

DISEASES OF THE MEDIASTINUM I

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MEDIASTINUM

- Mediastinum is the central space within the thoracic cavity bounded by:
 - Sternum anteriorly
 - Lungs and parietal pleura laterally
 - The vertebral column posteriorly
 - The thoracic inlet superiorly
 - The diaphragm inferiorly
- Mediastinum is divided into: superior and inferior compartments.
- The later is divided into anterior, middle and posterior compartments.

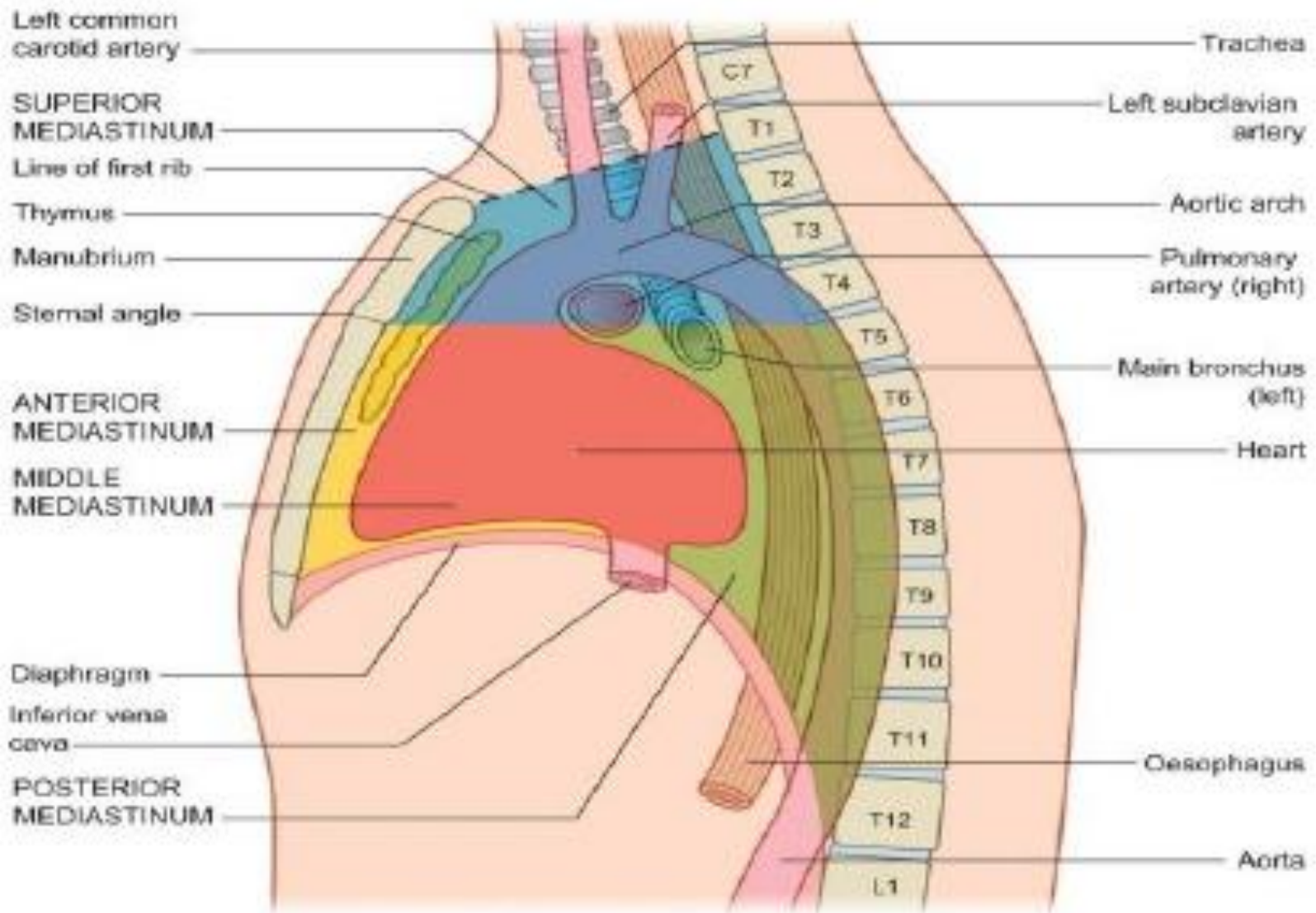
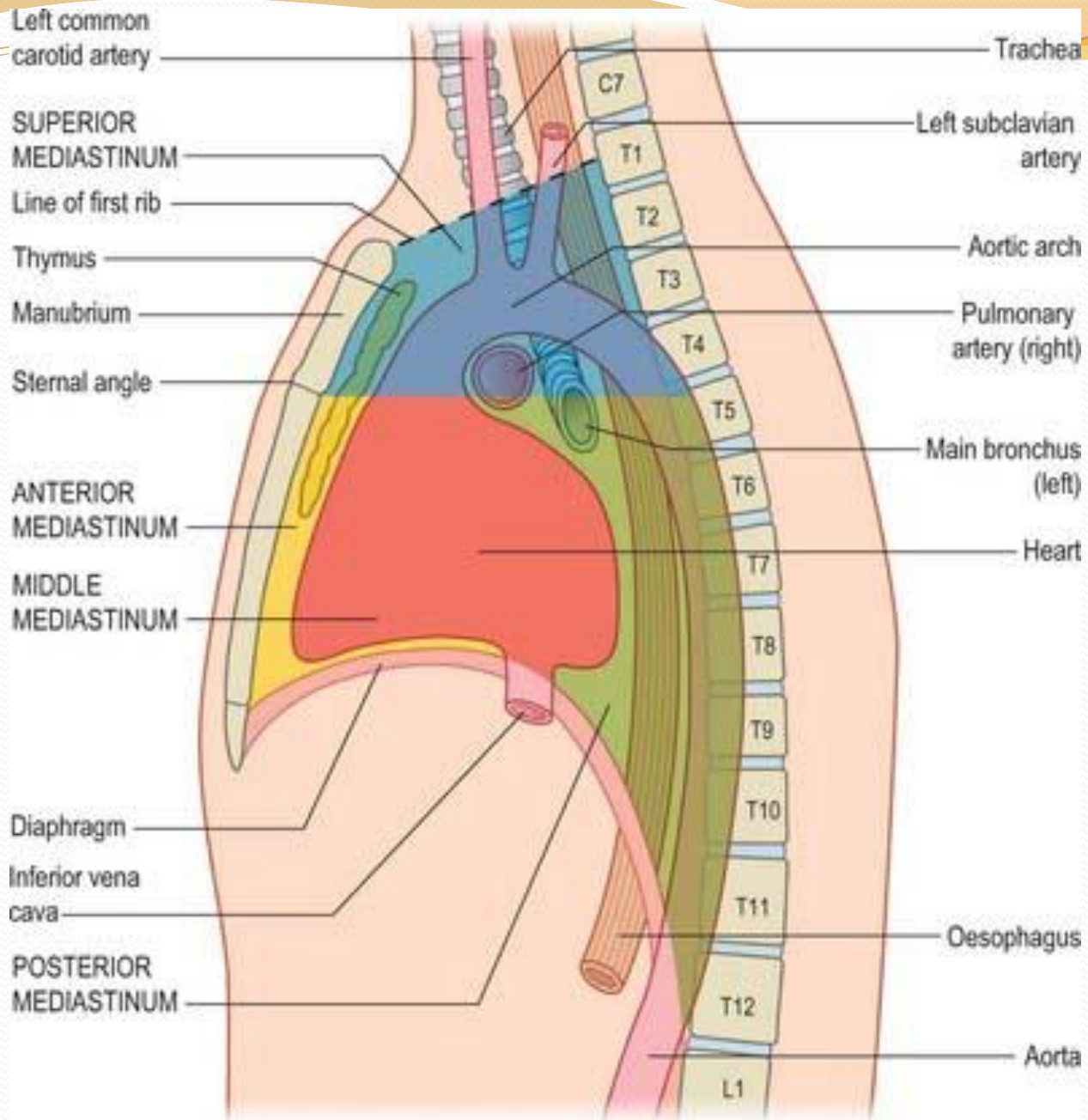


