



CURSO DE POSTGRADO

Infectología Clínica Médica

DERRAME PLEURAL

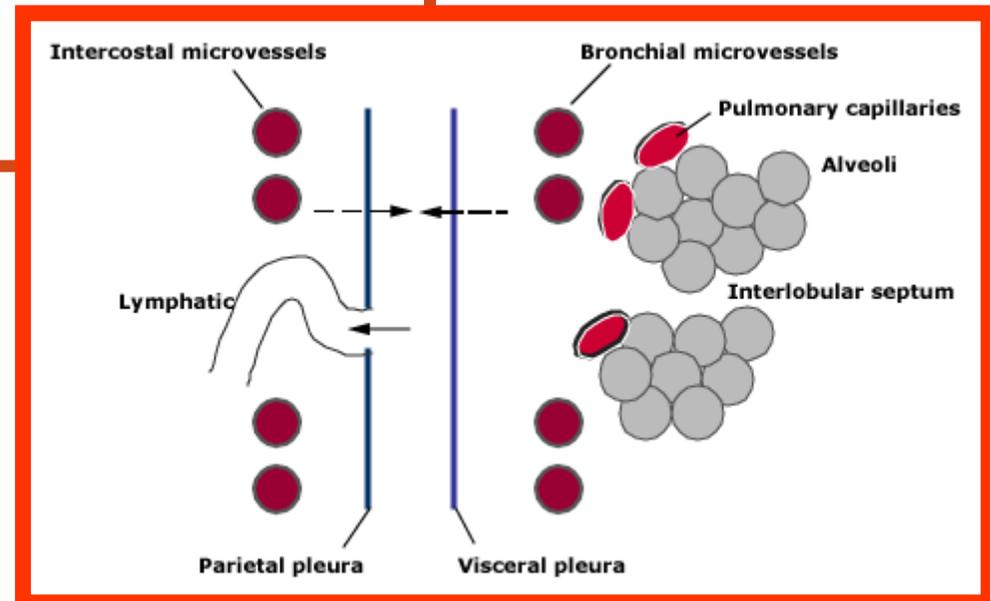
DR. ENRIQUE COURCELLES

IMT - 2009



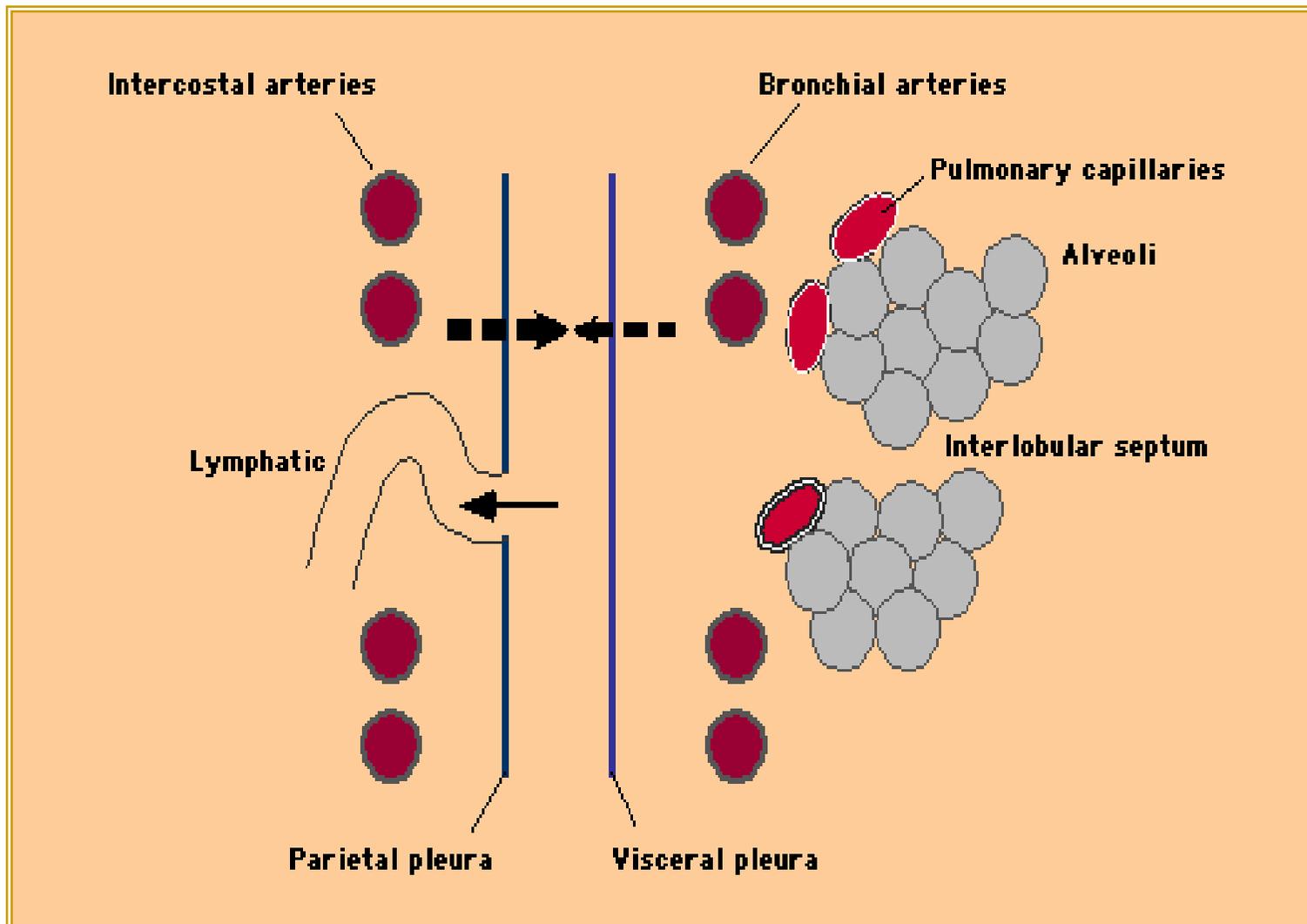
FISIOPATOLOGÍA DEL DERRAME PLEURAL

- Disminución de la presión oncótica
- Aumento de la presión negativa pleural
- Aumento de la presión hidrostática
- Aumento de la permeabilidad en la microcirculación
- Deterioro del drenaje linfático
- Paso de líquido desde el abdomen
- Traumatismo del tórax



DR. COURCELLES

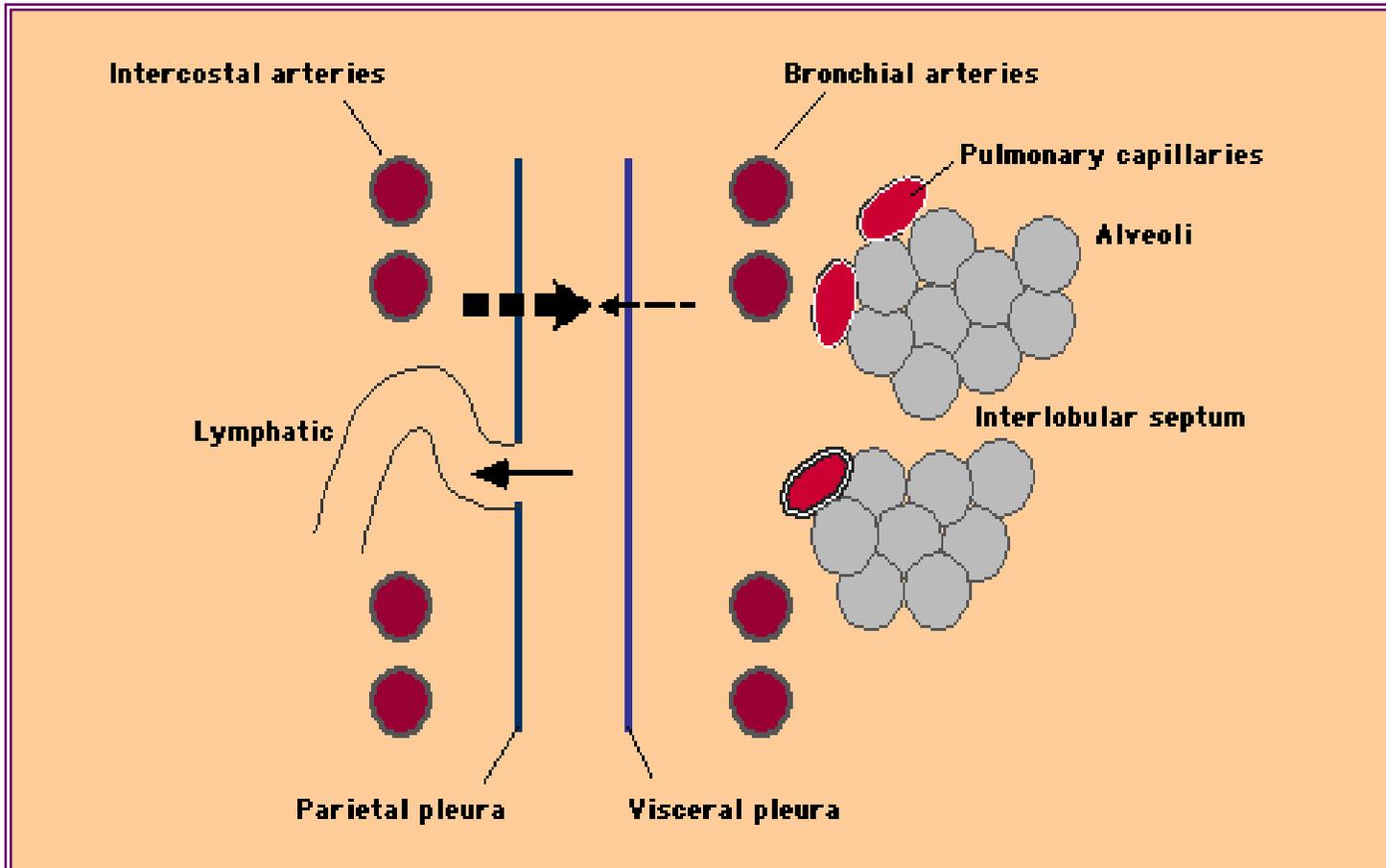
ACUMULACIÓN DE LÍQUIDO PLEURAL



Pathways of pleural fluid accumulation in pleurisy Schematic representation of the pathways of pleural liquid accumulation in pleurisy. Direct involvement of pleural membranes by disease increases the formation of liquid from the intercostal and bronchial arteries (dashed arrows) and interferes with parietal pleural lymphatic fluid removal (solid arrow).



