > 0.6
- PF LDH is >0.6 or ⅔ times the normal upper limit for serum LDH
- Sensitivity 98% and specificity 80%
- 20% transudative effusions are misidentified as exudative effusions.

Light's criteria Corollary

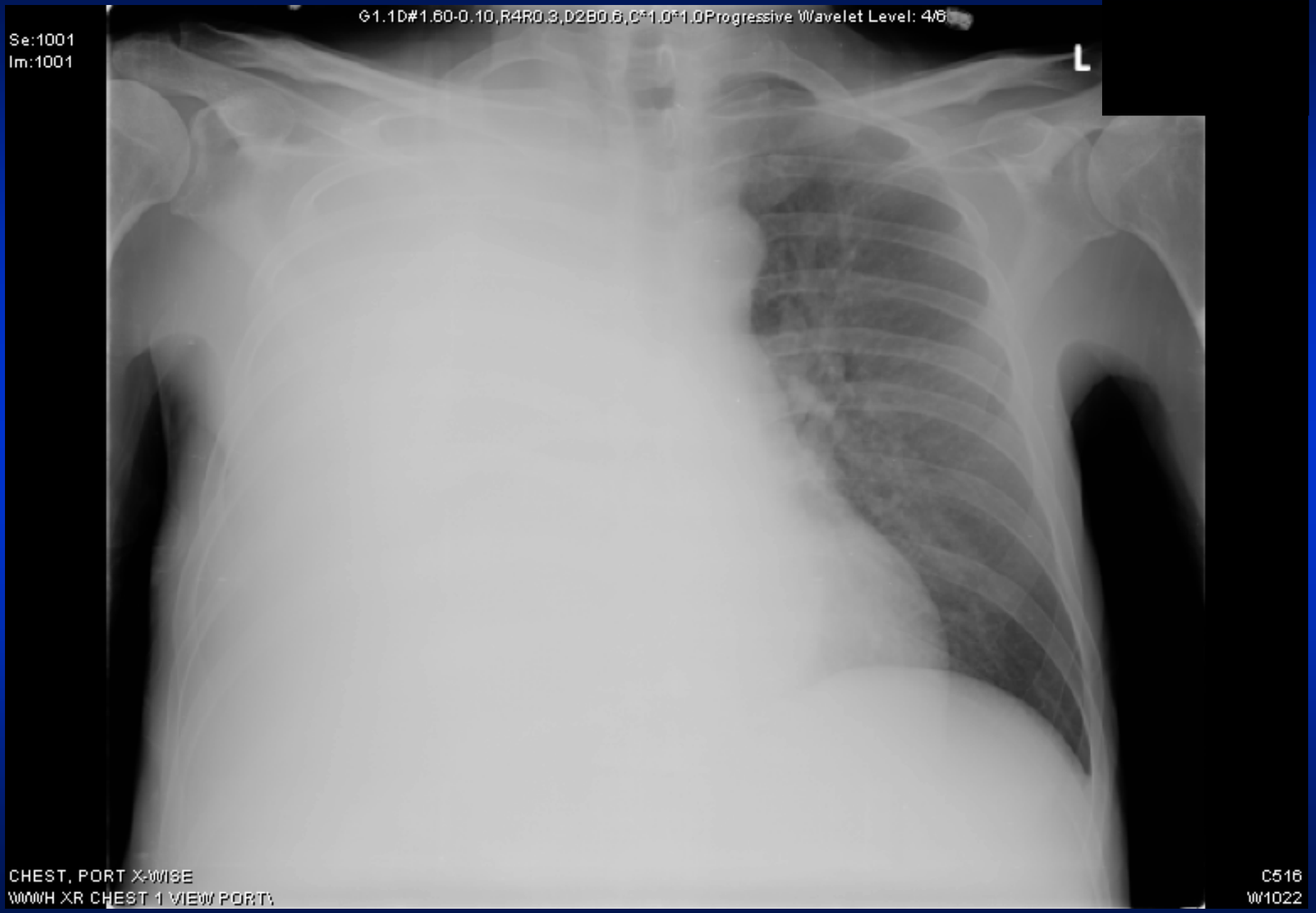
- **If difference between the serum albumin and PF >1.2 g/dL (12 g/L), transudative pleural effusion**
- **whether PF is a transudate/exudate is based not on chemical analysis of the fluid, but on diagnosis of the disease that produces the fluid.**

Risk for Poor outcome in Parapneumonic effusions

- **category 1: small size VERY LOW**
- **category 2: size > 10-mm thickness and < one-half the hemithorax. Gram stain /cx negative. pH >7.2 or glucose level >60 mg/dl. LOW**
- **category 3: one-half the hemithorax, loculated, thickened parietal pleura. Gram stain /cx positive or pH <7.20 or glucose <60 mg/dl. MODERATE**
- **category 4: pus. HIGH**

CASE 2

- 42 year old male with hx of liver cirrhosis
- Shortness of breath for 2 months
- Recurrent ascites with monthly therapeutic paracentesis
- Compliant with medical management
- No hx of renal insufficiency or encephalopathy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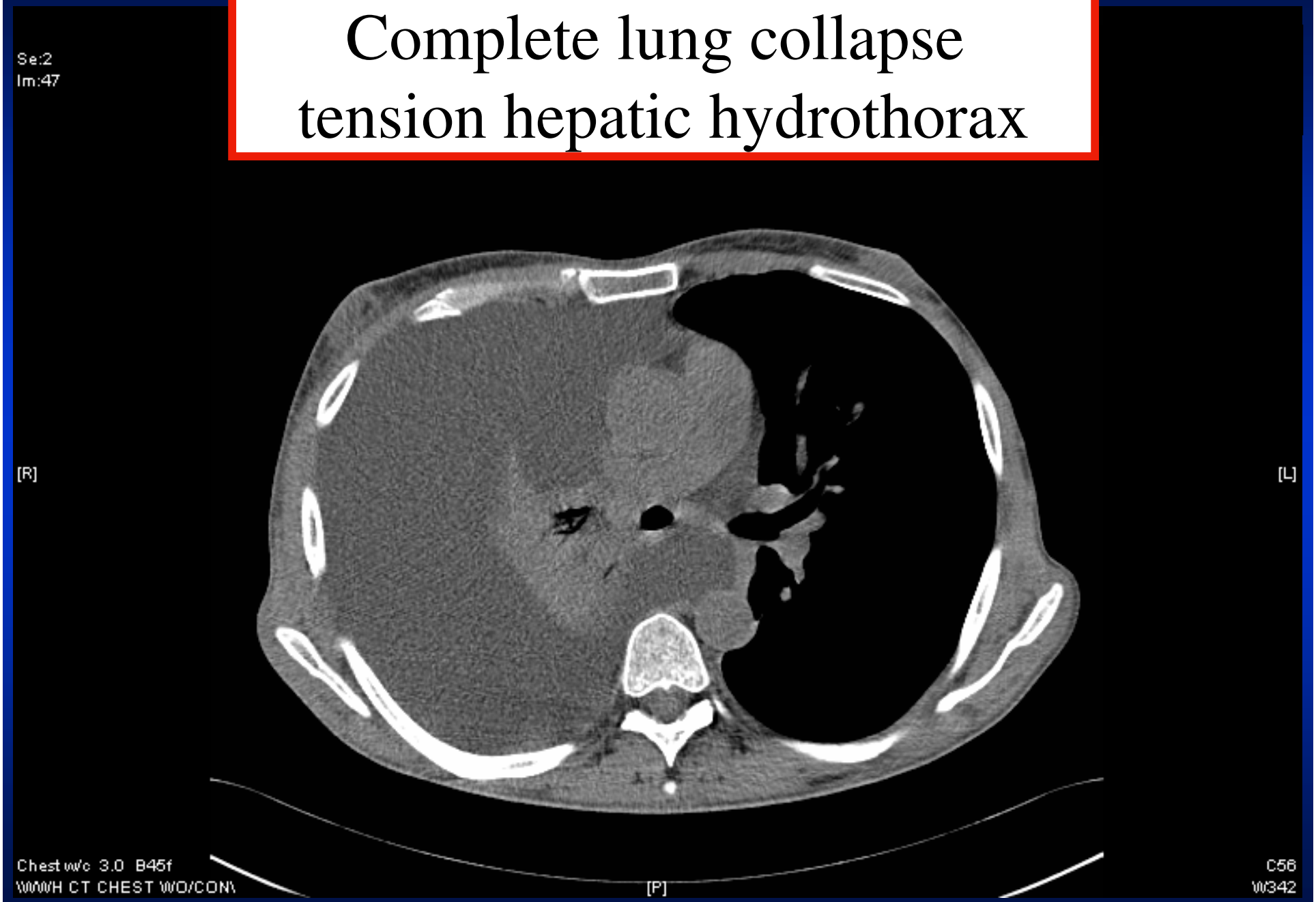
C516
W1022

