

PATHOLOGY OF THE PLEURAL CAVITY AND MEDIASTINUM

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PLEURAL CAVITY

- Visceral and parietal pleura
- Mesothelial lining
- Smooth and glossy surface
- 15 ml clear liquid

PLEURAL DISEASES

- **SECONDARY**

- Spread from surrounding structures
 - lungs → pleura
 - thoracic wall → pleura
 - lymph nodes → pleura
 - mediastinum → pleura
 - pericardium → pleura
- systemic diseases (SLE, uremia...)
- metastatic tumors

- **PRIMARY**

PLEURAL DISEASES

PATHOLOGIC CONTENT

INFLAMMATION

TUMORS

PATHOLOGIC CONTENT

- Content collection – lung and mediastinum compression
- Lung collapse – dyspnea, pneumonia
- Vena cava compression

HYDROTHORAX

transudate (pleural effusion)

ETIOPATHOGENESIS

- Congestive heart failure
- Hypoproteinemia (albumin)

PATHOLOGY

- Yellowish clear fluid
- Serosal surface smooth, glossy

HEMOTHORAX

blood

ETIOPATHOGENESIS

- Trauma
- Iatrogenic injury

PATHOLOGY

- Pleural cavity contains liquid or coagulated blood
- Serosal surface unchanged
- Hematoma organisation – granulation tissue, fibrous adhesions

CHYLOTHORAX

lymph

ETIOPATHOGENESIS

- Thoracic duct obstruction or injury

PATHOLOGY

- Milky fluid

PNEUMOTHORAX

air

ETIOPATHOGENESIS

- SPONTANEOUS – complication of lung disease (emphysema, asthma, TBC, abscess, tumor)
- TRAUMATIC – chest wall injury, rib fracture
- IATROGENIC – catheterisation, pleural puncture...

PATHOLOGY

- partial / complete lung collapse
- tension PNO – deviation of mediastinum with compression of mediastinal structures

PLEURITIS

ETIOPATHOGENESIS

- **ASEPTIC**

- lung infarction
- uremia (*pleuritis uraemica*)
- systemic disease (rheumatic fever, SLE)
- radiotherapy
- metastatic tumor (*pleuritis carcinomatosa*)

PLEURITIS

ETIOPATHOGENESIS

- **INFECTIOUS**

- viral (coxsackie, echovirus...)
- bacterial
- mycotic
- TBC

PLEURITIS

- **Exsudate on pleural surface / in pleural cavity**
- Big volume – lung collapse
 - 1) serous
 - 2) serofibrinous / fibrinous
 - 3) purulent
 - 4) hemoragic
 - 5) granulomatous / caseous

PLEURITIS

clinic

- Pain
- Dyspnea
- Systemic symptoms

SEROUS PLEURITIS

ETIOLOGY

- Aseptic inflammation, viral infection

PATHOLOGY

- Slow production of clear yellowish effusion indistinguishable from transudate (hydrothorax)
- Serous surface matt, hyperemic
- HISTO: edema, hyperemia, inflammatory infiltrate (lymphocytes, macrophages)

FIBRINOUS (serofibrinous) PLEURITIS

- THE MOST COMMON FORM OF PLEURITIS

ETIOLOGY

- Aseptic inflammation
 - Lung infarction
 - Pneumonia
 - Systemic diseases (SLE, rheumatic fever...)
 - Renal failure – uremia
 - Surgery
 - Radiotherapy
 - Tumor (primary / metastatic)
- Infections
 - viral
 - (initial phase of bacterial / TBC infection)

PURULENT PLEURITIS

ETIOPATOGENESIS

- Bacterial / mycotic infection
- Primary (trauma, surgery)
- Secondary (spread from surrounding structures, hematogenic or lymphogenic spread)

PURULENT PLEURITIS

PATHOLOGY

MAKRO

- Purulent exsudate on serosal surface
- Pus collection in pleural cavity – *empyema*, *pyothorax*

MIKRO

- Hyperemia, edema, neutrophils, fibrin

HEMORRHAGIC PLEURITIS

Fibinous / serofibrinous pleuritis with admixture of blood in exsudate.

ETIOPATOGENESIS

- Hemorrhagic diathesis
- Tumor (primary/secondary)
- TBC

- Cytological examination!

TBC PLEURITIS

ETIOPATOGENESIS

- Spread from lung or lymph nodes
- Hematogenic spread

PATHOLOGY

- Proliferative or/and exsudative form
- Caseification

PLEURITIS HEALING

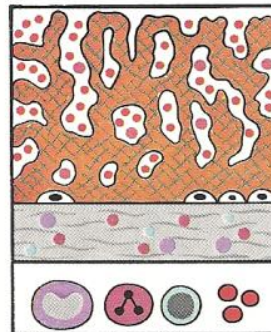
- Depends on the type of exsudate and severity of pleural injury

1) SEROUS PLEURITIS

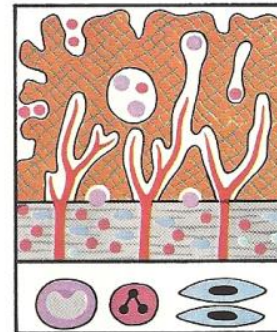
- Absorption of the exsudate, (fibrinolysis), healing ad integrum