Fig. 55.1 The major divisions of the mediastinum (see text for further details). Note that not all mediastinal contents are depicted.



Regions of the Mediastinum

- The mediastinum consists of most parts of the chest that are not taken up by the lungs or the heart and its associated large blood vessels.
- It is an area that in healthy individuals is filled with fatty tissue, connective tissue, lymph node tissue, and *an organ called the thymus.*

- *The mediastinum is generally considered to include three distinct regions:* the anterior (or anterosuperior mediastinum), the middle mediastinum, and the posterior mediastinum.
- The ***anterior mediastinum*** contains the thymus gland and thus is the usual location for thymomas (tumors of the thymus).

- Other common tumors of the anterior mediastinum are lymphomas and germ cell tumors (tumors originating in cells similar to testicular or ovarian cells but which are located abnormally in the chest).
- Masses in the *middle mediastinum* most commonly represent enlarged lymph nodes by malignant, infectious, or inflammatory process.

- Masses in the *posterior mediastinum* are usually benign tumors or cysts originating from either the nerves that are present in this area (neurogenic tumors) or from the esophagus (foregut duplication cysts).



MEDIASTINAL DISEASES

Classification Of Mediastinal Diseases

- **Mediastinal lesions can be classified in general into:**
 1. Non neoplastic lesions.
 2. Neoplastic lesions.

ANTERIOR MEDIASTINAL DISORDERS

I. *Thymic disorders*

1. Thymoma, thymic carcinoma
2. Thymic carcinoid
3. Thymolipoma
4. Thymic cyst
5. Thymic hyperplasia

II. *Thyroid disorders*

1. Intrathoracic goiter

III. Germ cell tumors

1. Teratoma
2. Seminoma
3. Others

IV. Lymphoma

1. Hodgkin's disease
2. Non-Hodgkin's

V. Parathyroid adenoma

VI. Mesenchymal tumors

MIDDLE MEDIASTINAL DISORDERS

I. Lymphoma

II. Benign lymphadenopathy

A. Granulomatous disease

1. Infectious
2. Non infectious

B. Miscellaneous

1. Amyloidosis
2. Drugs

III. Metastatic lymphadenopathy

IV. Cysts

1. Bronchogenic cysts
2. Pericardial cyst

V. Vascular Lesions

1. Aneurysm
2. Hemangioma

VI. Miscellaneous

1. Diaphragmatic hernias
2. Pancreatic pseudocyst

POSTERIOR MEDIASTINAL DISORDERS

I. Neurogenic tumors

1. Peripheral nerve

- Schwannoma, neurofibroma etc

2. Sympathetic ganglia

- Ganglioneuroma, neuroblastomaetc.