Complete lung collapse
tension hepatic hydrothorax



Hepatic Hydrothorax

- **prevalence 5-10% in ESLD**
- **[99Tcm]human albumin studies – unidirectional flow of ascites to pleural cavity**
- **negative intrathoracic pressure favors transfer of fluid across defects and often pts. have minimal ascites**

Rubenstein D et al. Gastroenterology 1985.
Serena A et al. Eur J Nucl Med 1985.

Hepatic Hydrothorax
clinical features

- **Usually right unilateral pleural effusion**
- **Transudative pleural effusion-**

Cell count <500 PMN cells/mm^3 if uncomplicated

- **Total protein and albumin may be higher than ascitic fluid (different mechanisms of fluid absorption in pleural space)**

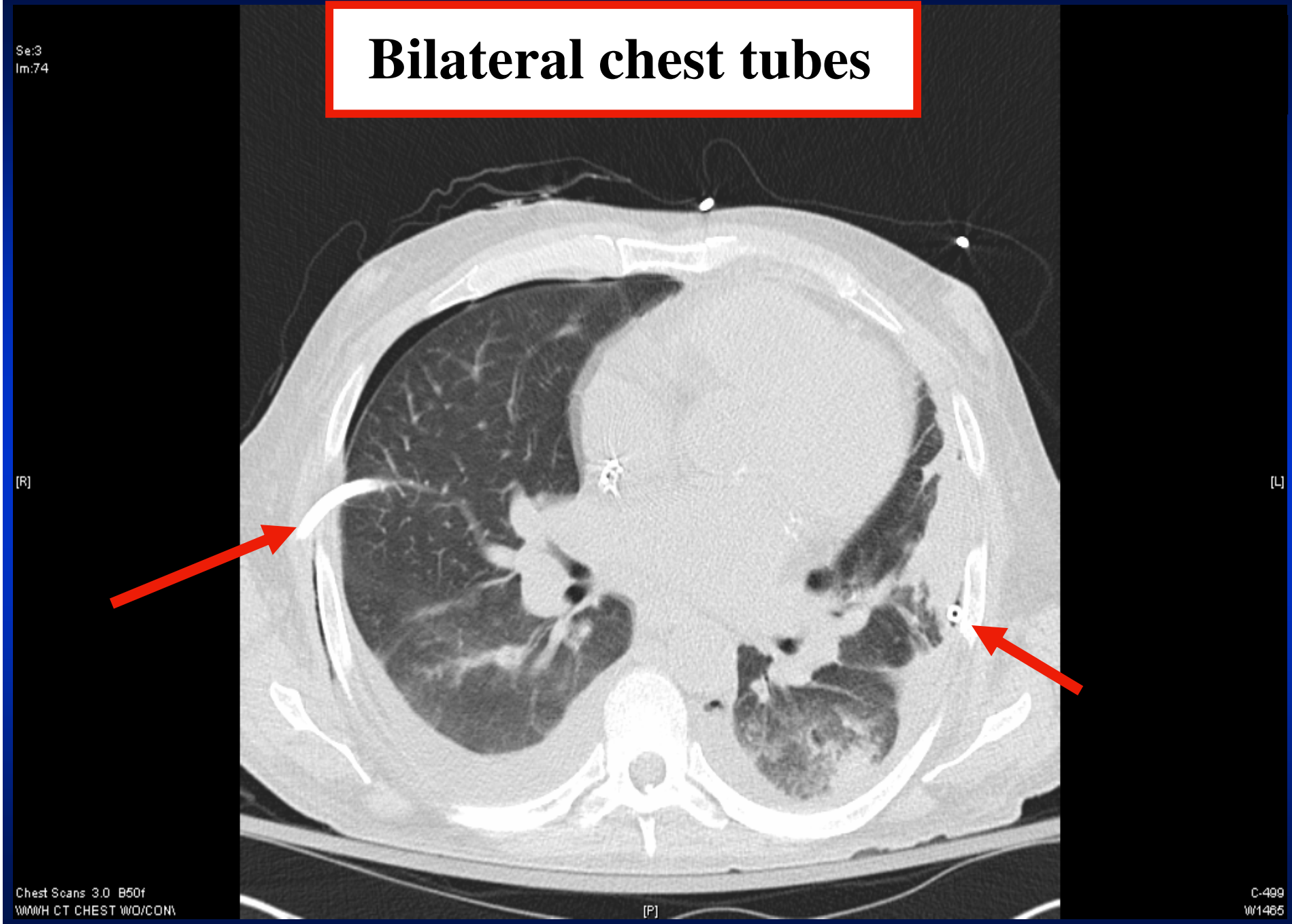
CASE 2 (continued)

- **Pleural fluid cell count: 120 WBC, 40%PMN, 60%Monocytes, RBC 500**
- **PF chemistry: Consistent with transudate**
- **Therapeutic thoracentesis of 4 liters with albumin replacement**
- **Discharged to home on aggressive diuretic regimen**

CASE 2 (continued)

- **Increasing shortness of breath over one month**
- **Follow-up labs show BUN/CR increased**
- **Recurrent large pleural effusion**
- **Placement of bilateral chest tube**
- **F/u trapped lung and restrictive lung disease**

Bilateral chest tubes




2 months later
Se:3
Im:65
[R]
[L]
CHEST W/O CONTRAST
\\WWH CT CHEST WO/CON\PNEUMOTHORAX, ASSESS CHANGE
[P]
C-499
W1465

Chest tube placement in cirrhotics

- 80 % morbidity from placement
- Bleeding, infection, hemothorax
- Protein and electrolyte depletion
- Difficulty removing the tube due to persistant portal hypertension

Borchardt J et al. BMJ 2003; 326:751-2.

Runyon BA et al. Am J Gastroenterol 1986;81:566-7.