2) FIBRINOUS, PURULENT, CASEOUS PLEURITIS

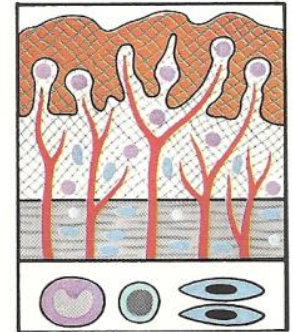
- Organisation of the exsudate (granulation tissue)
- Fibrosis
 - Pleural thickening
 - Pleural adhesions (focal, diffuse)
 - Dystrophic calcifications



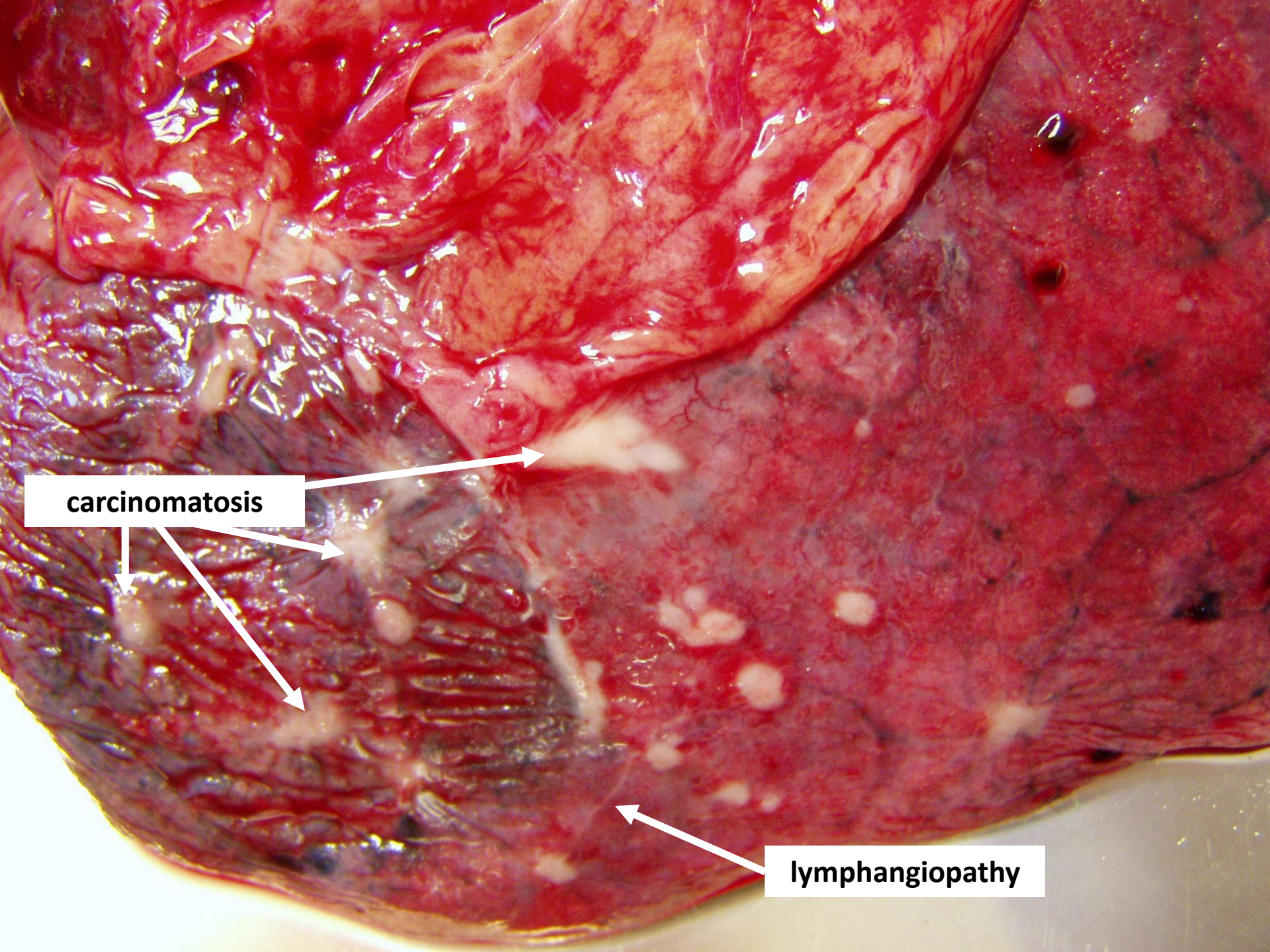
Fresh
fibrinous pericarditis,
1-5 days



Not quite fresh
fibrinous pericarditis,
5-8 days



Older
fibrinous pericarditis,
8-20 days



carcinomatosis

lymphangiopathy

MALIGNANT MESOTHELIOMA

- Malignant tumor from mesothelial lining of parietal or visceral pleura (also pericardium, peritoneum, tunica vaginalis testis)
- Male:female - 9:1, adult
- Medium survival 18 months, mortality 100 %