3. Paraganglionic tumors

- Pheochromocytoma

II. Esophageal disorders

1. Benign tumors
2. Esophageal diverticulum

III. Spinal

1. Lateral thoracic meningocele
2. Paraspinal abscess

IV. Miscellaneous

1. Thoracic duct cysts

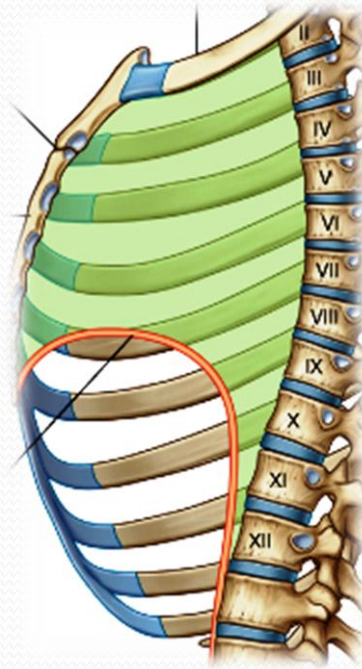
Location of most common mediastinal lesions

Superior:

- *Thymoma and thymic cysts*
- *Malignant lymphoma*
- *Thyroid lesions*
- *Parathyroid adenoma*

Anterior:

- *Thymoma and thymic cysts*
- *Germ cell tumours*
- *Thyroid lesions*
- *Parathyroid adenoma*
- *Malignant lymphoma*
- *Paraganglioma*
- *Hemangioma*
- *Lipoma*



Posterior:

- *Neurogenic tumors:*
- *Schwannoma*
- *Neurofibroma*
- *Ganglioneuroma*
- *Ganglioneuroblastoma*
- *MPNST*
- *Neuroblastoma*
- *Paraganglioma*
- *Gastrogenic cysts*

Middle:

- *Pericardial cyst*
- *Bronchial cyst*
- *Malignant lymphoma*



INFLAMMATORY DISEASES

Acute mediastinitis

- **Acute mediastinitis** is usually the result of *traumatic perforation of the esophagus, or descent of infection from within the neck through the 'danger space' anterior to the prevertebral fascia.*
- **Acute mediastinitis** involves predominantly the *posterior portion* of the mediastinum.

- The initial lesion may be a **neck abscess** resulting from *dental infection, Ludwig angina, necrotizing fasciitis, or pyriform sinus fistula* → *abscess formation*.
- Other types of mediastinitis are those resulting from *spread of infection from the chest wall*, and those developing *after heart surgery*; many of the latter are caused by *CMV infection*.

Chronic mediastinitis

- **Chronic mediastinitis** produce compression of the vena cava and simulate malignant process.
- The typical location is the ***anterior mediastinum***, in front of the tracheal bifurcation.
- ***Microscopically***, one may find *granulomas*, *fibrosis*, or a combination of both.

- **Mycotic** particularly histoplasmosis.
- *Histoplasma* were characterized by formation of thick fibrous capsule.
- In **Mycobacteria** TB the capsule was thin.
- **Nocardia** mediastinitis result in superior vena caval syndrome.
- In many cases of chronic mediastinitis, specific etiology cannot be demonstrated.

- Some cases represent examples of **fibrosing mediastinitis** (*idiopathic mediastinal fibrosis; idiopathic inflammatory fibrosclerosis of the mediastinum*), a member of the group of idiopathic fibrosing (sclerosing) inflammatory conditions, which also includes *retroperitoneal fibrosis, sclerosing cholangitis, Riedel struma, and inflammatory pseudotumor of the orbit*.
- Fibrosing mediastinitis can be seen in association with retroperitoneal fibrosis.

- ***This disease should be suspected if any of the following features are present:*** cellular fibrous reaction, polymorphic inflammatory infiltrate rich in plasma cells and eosinophils, and the occurrence of phlebitis.
- Some neoplastic disorders may contain extensive areas of fibrosis and chronic inflammation; this is particularly true for Hodgkin lymphoma.