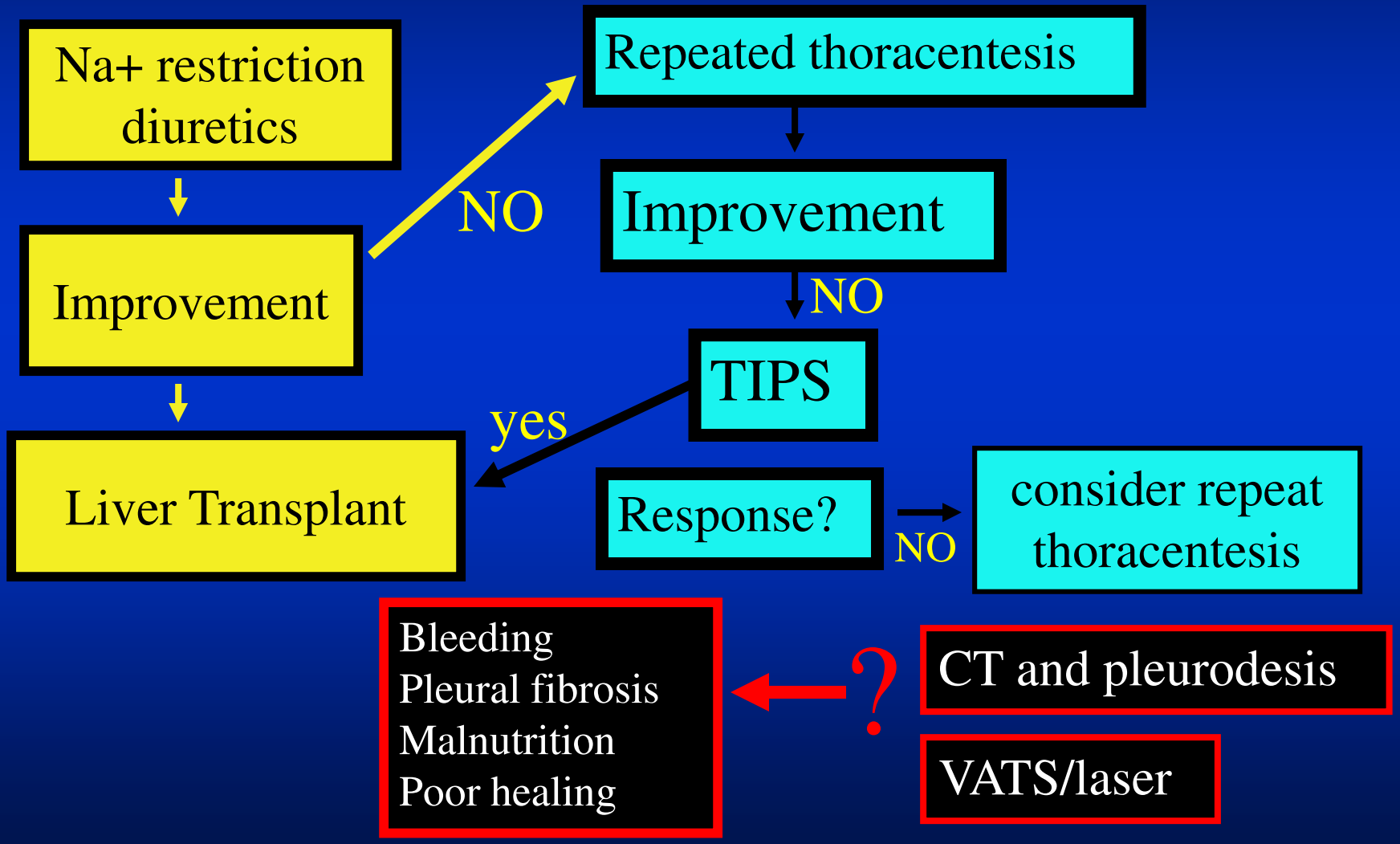
VATS with Pleurodesis

Recurrence in 43.7% within three months

- **fever, chest pain, empyema, incomplete re-expansion, pneumonia and wound infection**
- **morbidity (57.1%) and mortality (38.9%)**

Milanzez de Campos JR et al. Chest 2000;118:13-7.

Management of Hepatic Hydrothorax

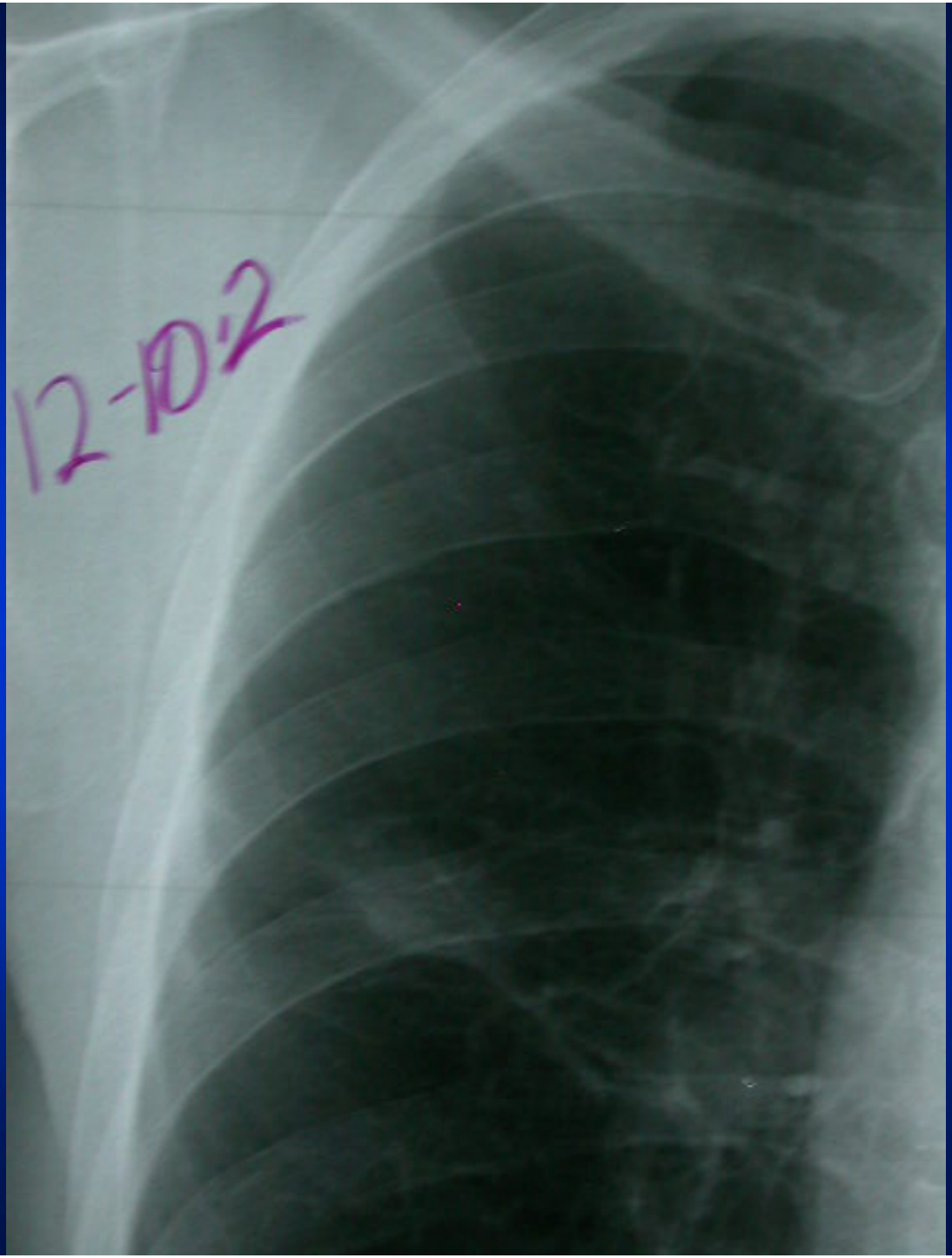


Transudative pleural effusions

- CHF
- Hepatic Cirrhosis
- Hypoproteinemia
- Nephrotic syndrome
- Acute atelectasis
- Myxedema
- Meig's syndrome
- Obstructive uropathy