AUMENTO DE LA PRESION VENOSA Y LIQUIDO PLEURAL AUMENTADO

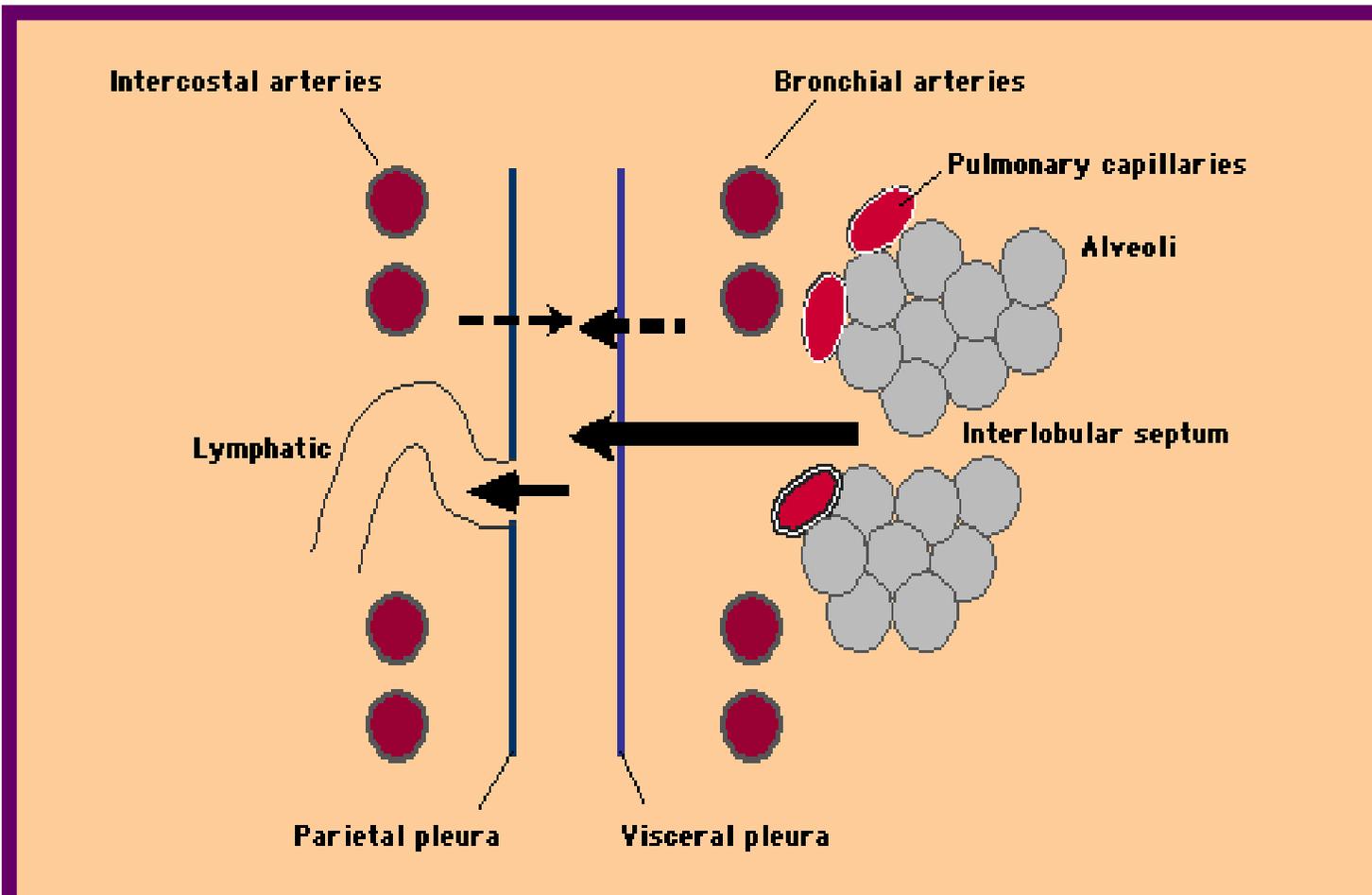


Pleural fluid formation with increased systemic venous pressure

Schematic representation of pleural fluid formation with increased venous pressure. An elevation in systemic venous pressure both increases filtration from the parietal pleural microvessels (the intercostal arteries) and decreases lymphatic drainage into the venous system (solid arrow). In comparison, an elevation in pulmonary venous pressure increases filtration from the visceral pleural microvessels (the bronchial arteries).



EDEMA PULMONAR INTERSTICIAL Y DERRAME PLEURAL



Pleural fluid accumulation in interstitial pulmonary edema Schematic representation of the mechanism of pleural fluid accumulation in interstitial pulmonary edema. Lung interstitial liquid can move into the pleural space along a pressure gradient and across leaky pleural membranes (heavy solid arrow). Lymphatic fluid removal is able to increase, but not sufficiently to prevent fluid accumulation in the pleura.



SOSPECHA DE DERRAME PLEURAL

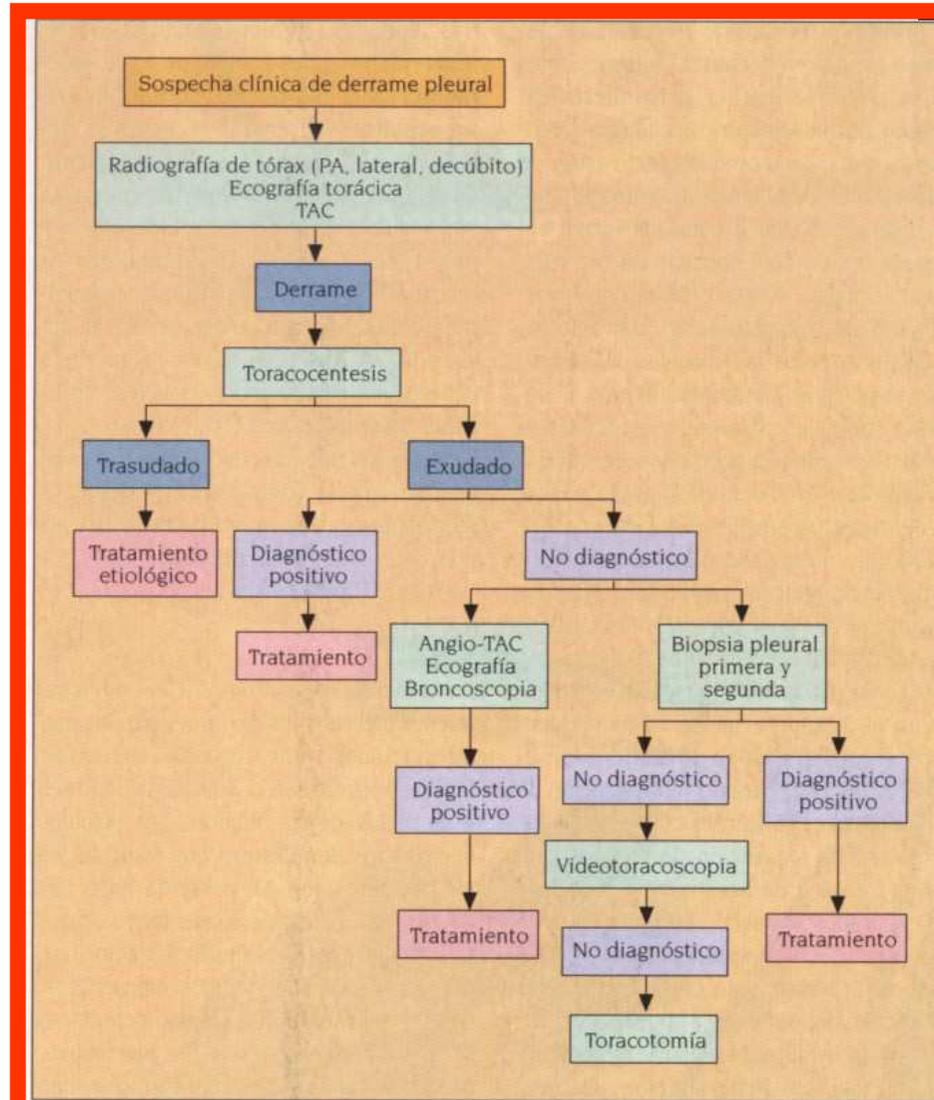
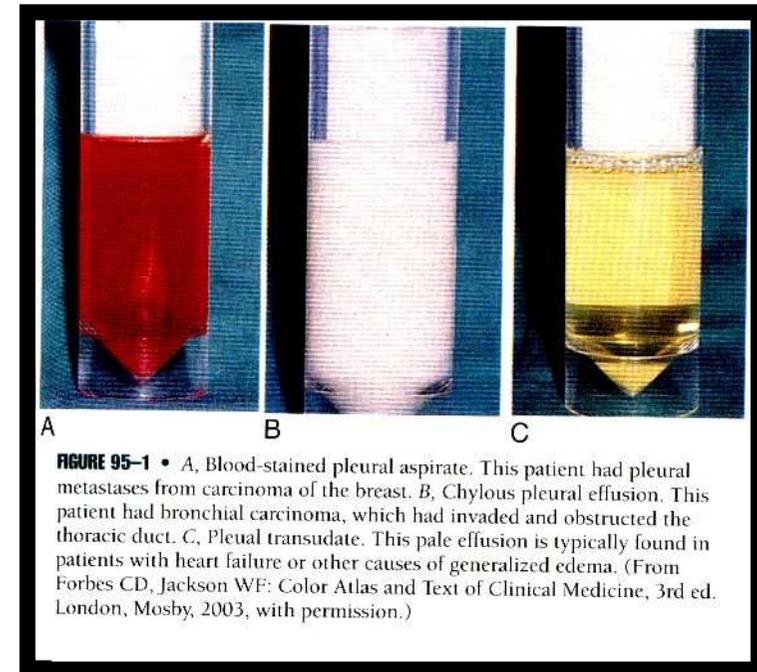


Fig. 1. Manejo del derrame pleural. PA: posteroanterior; TAC: tomografía axial computarizada.