Sclerosing Mediastinitis

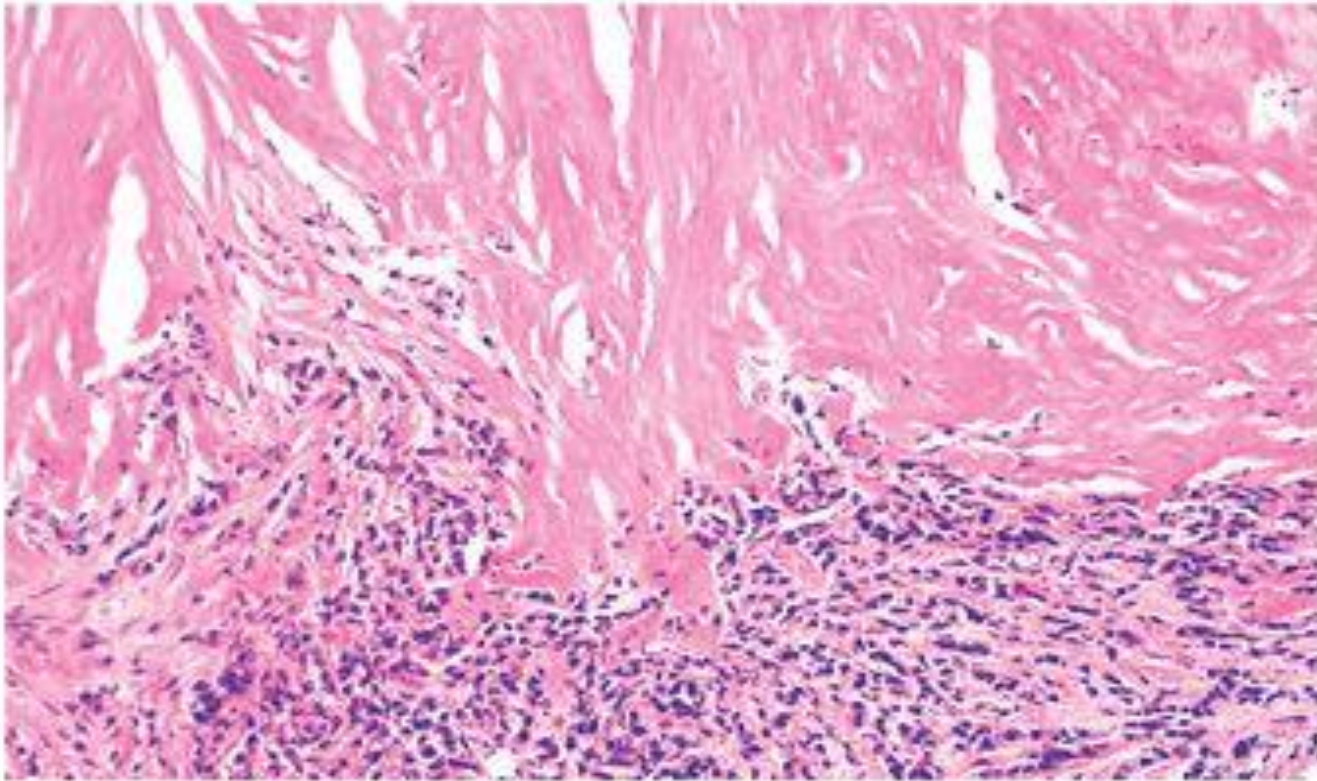
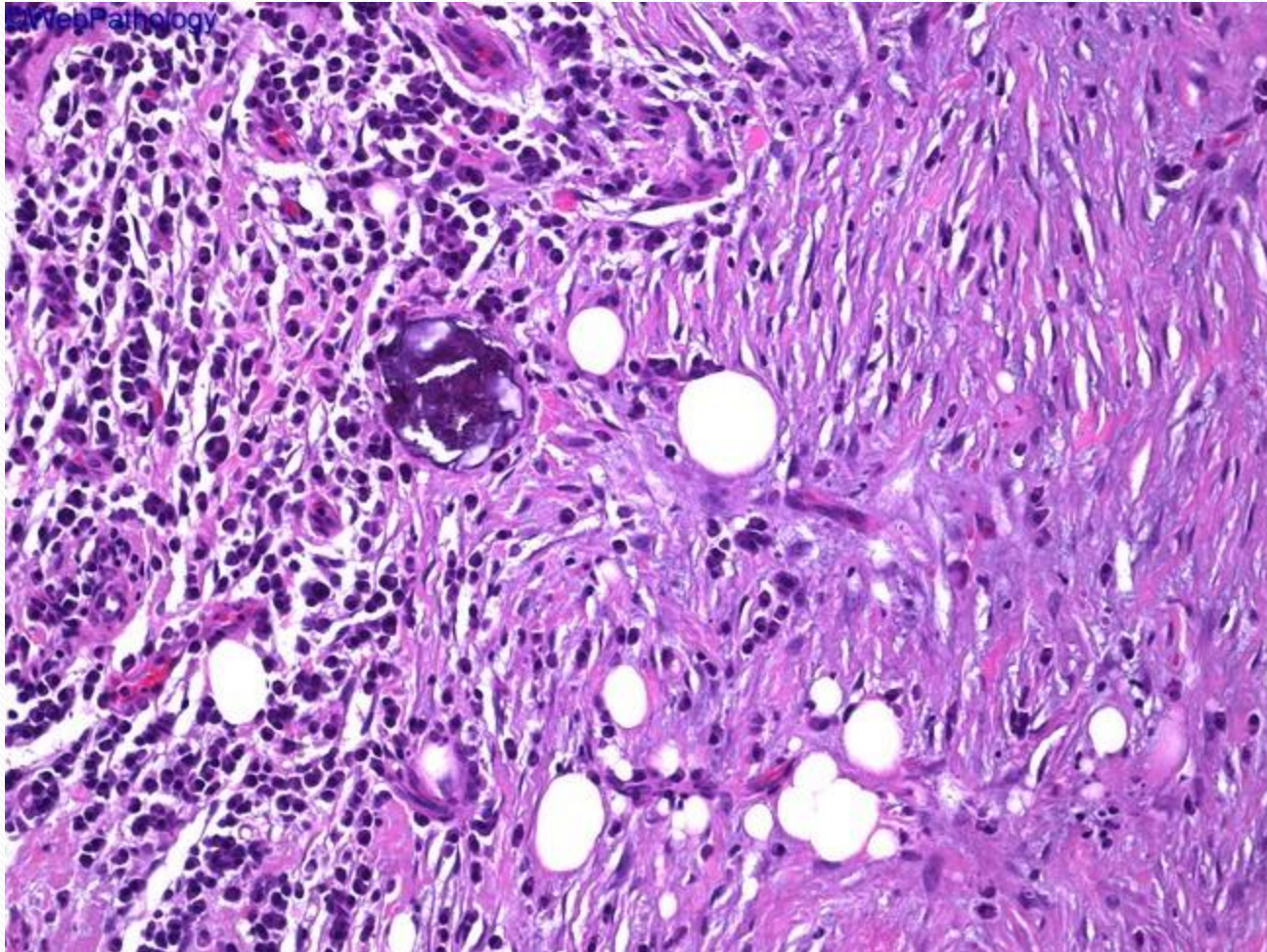


FIGURE 28.54 Sclerosing mediastinitis is exemplified in this photomicrograph showing dense, acellular hyaline fibrous tissue and a cuff of small lymphocytes. Granulomatous inflammation may be observed focally in this process in some instances.