53 y.o. male

- Smoker
- Severe COPD
- Routine CXR -> R Lung nodule
- 2/03 TTNA -> NSCLC
- Rx -> XRT till 4/03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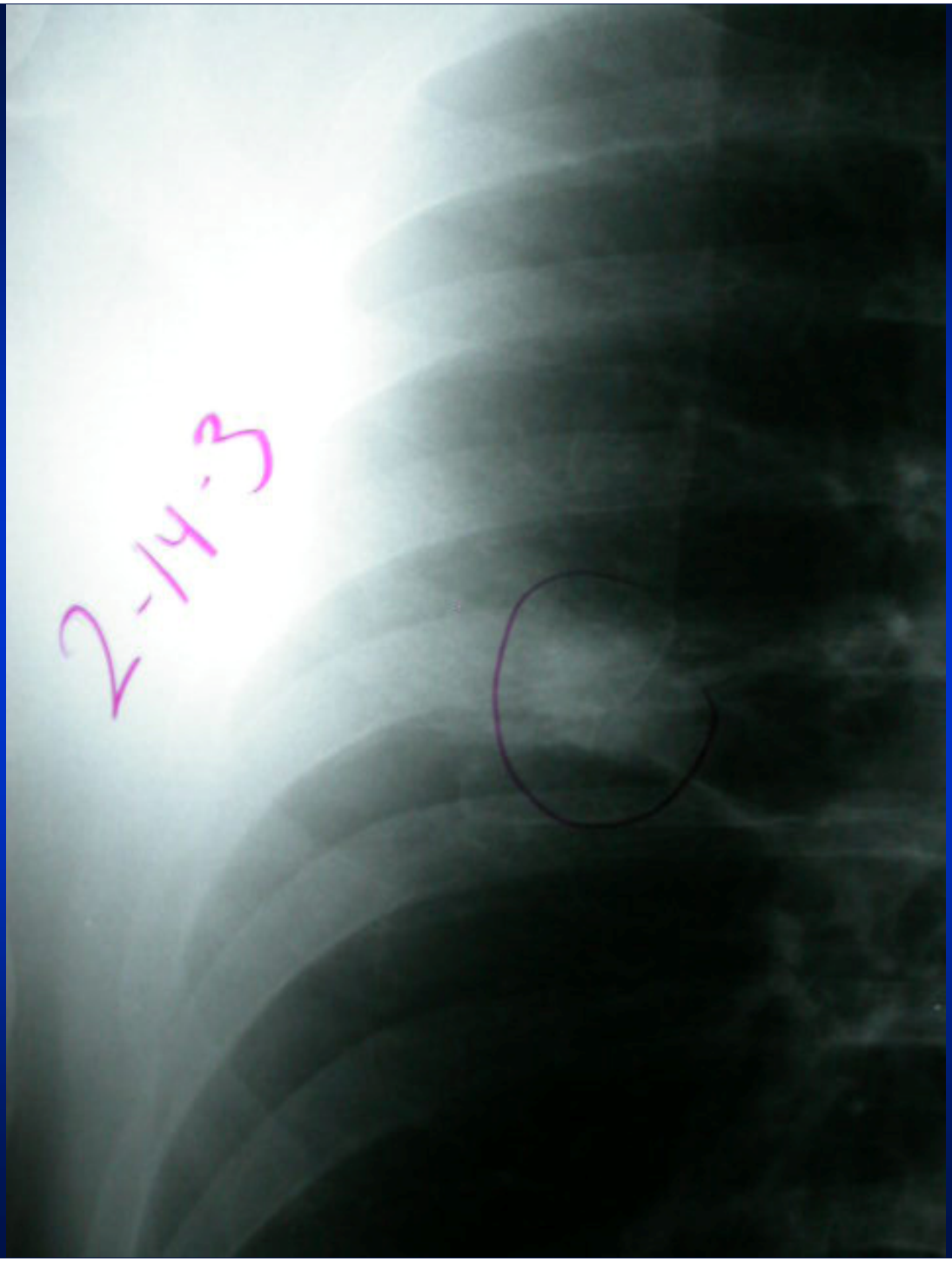
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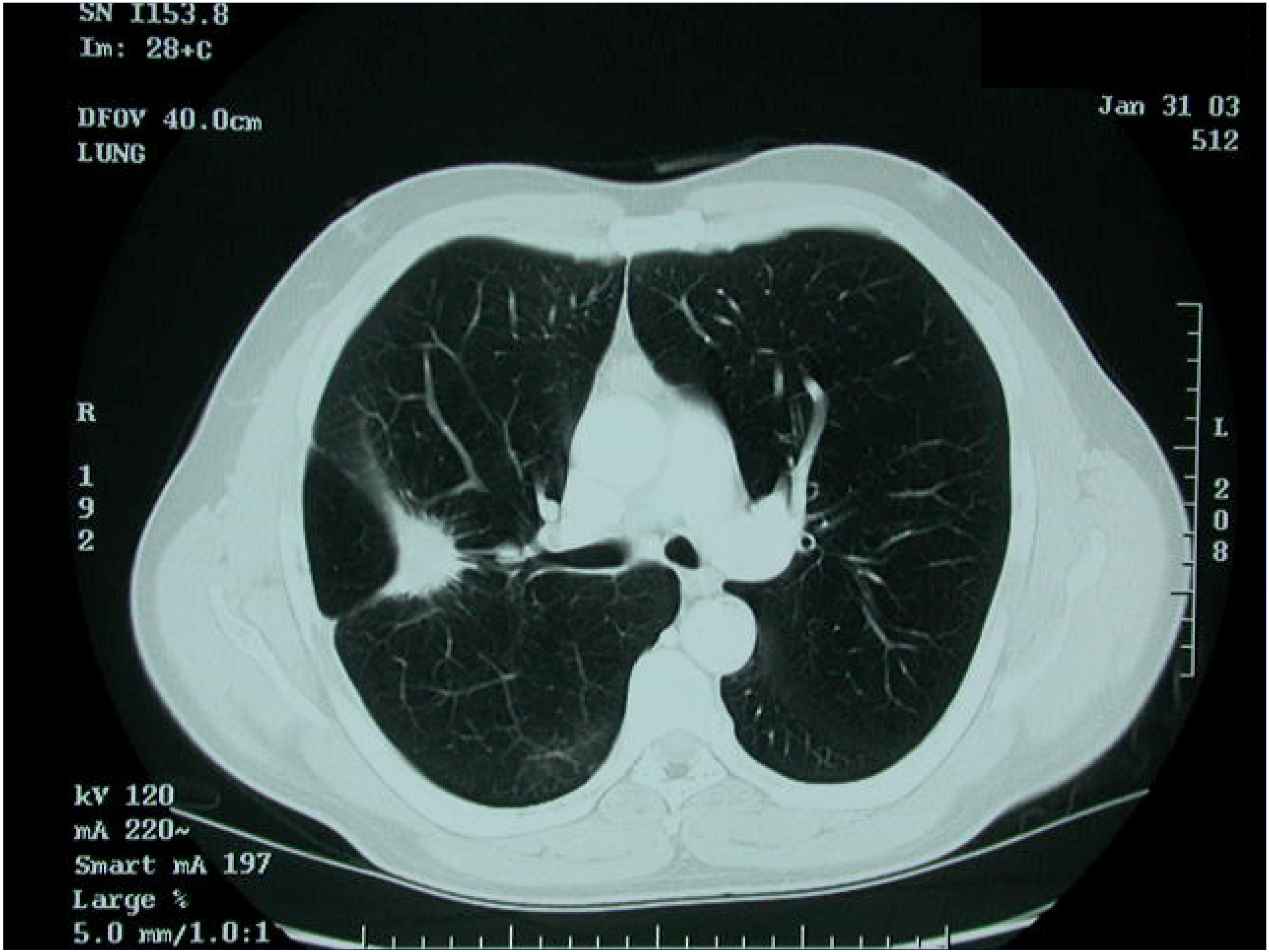
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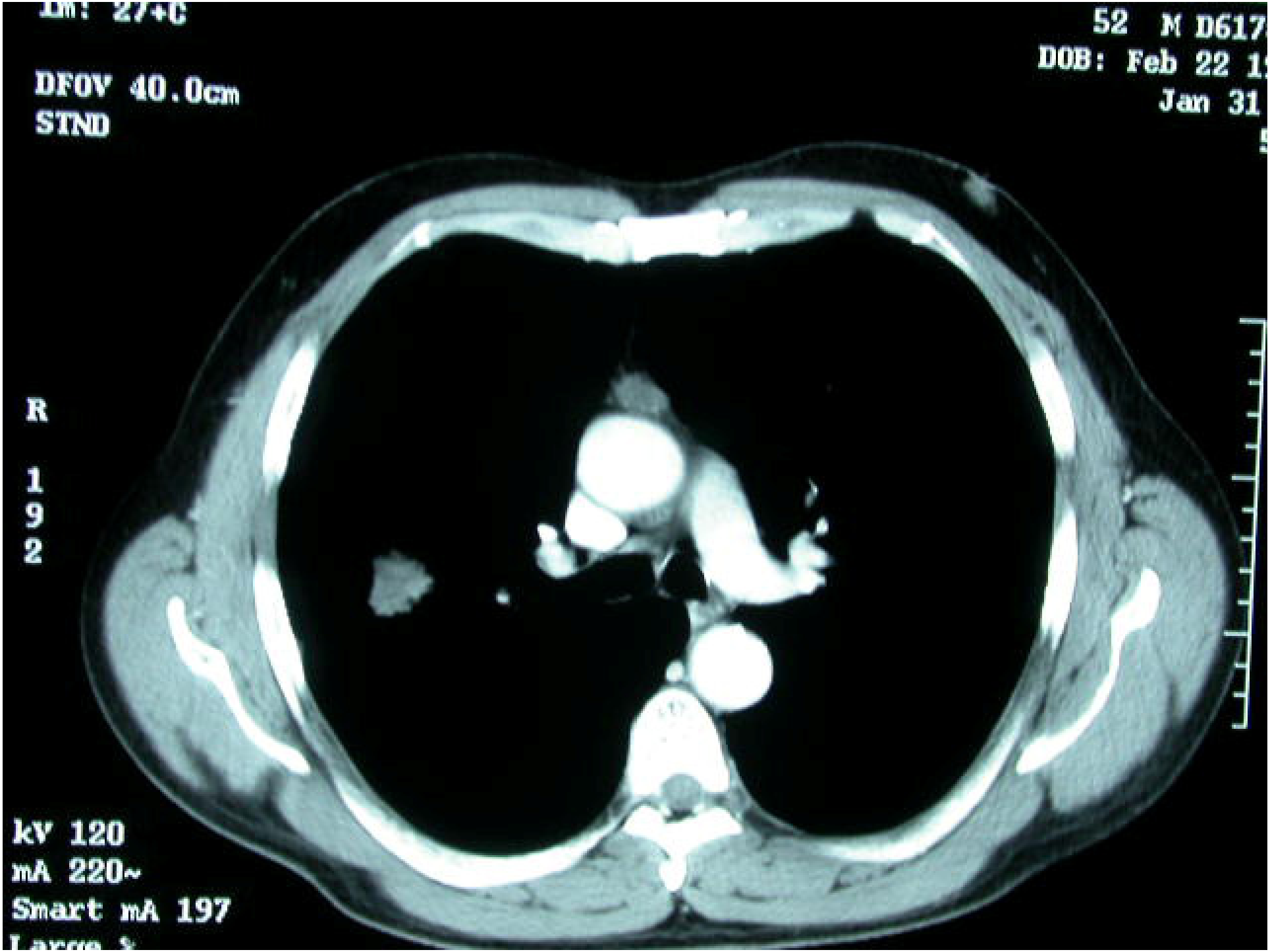
Im: 28+C
DFOV 40.0cm
LUNG
Jan 31 03
512
R
192
L
208
kV 120