DERRAME PLEURAL SUBPULMONAR

EXUDADO

Infeción
Iatrogénica
Neoplásica
Inflamatoria
Presión pleural negativa
Colagenosis
Disendocrinias
Enfermedad linfática
Origen abdominal

Exudados que ocasionalmente pueden ser **transudados**:

Neoplasia

TEP

Sarcoidosis

Hipotiroidismo



Right subpulmonic pleural effusion Chest radiograph of a right subpulmonic pleural effusion. The right lung base is slightly elevated. A small pneumoperitoneum outlines the actual level of the right hemidiaphragm. Left pleural effusion has spilled over into the left lateral costophrenic sulcus. Courtesy of Paul Stark, MD.

TRANSUDADO

Insuficiencia Cardíaca
Hipoalbuminemia
Nefrosis
Atelectasia
Hidrotorax hepático
Diálisis peritoneal
Pericarditis constrictiva
Obstrucción VCS
Pulmon atrapado

DR.COURCELLES



QUILOTORAX POST NEUMONECTOMÍA DERECHA



Chylothorax post right pneumonectomy Chest radiograph shows multiple gas-liquid levels in the vacant hemithorax, with cardiomedastinal shift to the left. Courtesy of Paul Stark, MD.



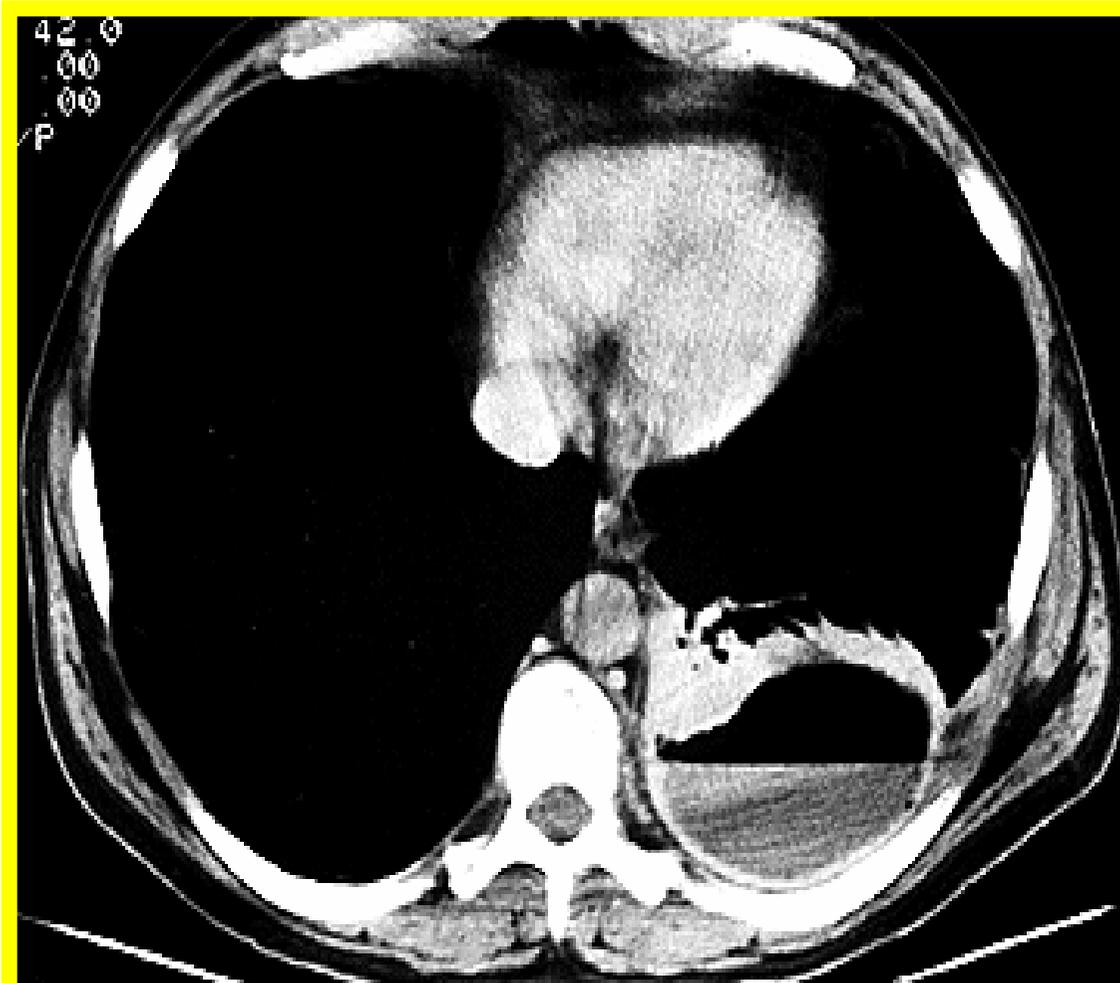
**DERRAME PLEURAL
BILATERAL DE
ETIOLOGIA DIFERENTE**



Contarini's condition Patient with a right sided transudate from left ventricular failure and with a left sided empyema that is loculated, adjacent to a focus of pneumonia with air bronchograms in the subjacent lung. This is also called Contarini's condition and refers to bilateral pleural effusions of differing etiologies. Courtesy of Paul Stark, MD.



EMPIEMA CON NIVEL LÍQUIDO



Empyema with gas-liquid level Empyema with large gas-liquid level in the left posterior hemithorax due to a bronchopleural fistula. The adjacent lung is compressed and partially atelectatic. Courtesy of Paul Stark, MD.



MALIGNO(MRI)

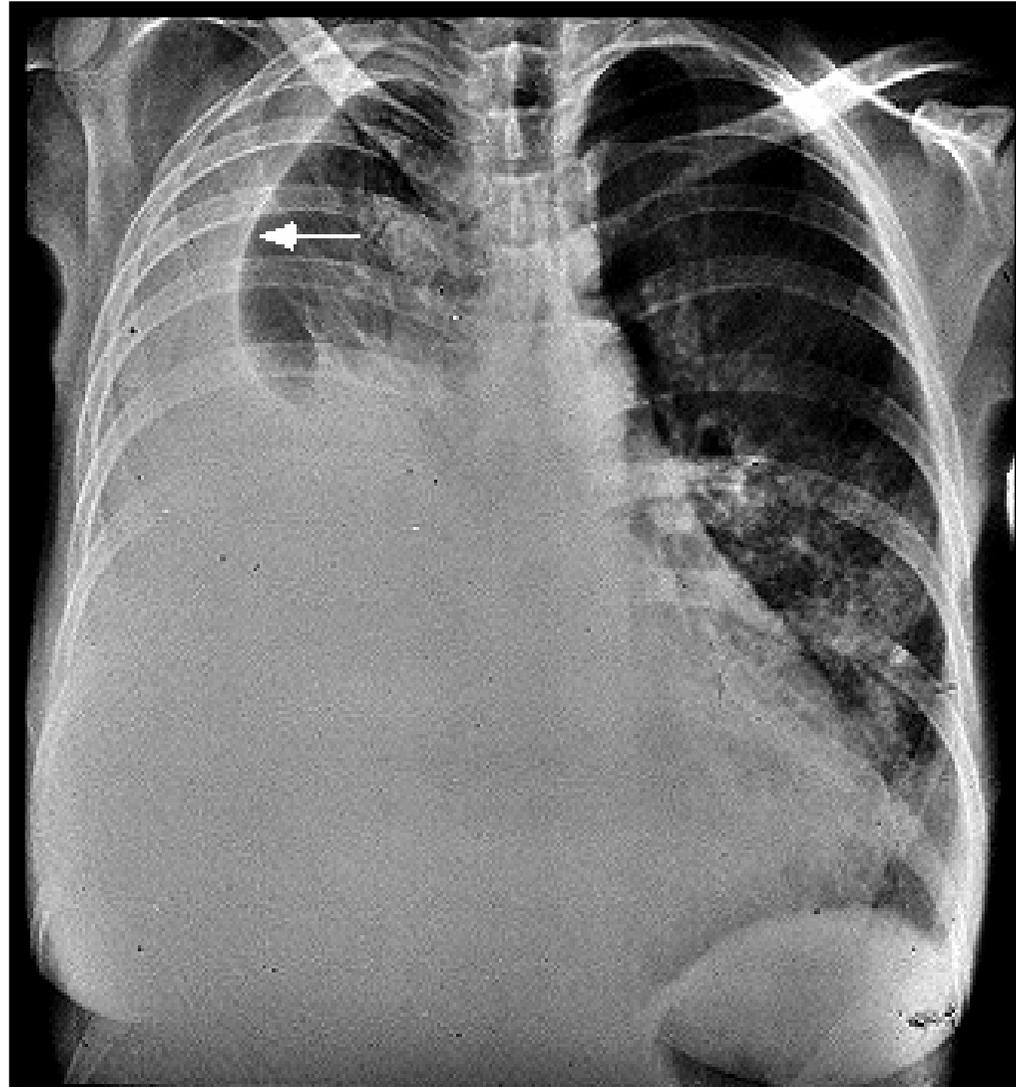


Hemorrhagic pleural effusion

Hemorrhagic effusion in patient with malignant mesothelioma. MRI of the chest, sagittal sequence in supine patient. Liquid-liquid level is evident, forming a "hematocrit effect". The red blood cells have a high signal due to intracellular methemoglobin. Courtesy of Paul Stark, MD.