Sclerosing Mediastinitis





Congenital Cysts

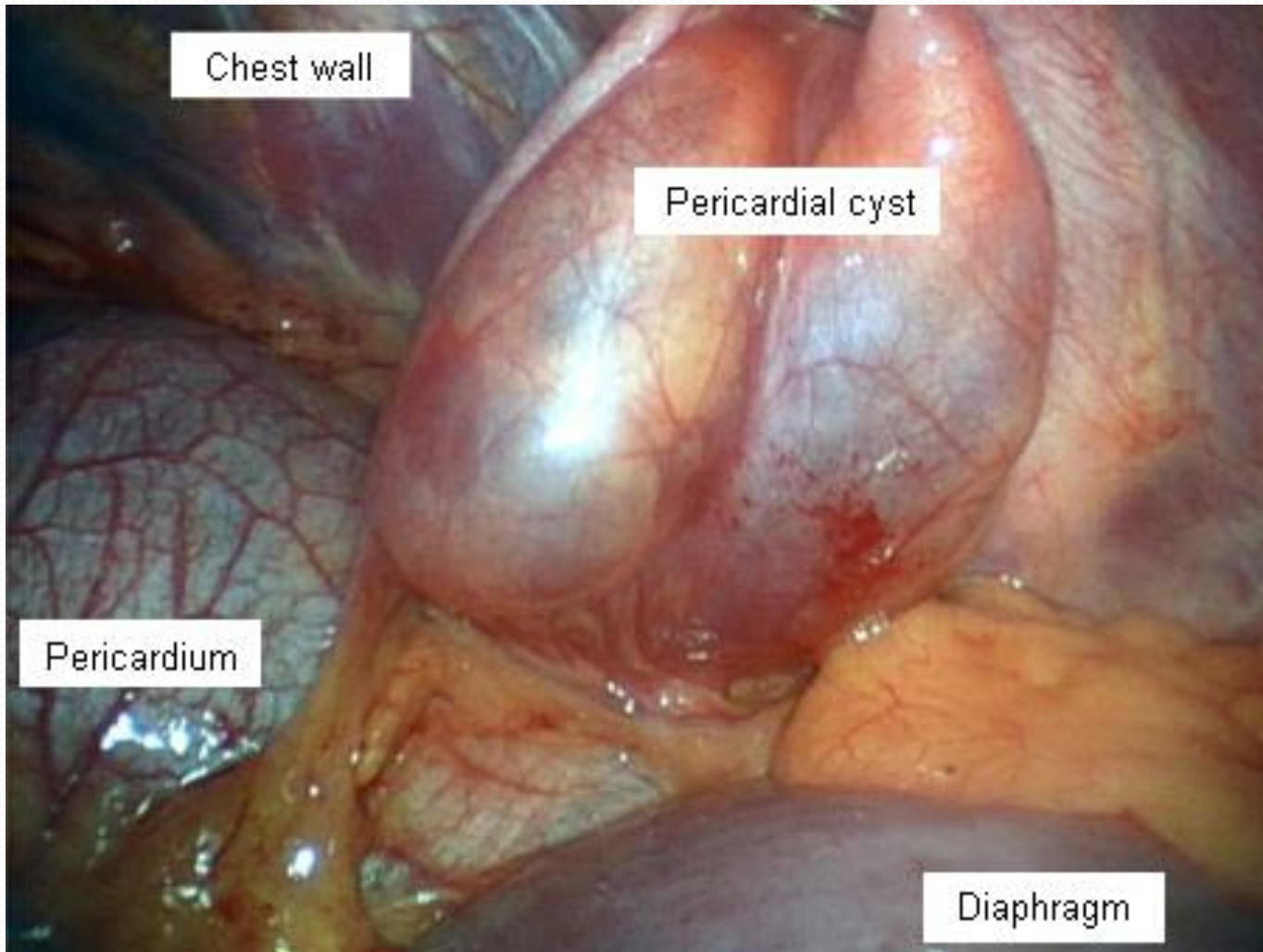
Mediastinal Cysts (other than Thymic)