mA 220~
Smart mA 197
Large %
5.0 mm/1.0:1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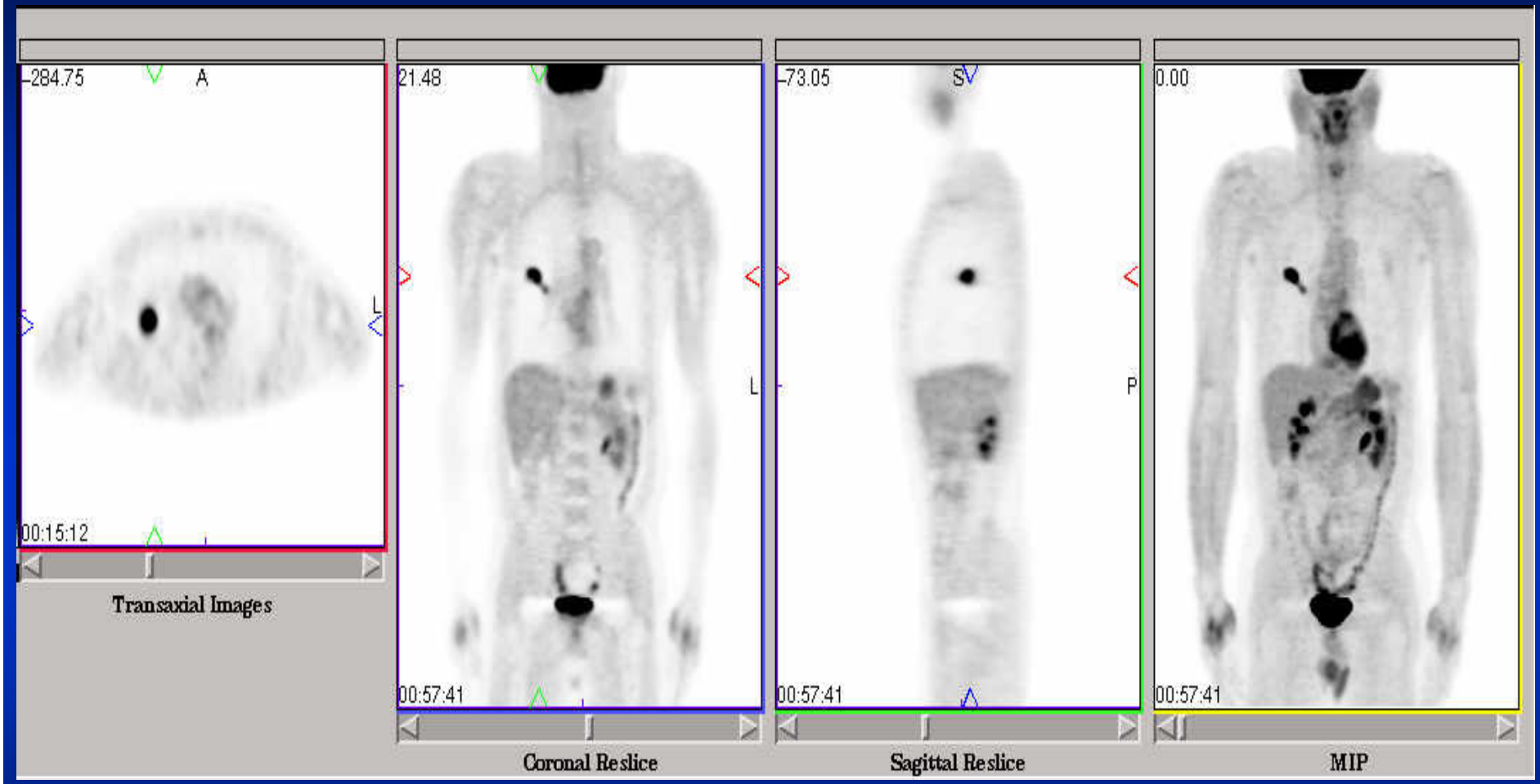
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A
L
00:15:12
Transaxial Images
21.48
L
00:57:41
Coronal Reslice
-73.05
S
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00:57:41
Sagittal Reslice
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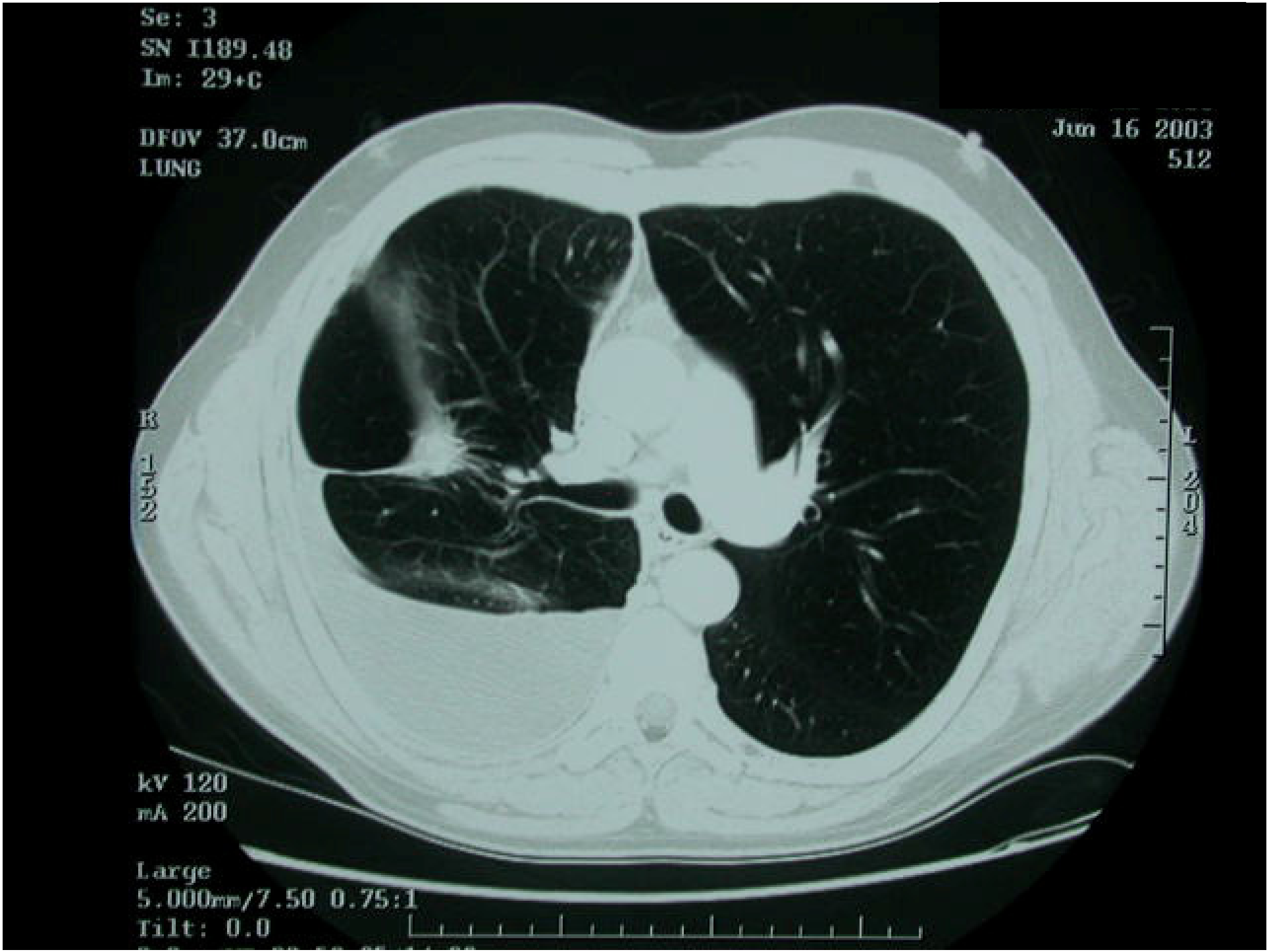
00:57:41
MIP