HIDROTORAX HEPÁTICO

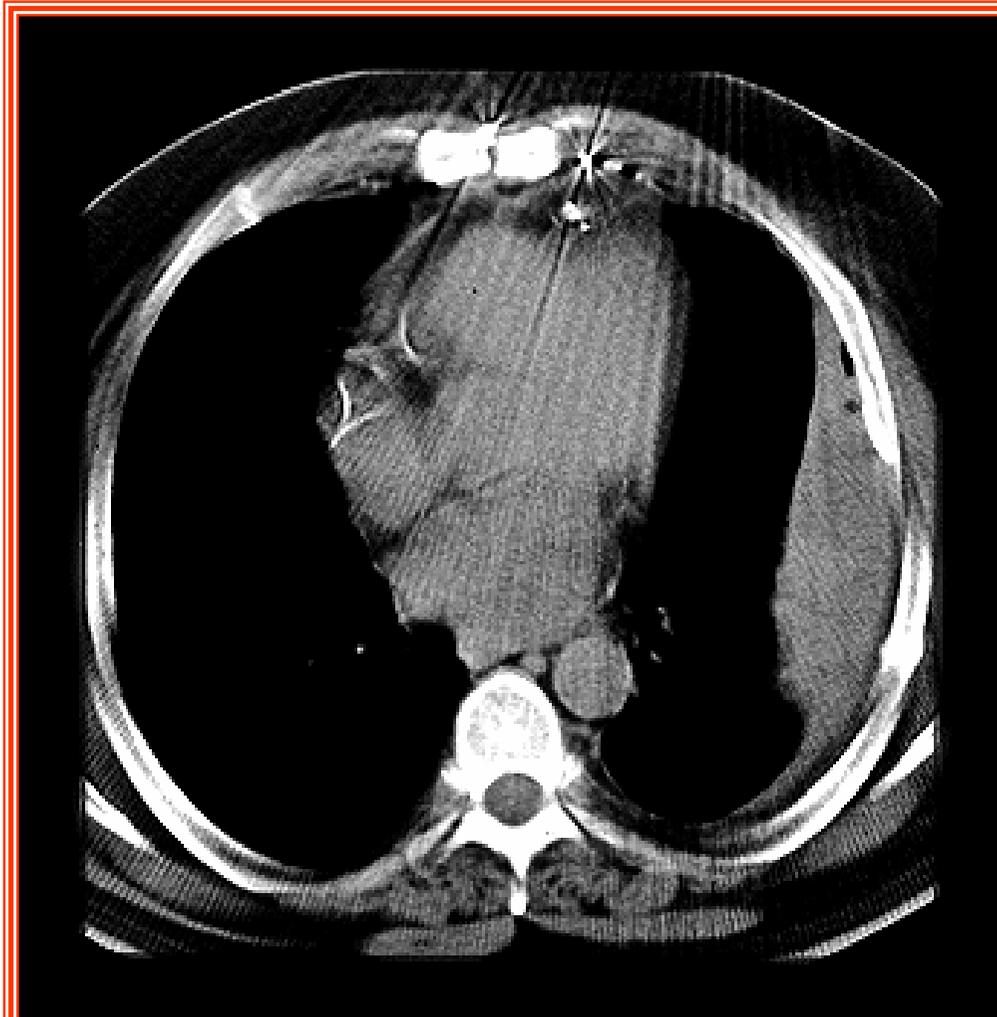


Hepatic hydrothorax Large right sided pleural effusion forming typical meniscus (arrow) in patient with advanced liver cirrhosis. Courtesy of Paul Stark, MD.

DR.COURCELLES



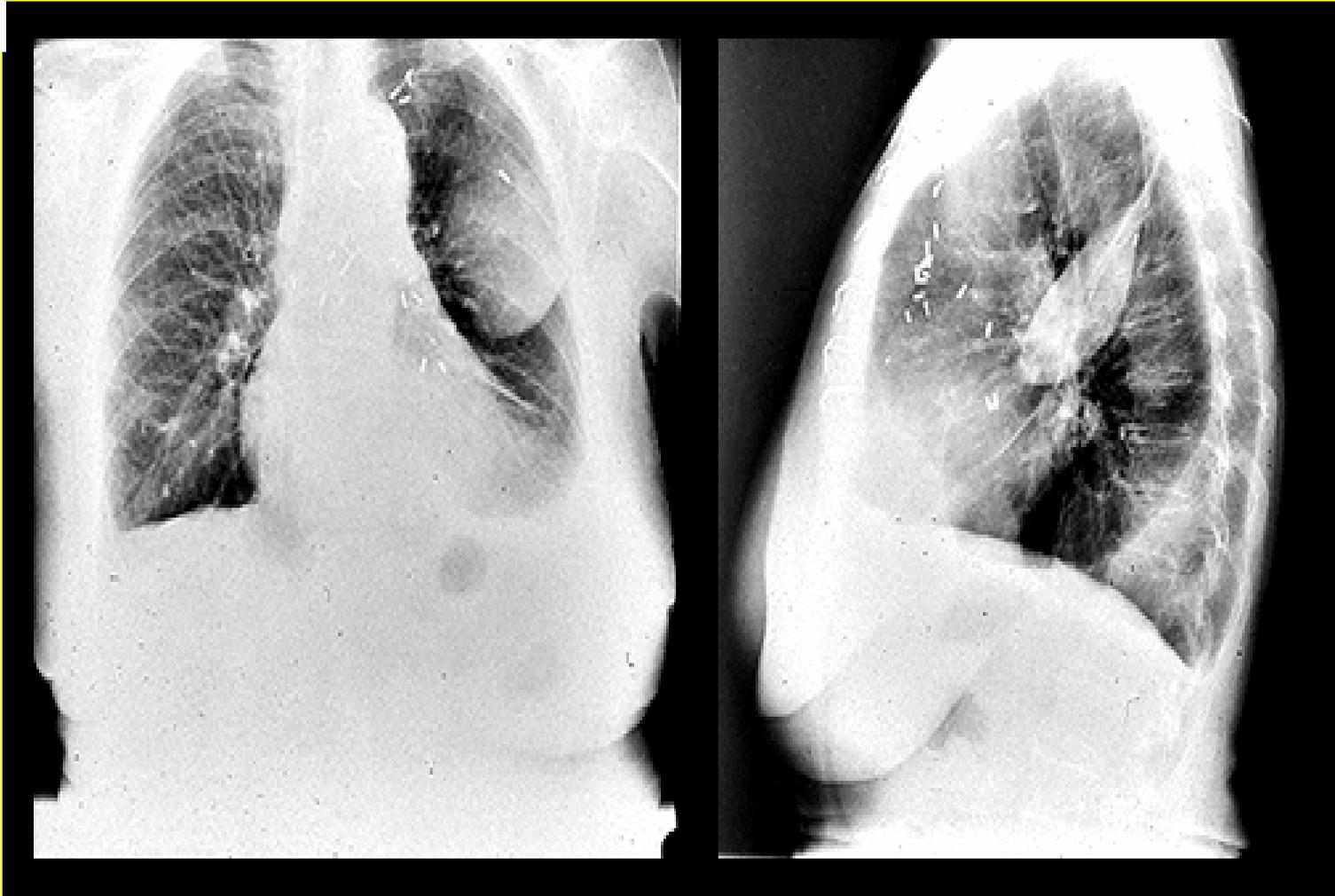
HEMATOMA PLEURAL LOCALIZADO



Loculated pleural hematoma Loculated pleural hematoma in left hemithorax after CABG. The loculated collection of blood has higher attenuation than the chest wall musculature. Courtesy of Paul Stark, MD.



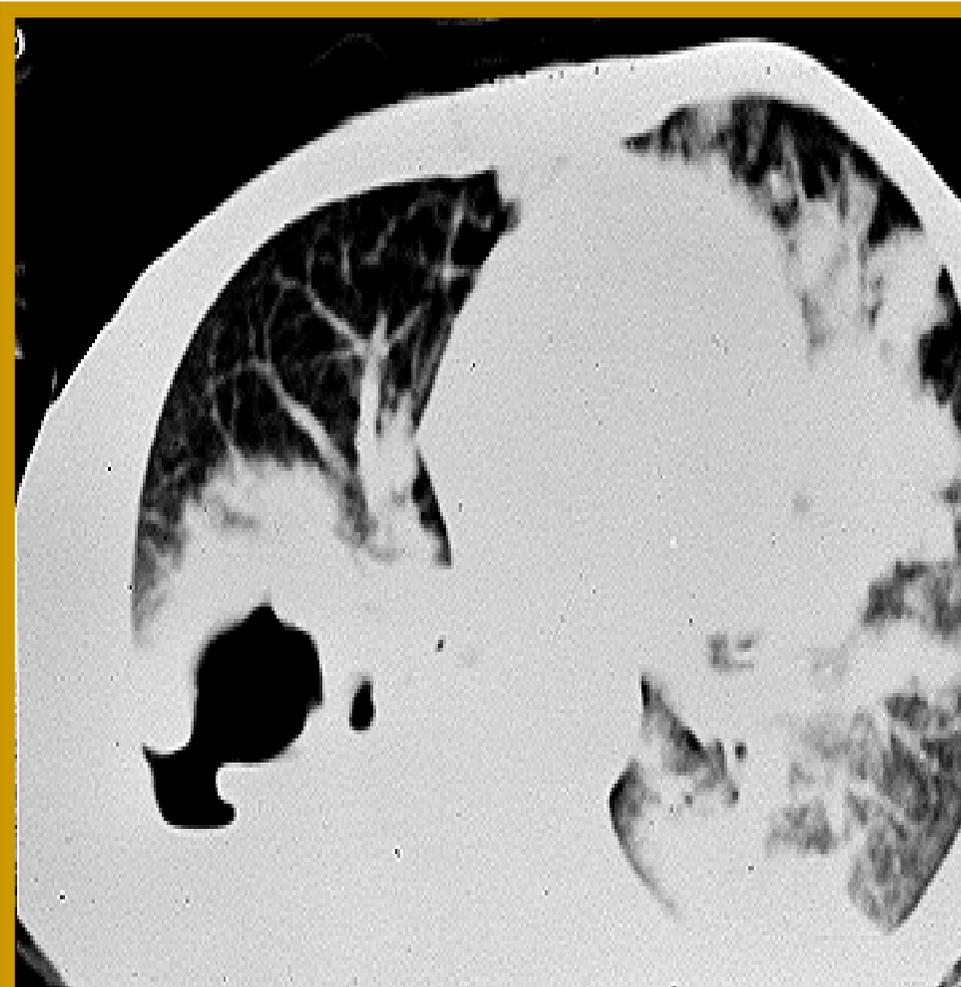
DERRAME PLEURAL LOCALIZADO



Loculated pleural effusion Chest radiographs show a loculated pleural effusion in the left major fissure. The mass-like appearance on the PA view (left) forms a pseudotumor. The lateral view (right) clearly localizes the mass to the major fissure. Courtesy of Paul Stark, MD.