Pericardial (coelomic) cysts

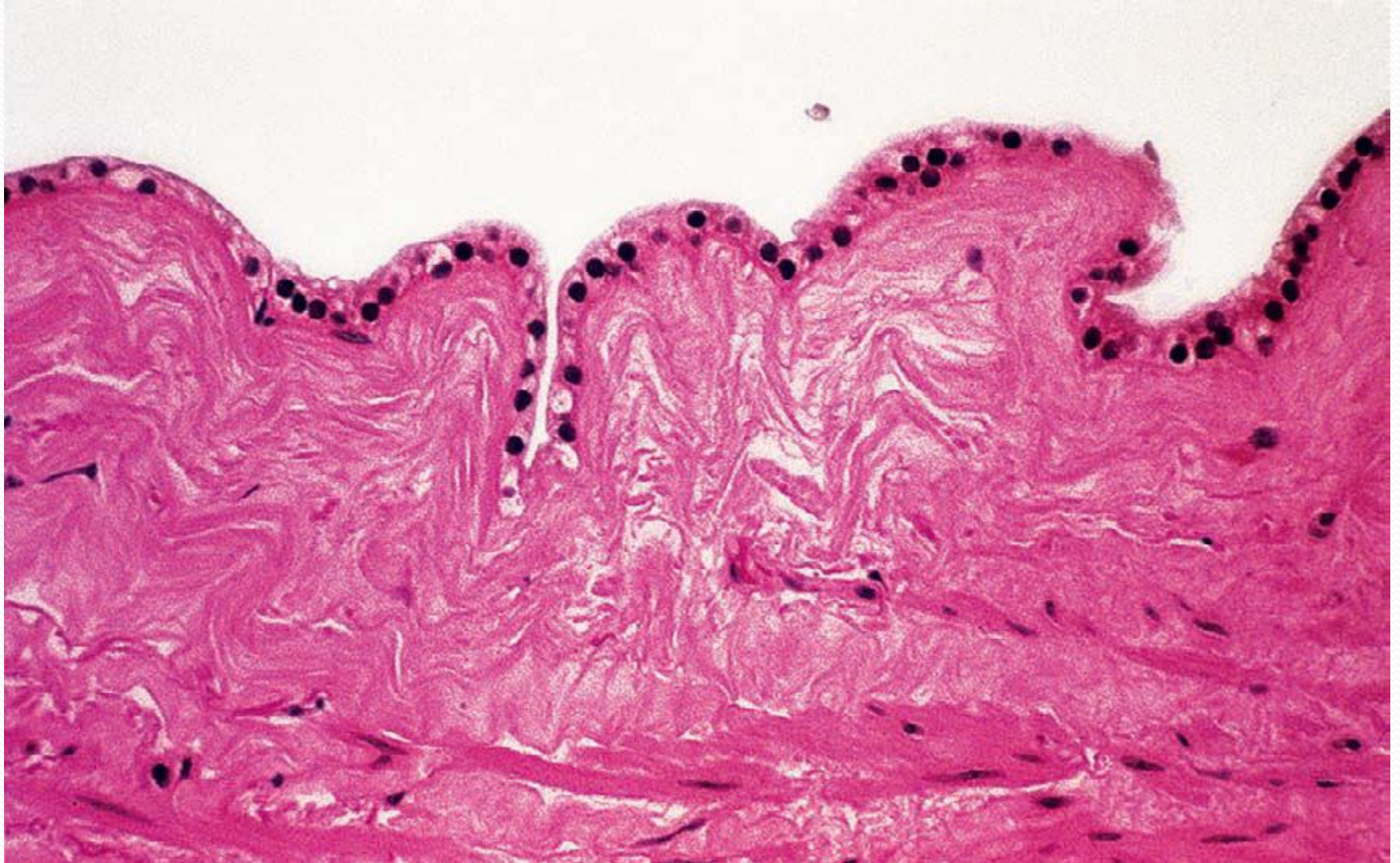
- **Pericardial sac** is formed by fusion of multiple disconnected lacunae.
- *Failure of one of **lacunar cavities** to merge with the others results in development of pericardial coelomic cyst.*
- *Such cysts are usually located at the right cardiophrenic angle.*
- *They are soft and unilocular, loosely adherent to the pericardium and attached to the diaphragm.*

- Sometimes they communicate with the pericardial cavity.
- Less commonly, they are seen in a *supra-pericardial position*.
- Sometimes multiple cysts may be present.
- They contain *clear fluid* unless infected.
- The blood supply comes from the pericardium.
- *The inner surface of the cyst wall is covered by single layer of flat or cuboidal mesothelium, which is strongly immunoreactive for keratin and mesothelial markers.*