53 y.o. male (cont.)

- Asymptomatic pleural effusion 6/03
- Symptomatic 8/03 and underwent thoracentesis-bloody exudate, hct 8%
- Nondiagnostic thoracentesis and remained symptomatic
- Pleuroscopy for Dx and Rx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DFOV 37.0cm
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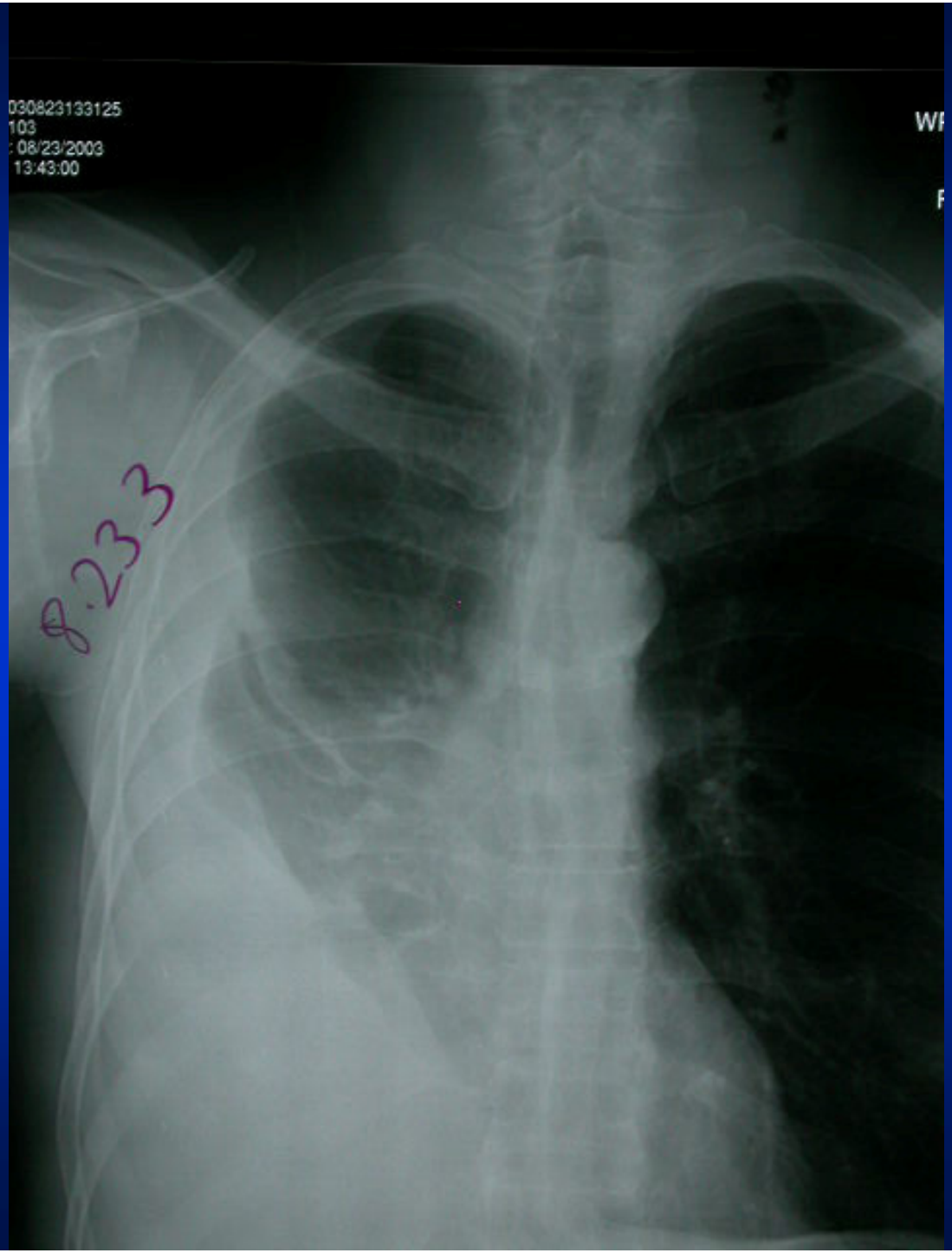
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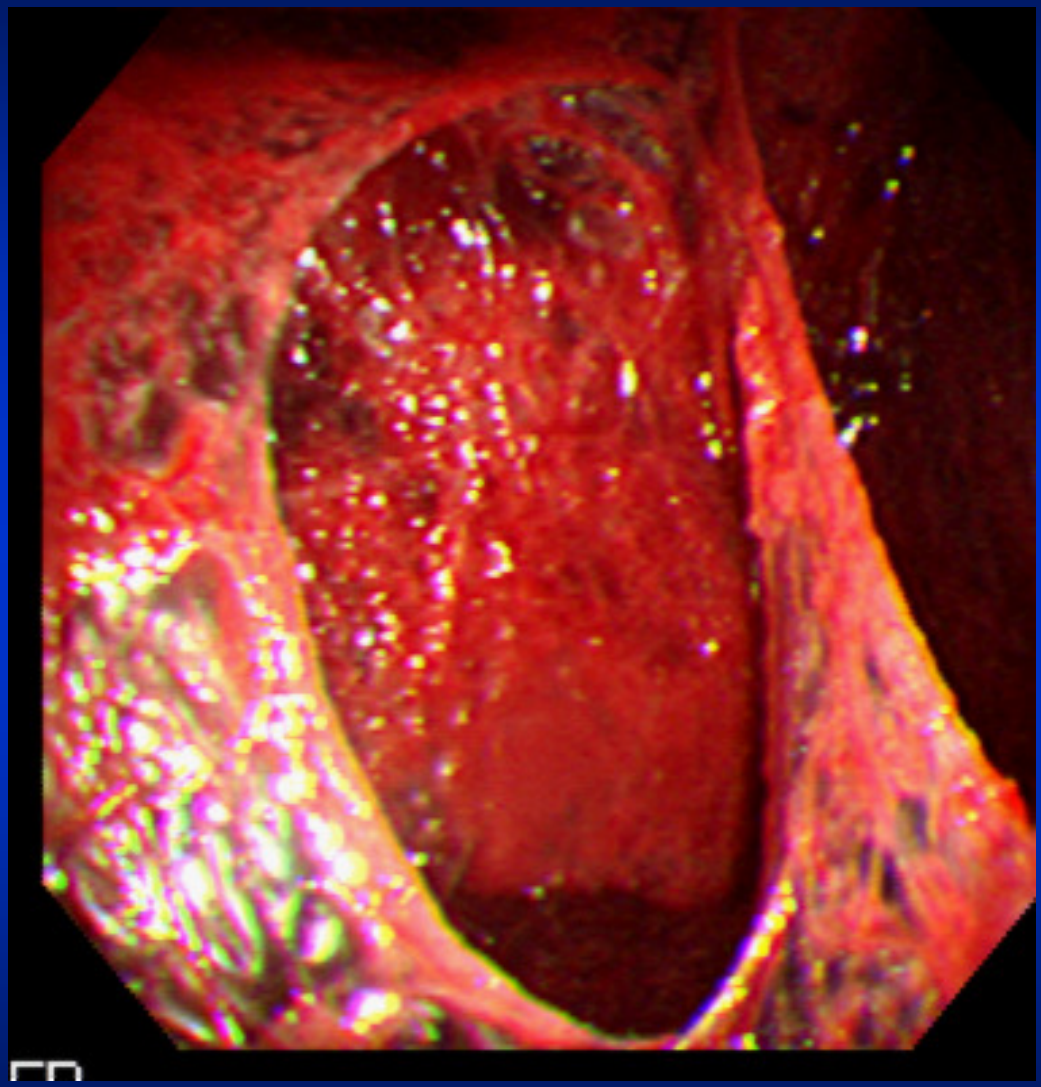