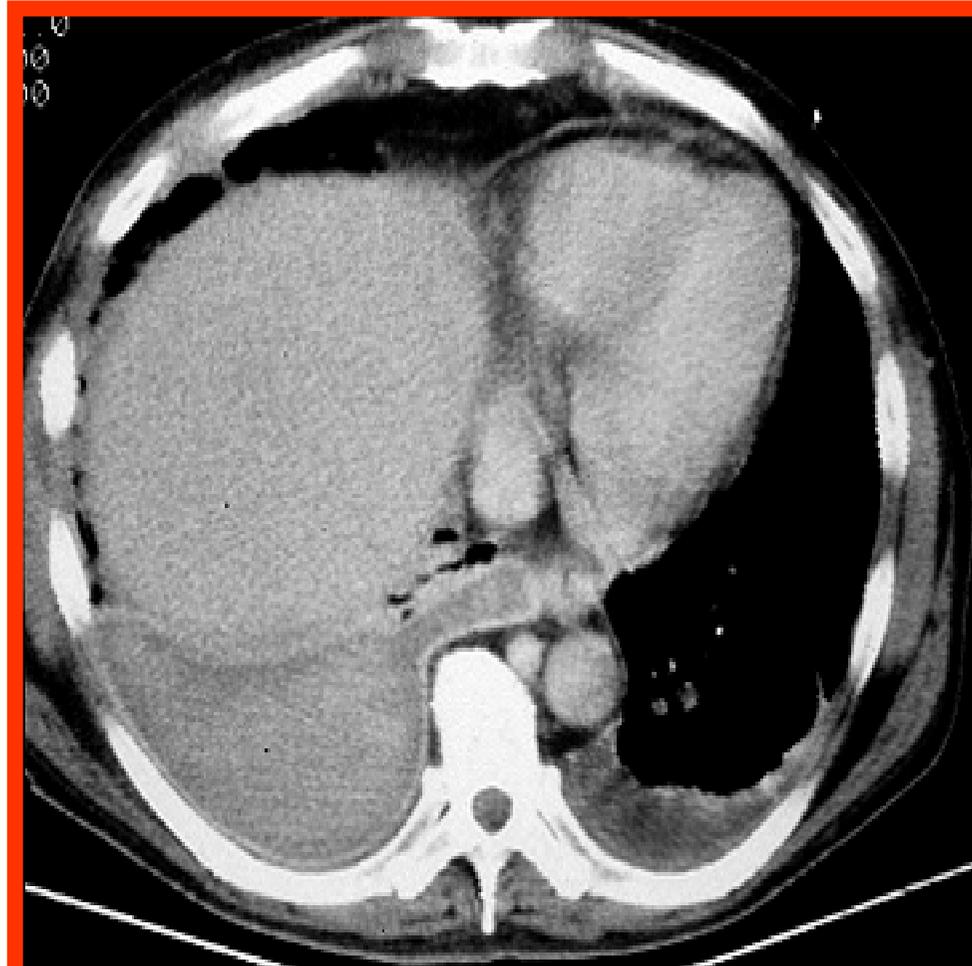
ABSCESO PULMONAR Y EMPIEMA



Lung-abscess Lung abscess in the right lower lobe with cavitation and narrow neck fistula leading to an empyema in the adjacent pleural space. Courtesy of Paul Stark, MD.



HEMATOMA PLEURAL



Pleural hematoma in right hemithorax

Spontaneous hemorrhage in an anticoagulated patient. The right effusion has high attenuation due to the fresh blood. The left pleural effusion is transudative and has lower attenuation. Courtesy of Paul Stark, MD.