Pericardial Cyst



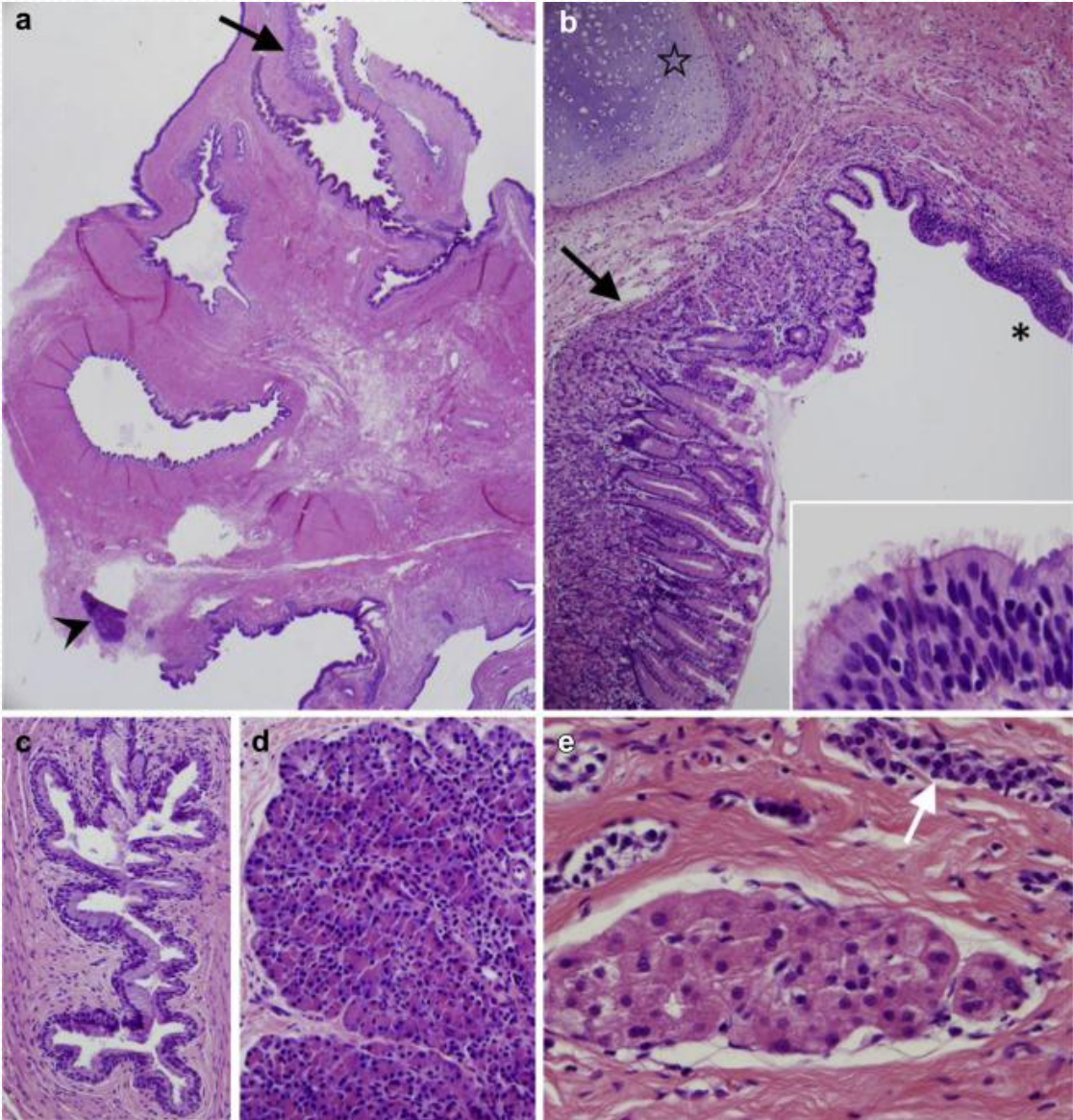
Pericardial Cyst



Foregut cysts

- During embryonic development, fusion of the lateral walls that form the *tracheoesophageal septum begins caudally*.
- If a small bud or diverticulum of the foregut is pinched off during this process, it will be carried into the mediastinum by downward growth of the lungs.
- It contains the endoderm and mesoderm that were become part of the trachea, bronchi, esophagus, stomach, or intestine.