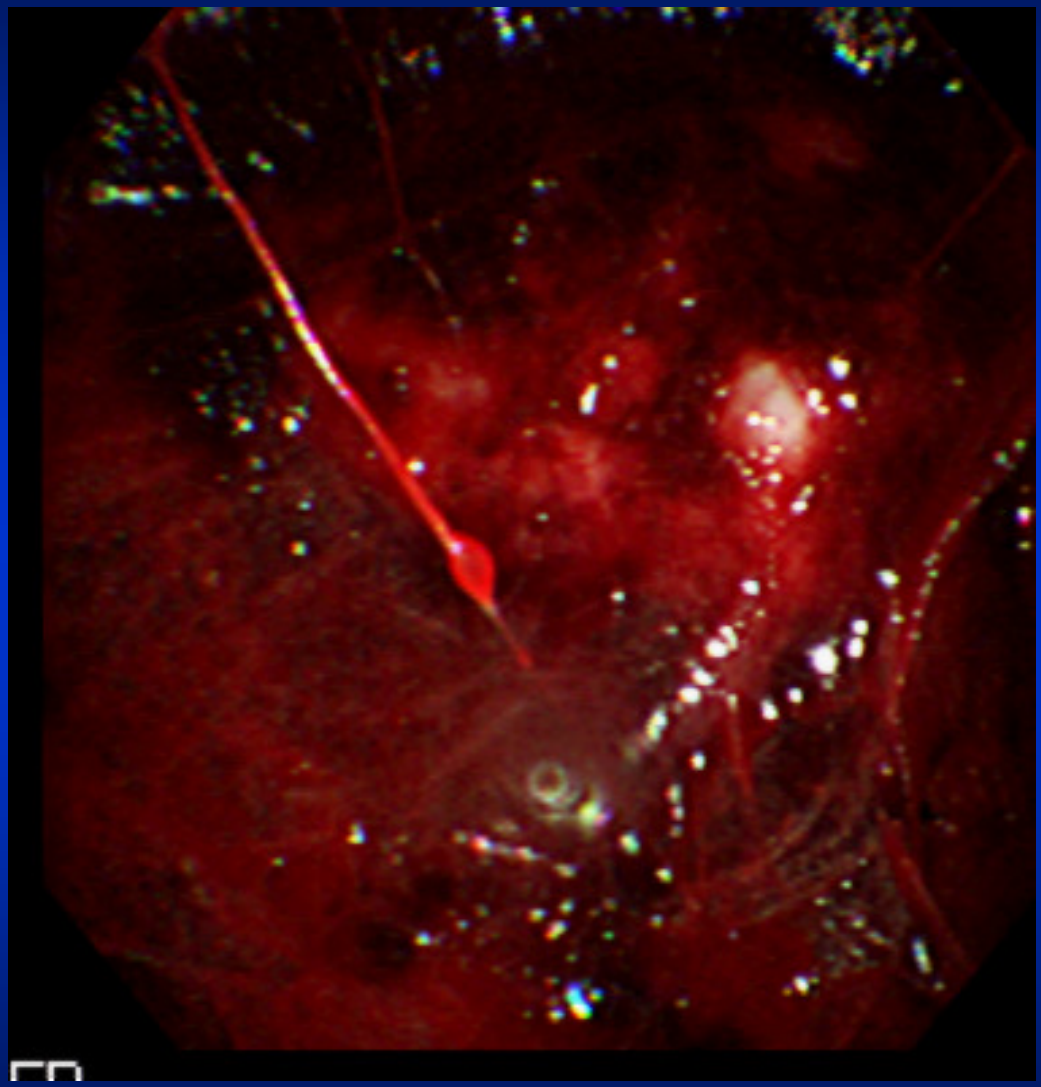

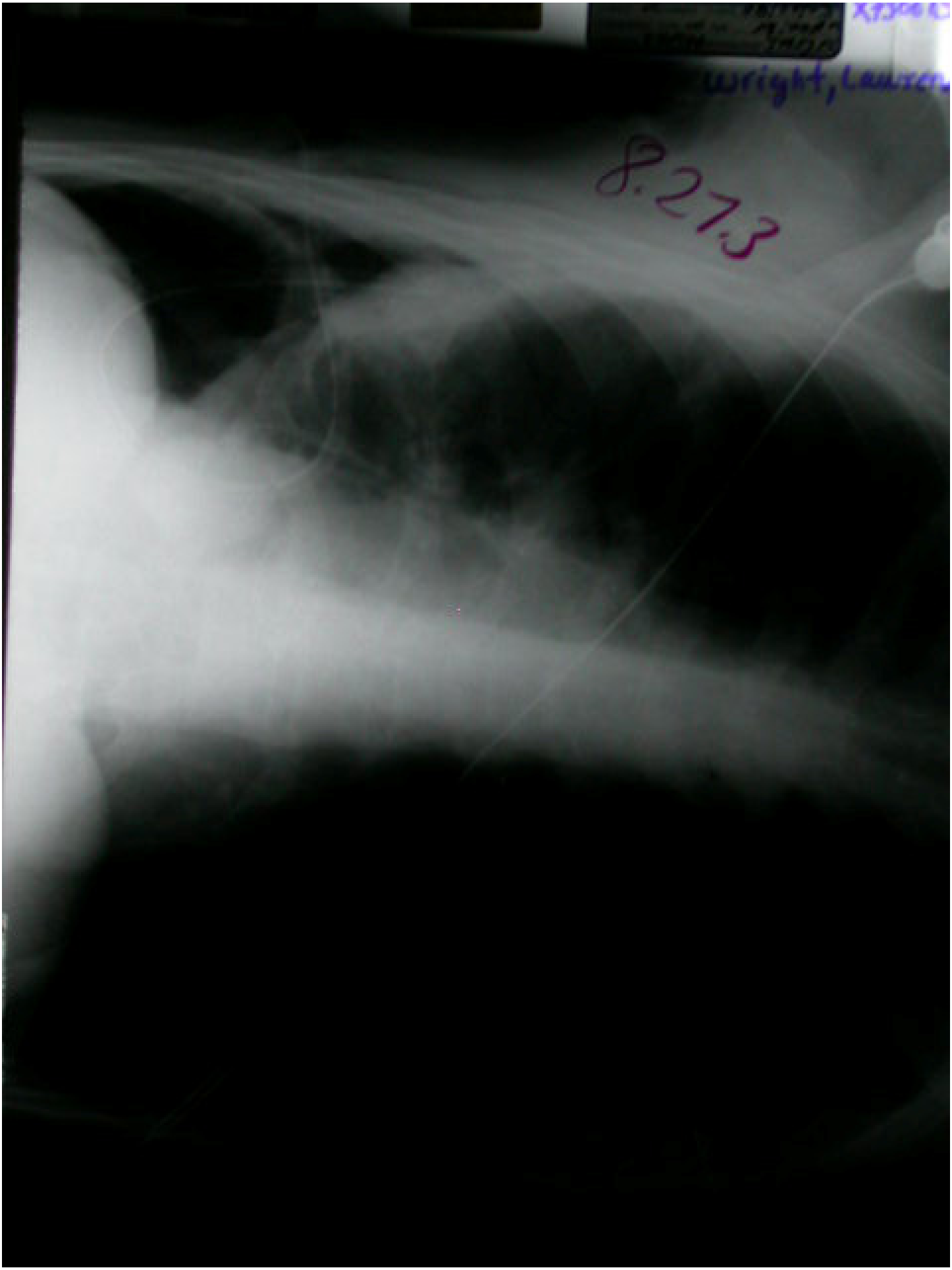
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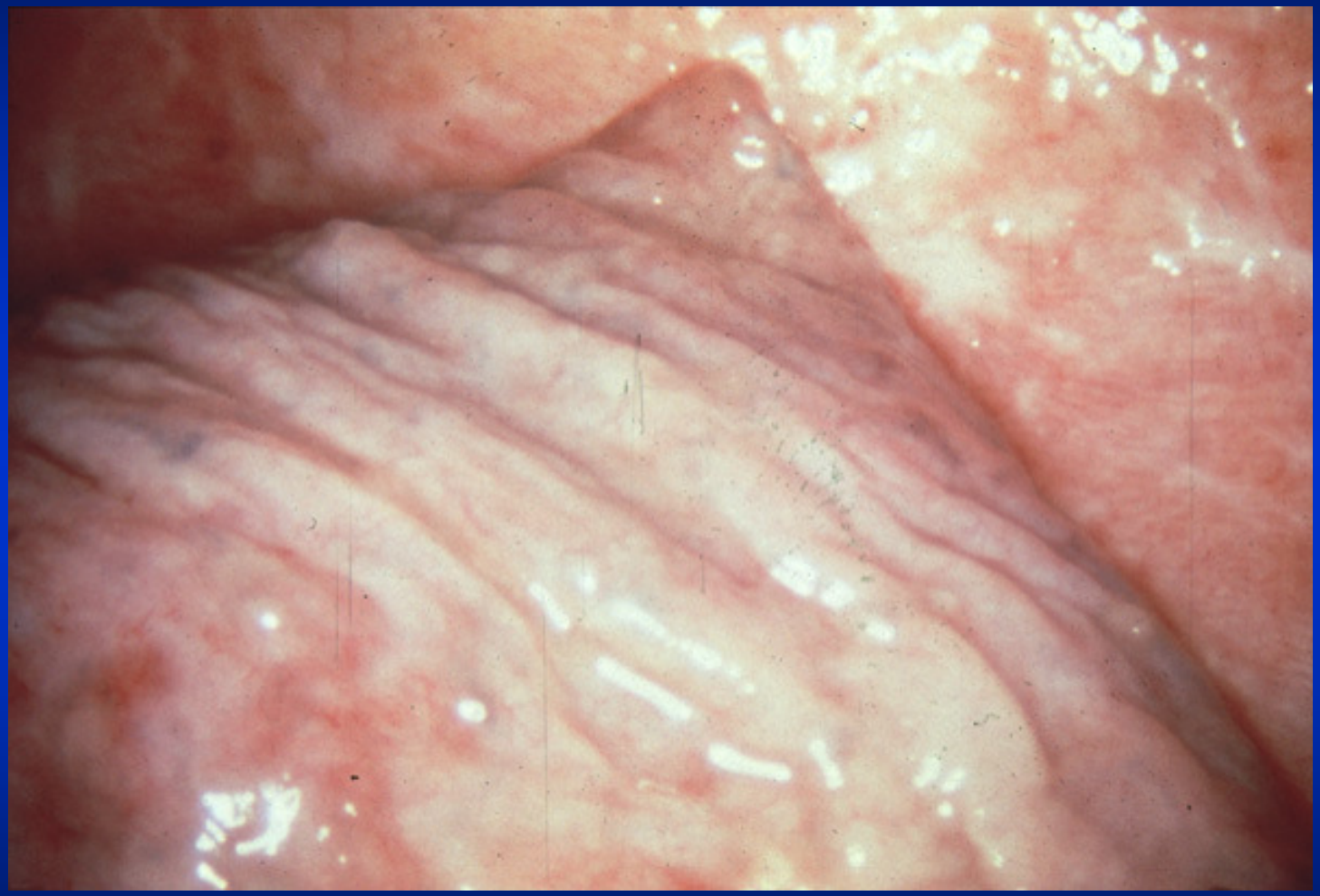

Role of Thoracentesis in MPE

- Only 50-60% of MPE are bloody
- <5% transudates are secondary to MPE
- 53% positive cytology with single sample
- 64%, 69% and 72% positive cytology with subsequent thoracentesis
- 10 ml of PF is adequate for diagnosis

Salyer, WR et al. 1975
Sallach SM et al. Chest 2002


S
E
SP
0:00:02

pH and pleurodesis in MPE

- Pleurodesis may fail in up to 40% of pts
- Median survival after successful pleurodesis is 4 months
- pH fluid values less than 7.20 associated with failure of pleurodesis and survival
- Low pH associated with improved diagnostic yield with cytology/pleural Bx
- Incidence of pH < 7.30 in MPE is 30-40%

Sahn SA et al. Ann Intern Med 1988.
Martinez-Moragon et al. Respiration 1988.