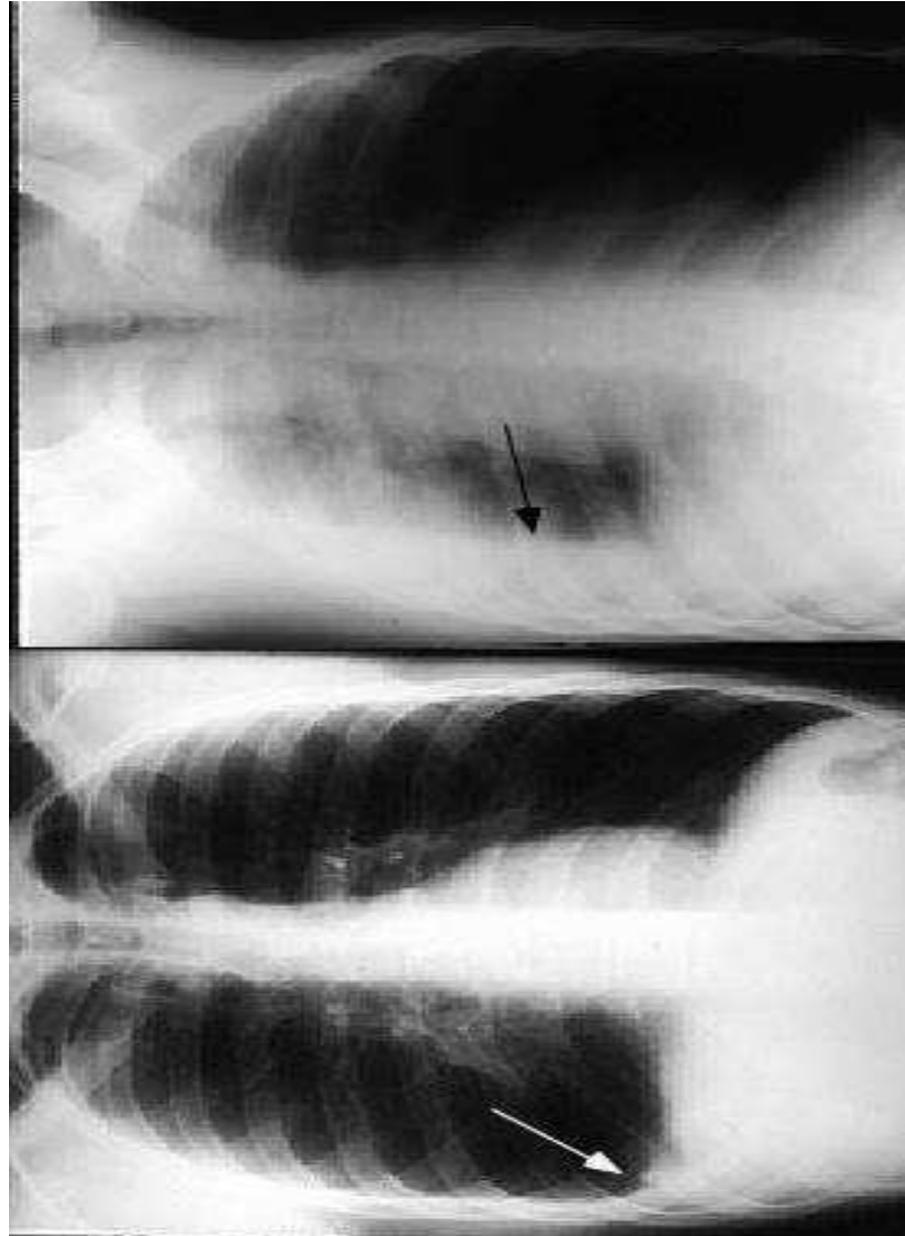
PARIETAL

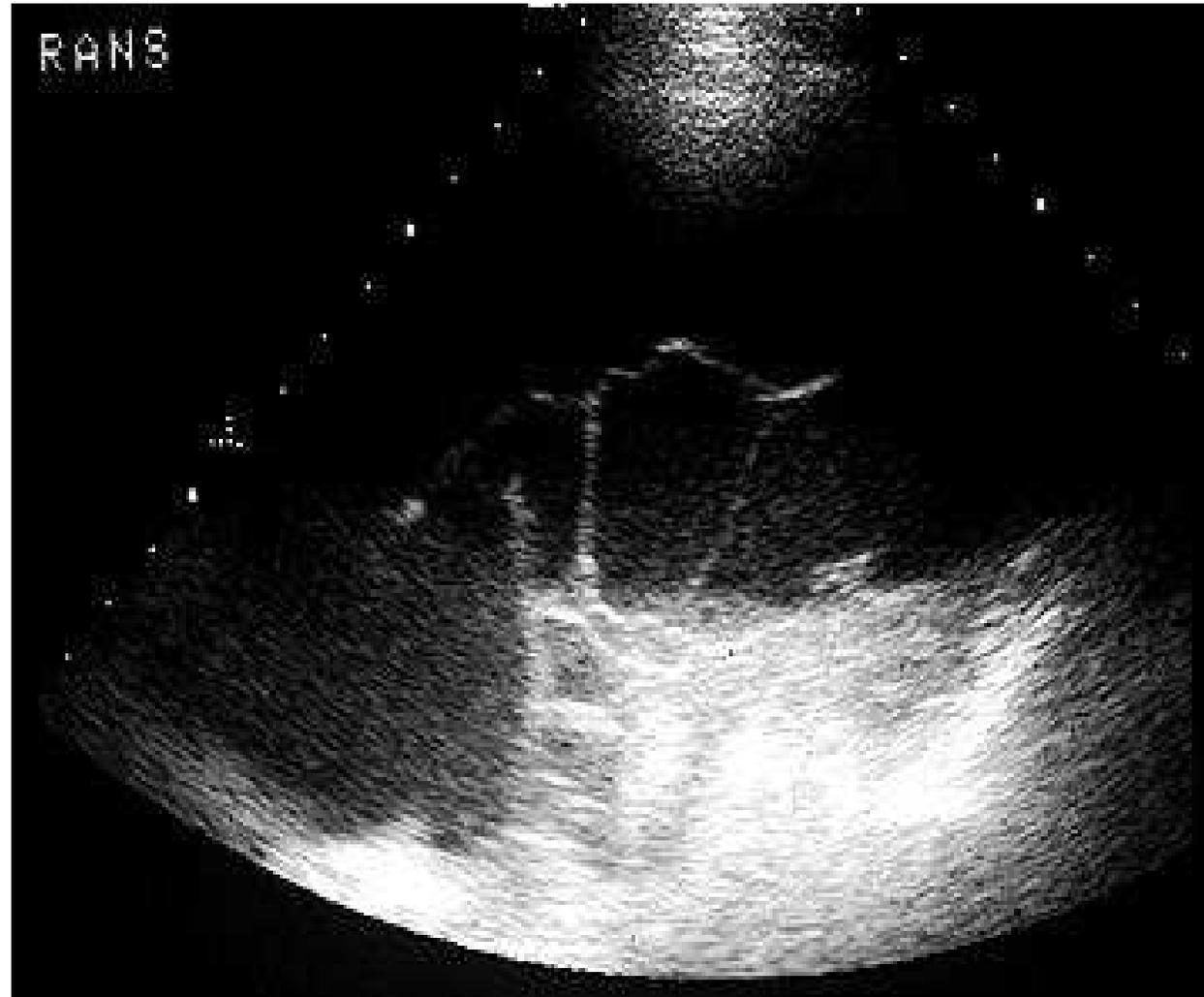


Empyema with split pleura sign CT scan demonstrates a loculated collection of pleural effusion in the left hemithorax with enhancing visceral and parietal pleura ("split pleura" sign) and a few bubbles of gas within the empyema, likely due to a gas forming organism. Larger collections of gas are usually indicative of a bronchopleural fistula. The contralateral right transudative effusion does not show enhancement of the pleura after intravenous contrast material administration. Courtesy of Paul Stark, MD.

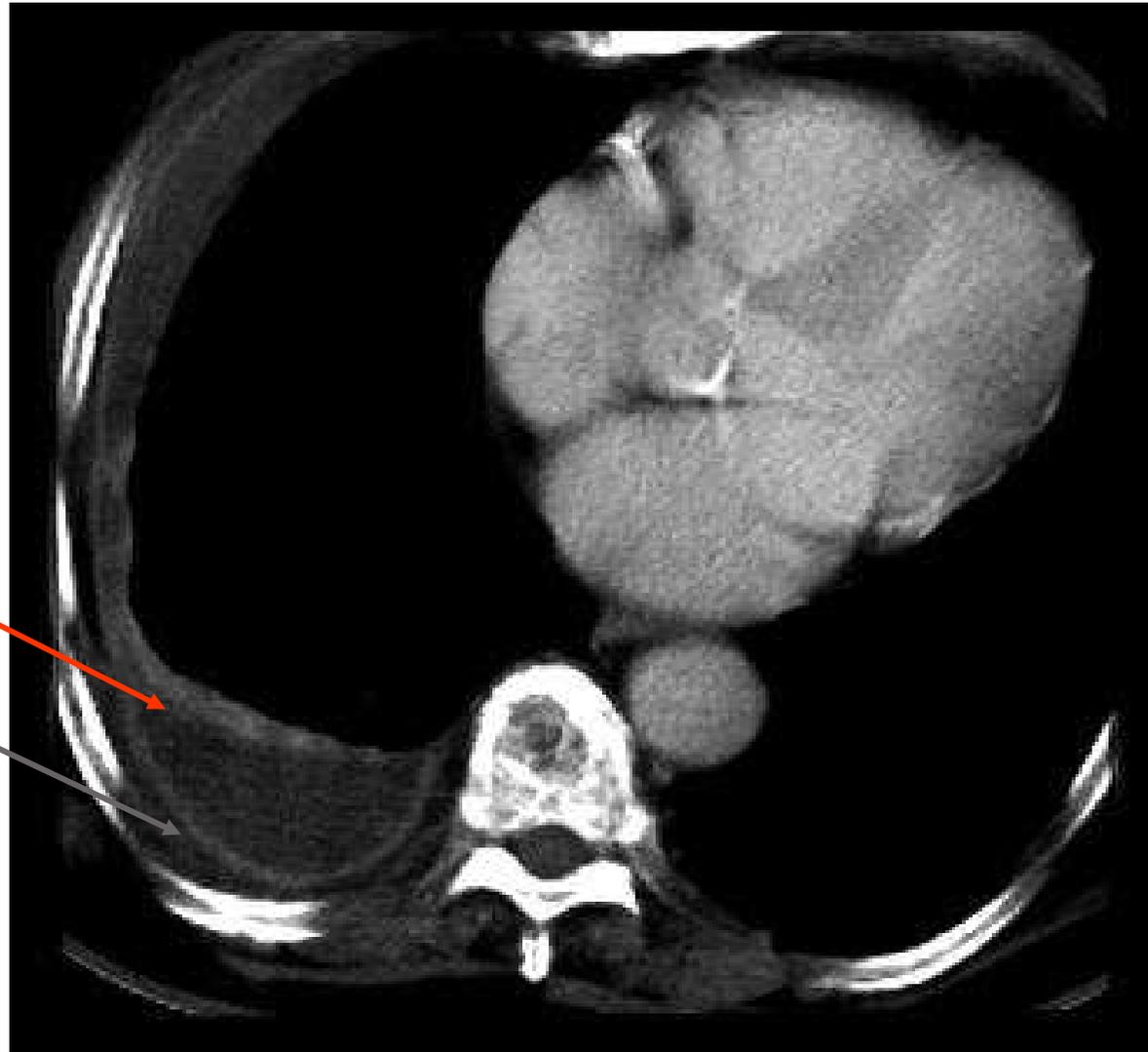


Decúbito lateral derecho





Derrame pleural tabicado



Pl. visceral

Pl. parietal

empiema



Tuberculous pleural effusion



CT scan showing a parenchymal focus of tuberculosis close to the pleura and an ipsilateral pleural effusion.

Courtesy of Paul Stark, MD.



DERRAME PLEURAL

NEJM 2002-346:25,1971

RW.Light,MD

<u>CAUSA</u>	<u>Incidencia anual</u>	<u>Transudado</u>	<u>Exudado</u>
Insufic. Cardíaca	500.000	(+)	(-)
Neumonía	300.000	(-)	(+)
Neoplasia	200.000	(-)	(+)
Embolia pulmón	150.000	(±)	(±)
Virosis	100.000	(-)	(+)
p/ bypass cor.	60.000	(-)	(+)
Cirrosis c/ ascitis	50.000	(+)	(-)



EVALUACIÓN DEL DERRAME PLEURAL

DR.E.COURCELLES

Suficiente líquido ?

10 mm x ECO o por
Rx en decúbito lateral

NO

Observar

SI

ICCG?

NO

toracocentesis

Prot.pleural/prot.sérica >0.5
LDH pleural/LDH serico >0.6
LDH pleural >2/3 límite sup. sérico

NO

transudado: tx.ICCG,cirrosis,nefrosis

SI

derrame asimétrico, dolor, fiebre

SI

NO

diuréticos/observar

pers.derrame >3d

SI

exudado: citología, glucosa, cultivo

linfocito: tbc

no dx: ?TEP



ORIENTACIÓN DIAGNÓSTICA DEL LÍQUIDO PLEURAL

COLOR

Amarillo pálido

**Hemorrágico
pulmonar**

Lechoso

Marrón

Negro

Amarillo verdoso

Verde oscuro

Color del contenido de cateter PVC o SNG

CARACTERÍSTICA

Purulento

Vizcoso

Bridas

Turbio

Achocolatado

OLOR

Pútrido

Amoniaco

SOSPECHA

transudado, a veces exudado

neoplasia, asbestosis, traumático, infarto

quilotorax, colesterol

sangre vieja, ruptura quiste hepático por ameba

aspergilus

reumatoide

biliotorax

empiema

mesotelioma

reumatoide

inflamatorio

abceso hepático por amebas

anaerobio

orina

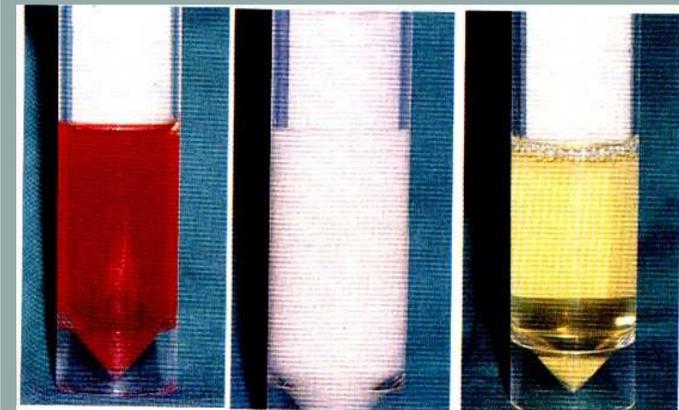


FIGURE 95-1 • A, Blood-stained pleural aspirate. This patient had pleural metastases from carcinoma of the breast. B, Chylous pleural effusion. This patient had bronchial carcinoma, which had invaded and obstructed the thoracic duct. C, Pleural transudate. This pale effusion is typically found in patients with heart failure or other causes of generalized edema. (From Forbes CD, Jackson WF: Color Atlas and Text of Clinical Medicine, 3rd ed. London, Mosby, 2003, with permission.)