MALIGNANT MESOTHELIOMA

- ETIOLOGIY
 - asbestos exposition (10% risk)
 - long latence period 25-45 years
 - 90% cases positive anamnesis
 - asbestos bodies in lung

MALIGNANT MESOTHELIOMA

- Local progression – diffuse growth in pleural cavity, propagation to lung, mediastinum, diaphragm, chest wall
- Metastasizing to mediastinal LN, lungs, liver
- Pleural effusion common
- Chest pain

MALIGNANT MESOTHELIOMA

HISTOLOGY

- Epithelioid mesothelioma (60 %) ... dif. dg. lung carcinoma
- Sarcomatoid mesothelioma (15 %)
- Biphasic mesothelioma (25%)

SOLITARY FIBROUS TUMOR

- Mesenchymal tumor
- Uncertain biological behavior: 85 % benign, may relaps
- Pleura (80 % visceral), lung, other sites
- Age 50-60
- Asymptomatic / pleural pain, effusion, lung compression
- MAKRO: variable size, stalked, well demarcation
- MIKRO: spindle cells, variable cellularity, collagenous stroma
- STAT6 transcription factor mutation

DISEASES OF THE MEDIASTINUM

- Mediastinal emphysema
- Mediastinitis
- Tumors and pseudotumors

MEDIASTINAL EMPHYSEMA (pneumomediastinum)

- ET: trauma, iatrogenic injury, spontaneous – esophageal or bronchial wall destruction (tumor, necrosis)
- Compression of structures (vena cava)
- Clin: dyspnea, cyanosis, subcutaneous emphysema
- Compl: mediastinitis, heart failure

MEDIASTINITIS

- Purulent phlegmonous inflammation
- ET: rupture/necrosis of esophageal/tracheal/bronchial wall, spread from surrounding structures (pleural or pericardial cavity, lung, ...)
- High mortality (50 %)
- Compl.: sepsis, vena cava thrombosis, mediastinal fibrosis

CHRONIC MEDIASTINITIS

- Result of healing of acute mediastinitis, TBC lymphadenitis, severe silicosis, radiotherapy, IgG4 disease
- Adhesive mediastinopericarditis
- Compression of mediastinal structures (vena cava)

PSEUDOTUMORS AND TUMORS OF THE MEDIASTINUM

- Compression of mediastinal organs – mediastinal syndroms
 - *Ventral*
 - *Superior vena cava syndrome*
 - *Middle*
 - *Caugh, dyspnea, hoarse, hiccup*
 - *Dorsal*
 - *Difficulty swallowing, neuralgia, Horner trias*

PSEUDOTUMORS OF THE MEDIASTINUM

- **Cysts:** bronchogenic, enteric, thymic, perikardial...
- **Ectopic tissues:** thyroid gland, parathyroid gland
- **Lymphadenopathy**
- **Organ disorders/development anomalies:** aortal aneurysm, gastric herniation, esophageal diverticles

TUMORS OF THE MEDIASTINUM

- PRIMARY – from mediastinal structures / organs
- SECONDARY – metastases (lymph nodes), spread from surrounding organs

TUMORS OF THE MEDIASTINUM

VENTRAL MEDIASTINUM

- Lymphoma (Hodgkin lymphoma, Primary mediastinal large cell B cell lymphoma, T lymphoblastic lymphoma)
- Germinal tumors
- Thymic tumors
- (Thyroid and parathyroid tumors)

MIDDLE MEDIASTINUM

- Lymphoma (DLBCL)
- Germinal tumors

TUMORS OF THE MEDIASTINUM

DORSAL MEDIASTINUM

- Neuroectodermal tumors (neurinoma, neurofibroma, ganglioneuroma, paraganglioma, MPNST)
- Tumors of the esophagus

THYMUS

- Epithelial cells
 - cortical (polygonal)
 - medullar (spindle, form Hassal bodies)
 - T-lymphocytes
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- Congenital malformations
 - Hyperplasia
 - Tumors

THYMUS

congenital malformations

- Hypoplasia and aplasia
 - DiGeorge syndrome (immunodeficiency, heart and large vessels malformations, hypoparathyroidism)
- Thymic cysts

THYMIC HYPERPLASIA

- Lymphatic follicles in thymic medulla (B-lympho)
- *myasthenia gravis* (autoimmune disease, anticholinergic antibodies)
- 65 % thymic hyperplasia, 15 % thymoma

THYMOMA

- Tumor from thymic epithelial cells
- Adults
- Rare tumors (< 1 %)
- Ventral mediastinal syndrome
- myasthenia gravis

THYMOMA

- Type A :-)
spindle cells, no lymphocytes
- Type B :-/ ... :-(
dendritic/polygonal cells + lymphocytes
subtypes B1, B2, B3 – depending on the proportion of tumor epithelial cells and non-tumor lymphocytes (TdT+) and on cellular atypia
- Type AB (mixed) :-)
combination of A and B morphology
- THYMIC CARCINOMA :-(
most commonly squamous cell carcinoma