SENSIBILIDAD DEL TEST PARA EXUDADO



<u>TEST</u>	<u>Sensibilidad</u>	<u>Especificidad</u>
 criterios de Light (uno o más)	98%	83%
Prot.pleural/ prot. suero >0.5	86%	84%
LDH pleural/ LDH suero > 0.6	90%	82%
LDH pl. >2/3 límite normal sup.LDH suero	82%	89%
Colesterol pleural >60 mg / dl	54%	92%
Colesterol pleural >43 mg / dl	75%	80%
Col.pleural / Col.sérico > 0.3	89%	81%
Albúmica sérica / Alb.pleura <1.2 gm / dl	87%	92%



DIAGNÓSTICO LABORATORIAL DEL LÍQUIDO PLEURAL

ENFERMEDAD

TEST

Empiema	frotis y cultivo
Neoplasia	citología
Lupus	células LE, ANA >1.0 en líquido pleural
TBC	frotis y cultivo
Ruptura esófago	amilasa salival y líquido ácido (pH:6.0)
Micosis	frotis y cultivo (KOH)
Quilotorax	triglicéridos > 110 mg, quilomicrones por electroforesis
Hemotorax	hto. líq. pleural/sangre > 0.5
Urinotorax	creatinina líq. pleural/ sangre > 1.0
Diálisis peritoneal	proteína < 1 gm glucosa 300-400 mg
Extravasación PVC	glucosa líq.pleural/ sangre > 1.0
Extravasación NSG	lechoso
Reumátoide	citología



DERRAME PLEURAL

Diagnóstico diferencial del derrame pleural

Tipo	Trasudado	Exudado					
Etiología	Insuficiencia cardíaca, cirrosis hepática, síndrome nefrótico, síndrome de Meigs	Metaneumónico empiema pleural	Tbc	Embolia pulmonar, infarto pulmonar	Tumor	Colagenosis, artritis reumática, lupus eritematoso generalizado	Quilotórax, tumor, lesión del conducto torácico
Aspecto	Seroso, claro; a menudo, del lado derecho	Seroso, turbio; purulento	amarillo	Sanguinolento	Sanguinolento	Amarillento	quiloso
Proteínas	Menos de 30 g/l	Más de 30 g/l	> 30 g/l	> 30 g/l	> 30 g/l	≥ 30 g/l	
Peso específico	Menos de 1016	Más de 1016	> 1016	> 1016	> 1016	> 1016	
Células	0	Leucocitos polimorfonucleares	Linfocitos	Hemáties	Hemáties, células malignas	Linfocitos	0 Gotas de grasa
Bacterias	0	+/- Gram	+ Ziehl-Neelsen	0	0	0	0
Glucosa	Como suero	(↓)	↓	Como suero	↓	↓↓↓	
LDH	Bajo	Elevado	Elevado			Elevado	
pH	Como suero	<7,2	<7,2			<7,2	



DERRAME PARANEUMÓNICO

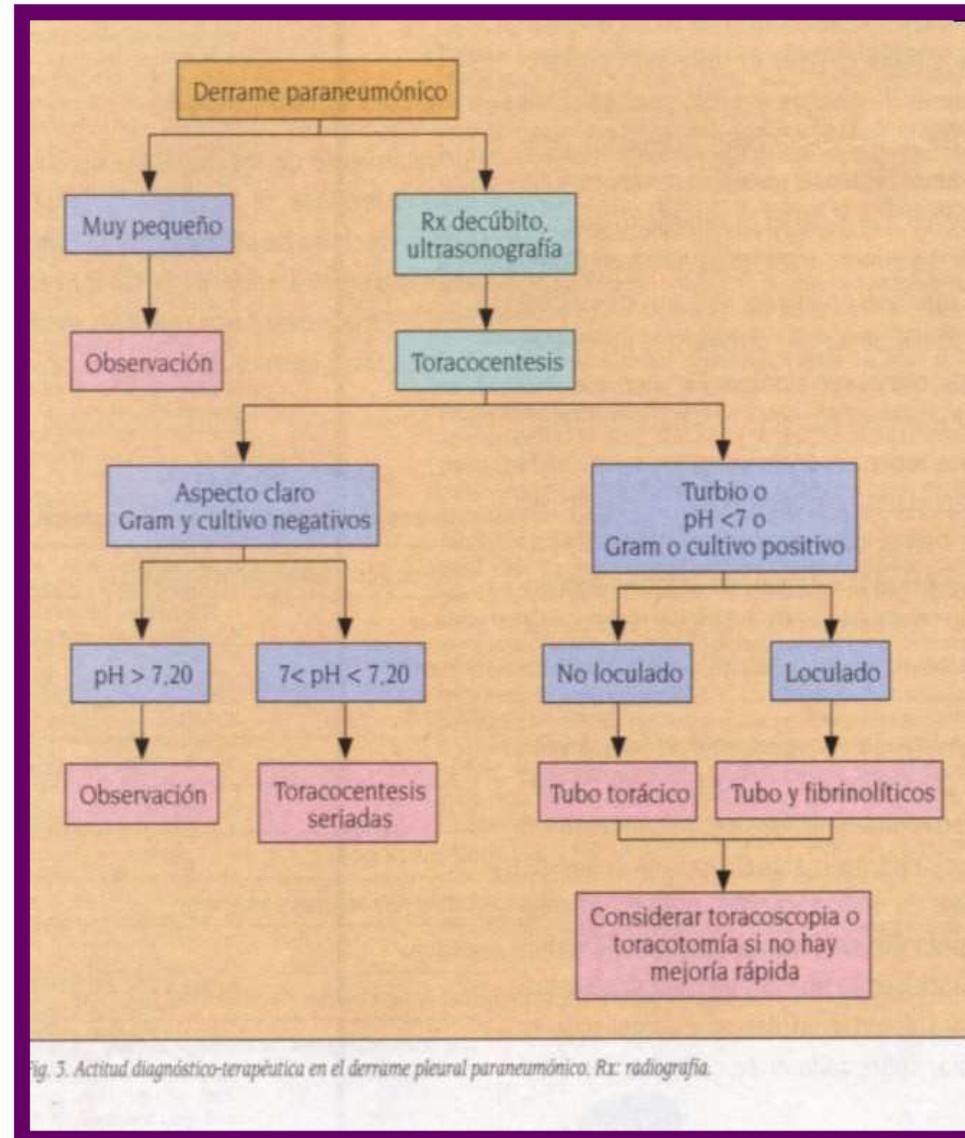


Fig. 3. Actitud diagnóstico-terapéutica en el derrame pleural paraneumónico. Rx: radiografía.



CAUSA DE EXUDADOS

Causes of Exudative Pleural Effusions

Infectious

Bacterial pneumonia
Tuberculous pleurisy
Parasites
Fungal disease
Atypical pneumonias (viral, mycoplasma)
Nocardia, Actinomyces
Subphrenic abscess
Hepatic abscess
Splenic abscess
Hepatitis
Spontaneous esophageal rupture

Iatrogenic

Drug-induced
Esophageal perforation
Esophageal sclerotherapy
Central venous catheter
misplacement/migration
Enteral feeding tube in pleural space

Malignancy

Carcinoma
Lymphoma
Mesothelioma
Leukemia
Chylothorax
Paraproteinemia (multiple myeloma,
Waldenstrom's macroglobulinemia)

Other inflammatory disorders

Pancreatitis (acute, chronic)
Benign asbestos pleural effusion
Pulmonary embolism
Radiation therapy
Uremic pleurisy
Sarcoidosis
Postcardiac injury syndrome
Hemothorax
ARDS

Increased negative intrapleural pressure

Atelectasis
Trapped lung
Cholesterol effusion

Connective tissue disease

Lupus pleuritis
Rheumatoid pleurisy
Mixed connective tissue disease
Churg-Strauss syndrome
Wegener's granulomatosis
Familial Mediterranean Fever

Endocrine dysfunction

Hypothyroidism
Ovarian hyperstimulation syndrome

Lymphatic abnormalities

Malignancy
Chylothorax
Yellow nail syndrome
Lymphangiomyomatosis
Lymphangiectasia

Movement of fluid from abdomen to pleural space

Pancreatitis
Pancreatic pseudocyst
Meigs' syndrome
Carcinoma
Chylous ascites
Subphrenic abscess
Hepatic abscess (bacterial, amebic)
Splenic abscess, infarction



CAUSAS DEL TRANSUDADO EN EL DERRAME PLEURAL

Causes of Transudative Pleural Effusions

Effusion always transudative

Congestive heart failure
Hepatic hydrothorax
Nephrotic syndrome
Peritoneal dialysis

Hypoalbuminemia
Urinothorax
Atelectasis
Constrictive pericarditis
Trapped lung

Superior vena caval obstruction

Comment

Acute diuresis can result in pseudoexudate
Rare without clinical ascites
Usually subpulmonic and bilateral
Acute massive effusion develops within 48 hours of initiating dialysis
Edema fluid rarely isolated to pleural space
Caused by ipsilateral obstructive uropathy
Caused by increased intrapleural negative pressure
Bilateral effusions; may be exudative
A result of remote or chronic inflammation; may be exudative
May be due to acute systemic venous hypertension or acute blockage of thoracic lymph flow

"Classic" exudates that can be transudates

Malignancy
Pulmonary embolism
Sarcoidosis
Hypothyroid pleural effusion

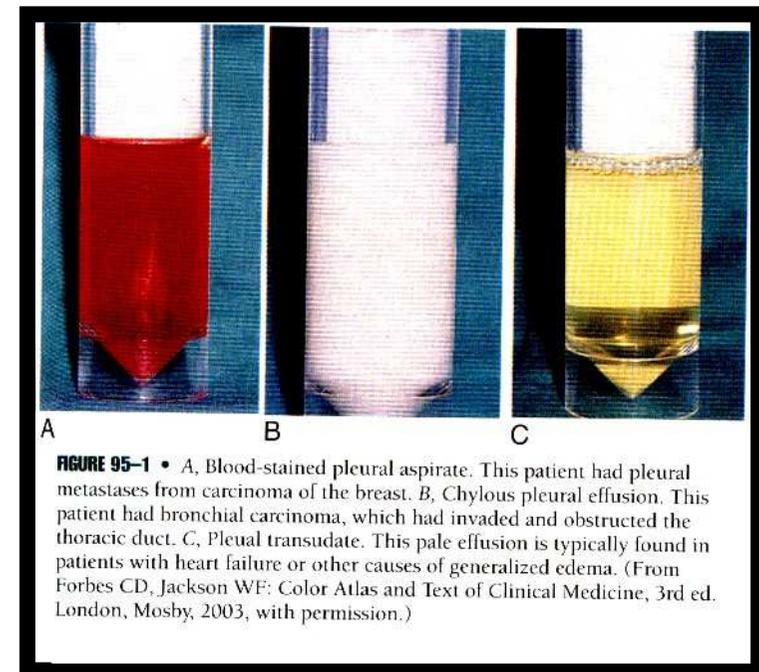
Comment

Due to early lymphatic obstruction, obstructive atelectasis, or concomitant disease (CHF)
23 percent incidence; due to atelectasis
Stage II and III disease
From hypothyroid heart disease or hypothyroidism per se



DERRAME PLEURAL SEGÚN ASPECTO

<u>ASPECTO</u>	<u>TEST</u>	<u>INTERPRETACIÓN</u>
Hemorrágico	Hto.	<1% = no importante 1-20%= neo, TEP, traumatismo >50% de Hto.periférico= hemotorax
Turbio lípidos	Centrifugación	sobrenadante turbio: >110 mg/dl: quilotorax >50<110 mg/dl: obtener lipoproteínas
quilomicrones=quilotorax		±50 mg/dl y colesterol >250= pseudoquilot.
Olor pútrido	Frotis y cultivo	probable anaerobiosis





Evidencia y Estrategia: historia y examen físico (+++)

galope, rales, edema= ICCG

tromboflebitis, hepar, adeno= TEP, neoplasia

Indicaciones de toracocentesis: derrame importante (ver algoritmo)

derrame unilateral

derrame persistente >3 días con diurético

Aspecto del líquido hemorrágico= neo, tep, infección, traumatismo

turbio= ver células, lípidos, fibrina

olor= pútrido (anaerobios)

Exudado vs. Transudado: transudado: proceso sistémico

exudado: factor local

criterios de Light (colest.,LDH,prot., albúmina)



Evaluación del exudado: células, frotis, cultivo, glucosa, buscar TBC

neutro >50%=proceso agudo en pleura

>81%=paraneumónico, 43%=neoplasia

80%= TEP o pancreatitis

mononucleares: proceso crónico, con linfocitos pequeños

pensar neo,tbc, p/ bypass Ao.-cor.

linfocitos: >50%= 94% neo o TBC

eosinófilos:>10%= drogas, Churg Straus

Frotis y cultivo: para aerobios y anaerobios, hongos. Insistir **tbc** en inmunodeprimidos

Glucosa en liquido pleural: <60 mg/dl= paraneumonía o neo y menos frecuente hemotorax, tbc, pleuritis reumática o Churg Straus, paragonimiasis y pleuritis lúpica.

LDH en líquido pleural: se correlaciona con inflamación. Su aumento progresivo indica que se debe ser más agresivo en el diagnóstico



SOSPECHA DE **TBC** EN DERRAME PLEURAL

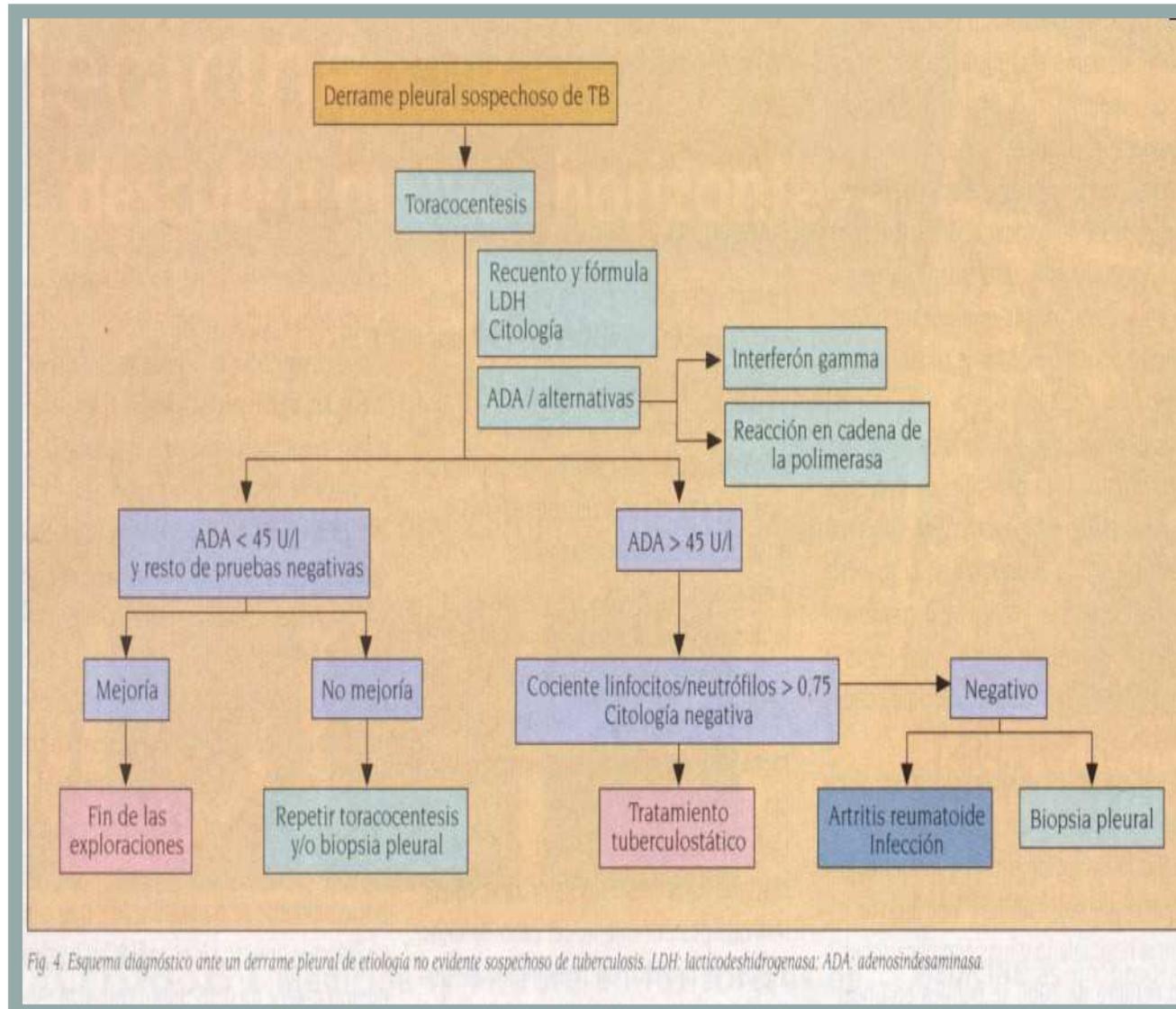


Fig. 4. Esquema diagnóstico ante un derrame pleural de etiología no evidente sospechoso de tuberculosis. LDH: lacticodehidrogenasa; ADA: adenosindesaminasa.



CARACTERÍSTICAS

- Exudado > 3 gm/dl prot. y > 5 gm en el 50 - 77%
- LDH elevado en el 75%, por lo general > 500 UIL
- Bajo pH y glucosa (60 a 100 mg) en el 20% < 50 mgdL
- pH por lo general < 7.4 y en un 20% < 7.3
- Polinucleares en agudo y mononucleares en subag. y crónico



DERRAME PLEURAL TUBERCULOSO

CARACTERÍSTICAS RADIOLÓGICAS

- Unilateral en el 95% y por lo general a la derecha
- Pequeño y moderado y no guarda relación con pronóstico
- En el 50% se ve las lesiones en el parénquima
- En lóbulo superior por lo general es reactiva
- En lóbulo inferior por lo general es primaria



DERRAME PLEURAL TUBERCULOSO

TEST ESPECÍFICOS

- **ADA (AdenosinaDeAminasa) > 45 UL**
- **Lysozima > 15 mg dL en > 80%**
- **Interferón gamma > 140 con sensib.espec. en el 94% y 92%**
- **Ensayos inmunológicos no son útiles**
- **Ac. Nucleico: PCR con sensibilidad del 42 al 81%**



CONCLUSIONES

- Toracocentesis (dx/tx) en causa desconocida → TAC
- Obtener líquido para ver si es exudado o transudado
- Si es **exudado** insistir en tbc, citología y frotis (proceso local)
- Si es **transudado**, pensar en proceso sistémico
- Si todo es negativo, pensar en TEP si hay clínica
- Si sigue negativo, considerar toracoscopia y biopsia
- Toracoscopia si el derrame es bilateral y asimétrico