Retrocardiac mediastinal foregut duplication cyst

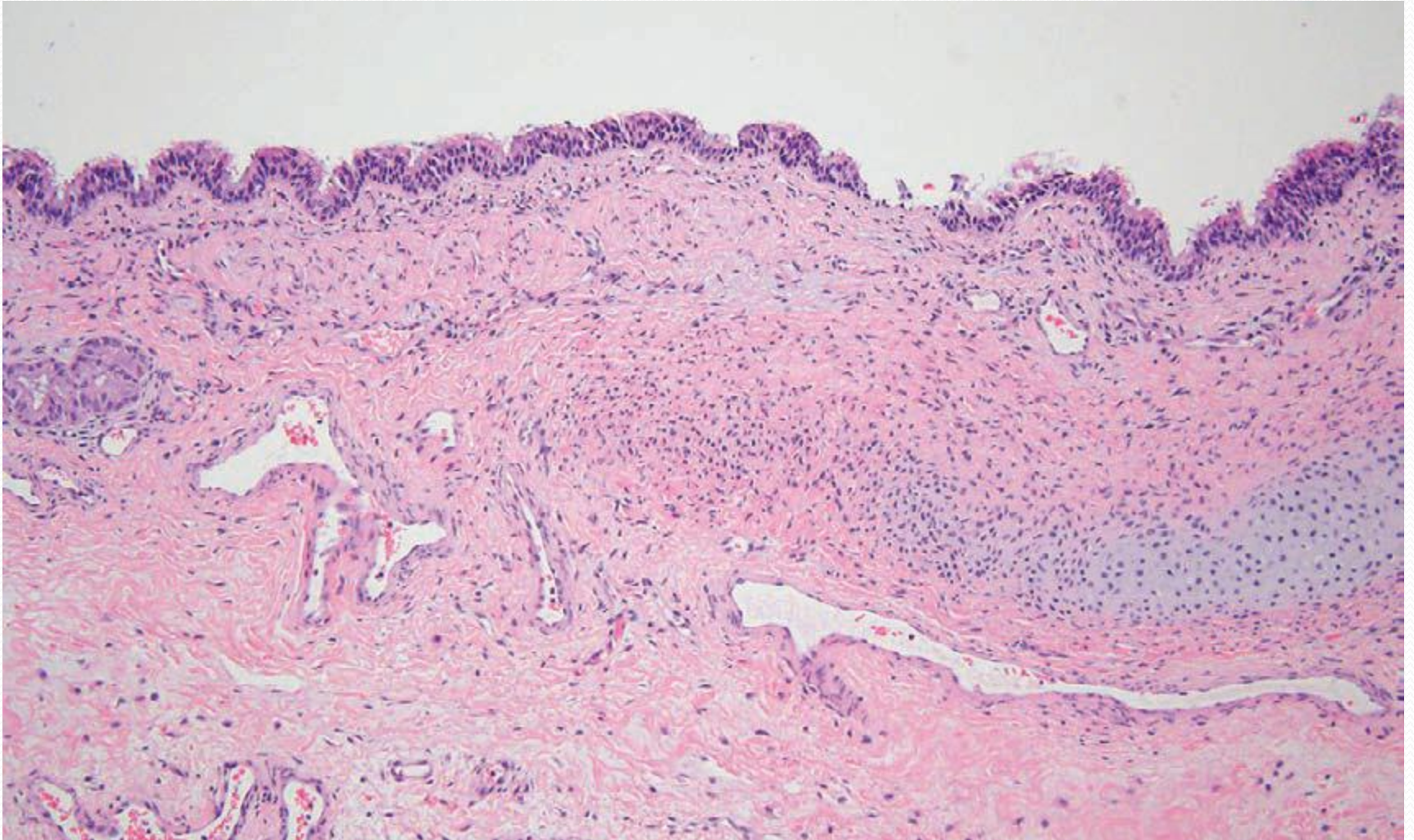


Bronchial cysts

- They occur along the tracheobronchial tree.
- Their most common location being *posterior to the carina*.
- Rarely, they are located just above the diaphragm.
- They can be detected on barium-swallow or CT.
- These cysts contain clear or gelatinous fluid.
- They are usually *unilocular, thin-walled, and spherical*; and have an average diameter of 3–4 cm.

- **Microscopically**, they usually are *lined by ciliated columnar epithelium, but focal or extensive squamous metaplasia and/or extreme attenuation of this lining can occur.*
- The wall may contain hyaline cartilage, smooth muscle, bronchial glands, and nerve trunks.

Bronchial Mediastinal Cyst

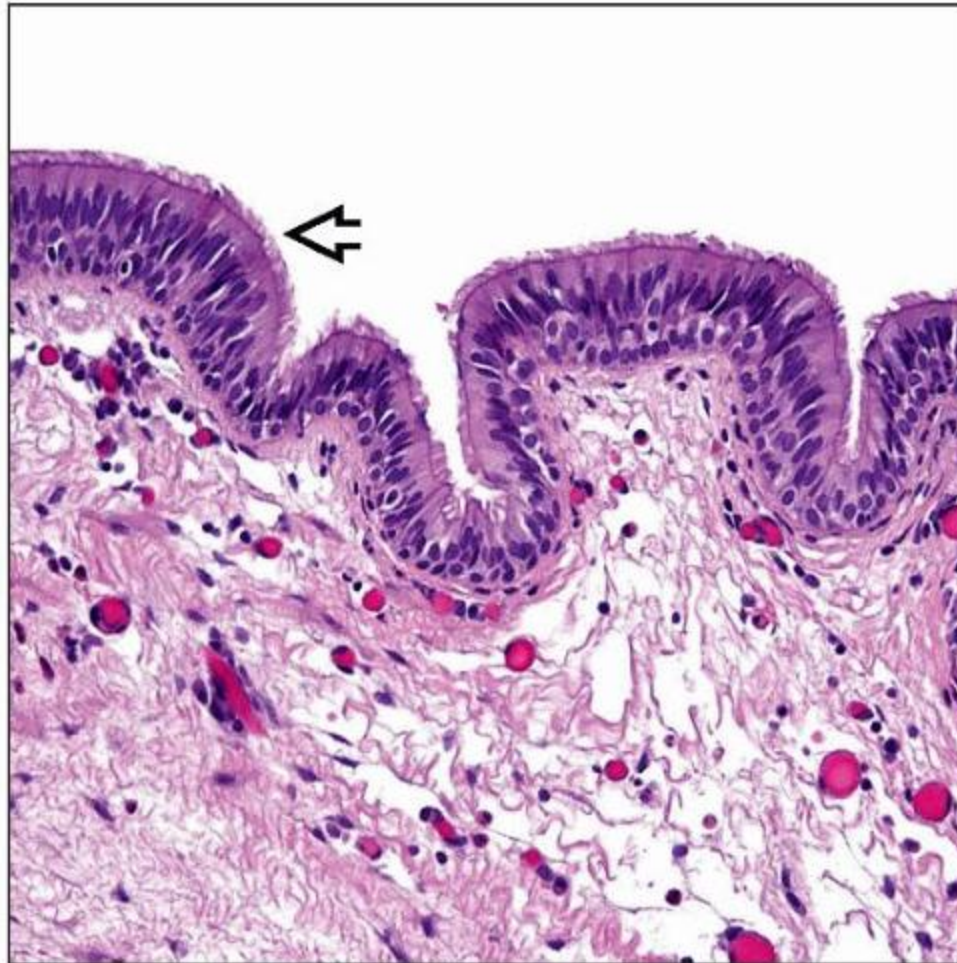


Esophageal cysts

- **Esophageal cysts** may arise from persistence, in the wall of the foregut, of vacuoles that form during the solid tube stage of development.
- Most are found *embedded in the wall of lower half of the esophagus.*
- The lining may be squamous, ciliated, columnar, or mixture of them.

- *Distinction from bronchial cyst may be difficult or even impossible, especially because the latter can be found entirely within the wall of the esophagus.*
- The best evidence that a cyst in this location is of esophageal type is *the presence of a definite double layer of smooth muscle in their wall.*

Esophageal Duplication Cyst

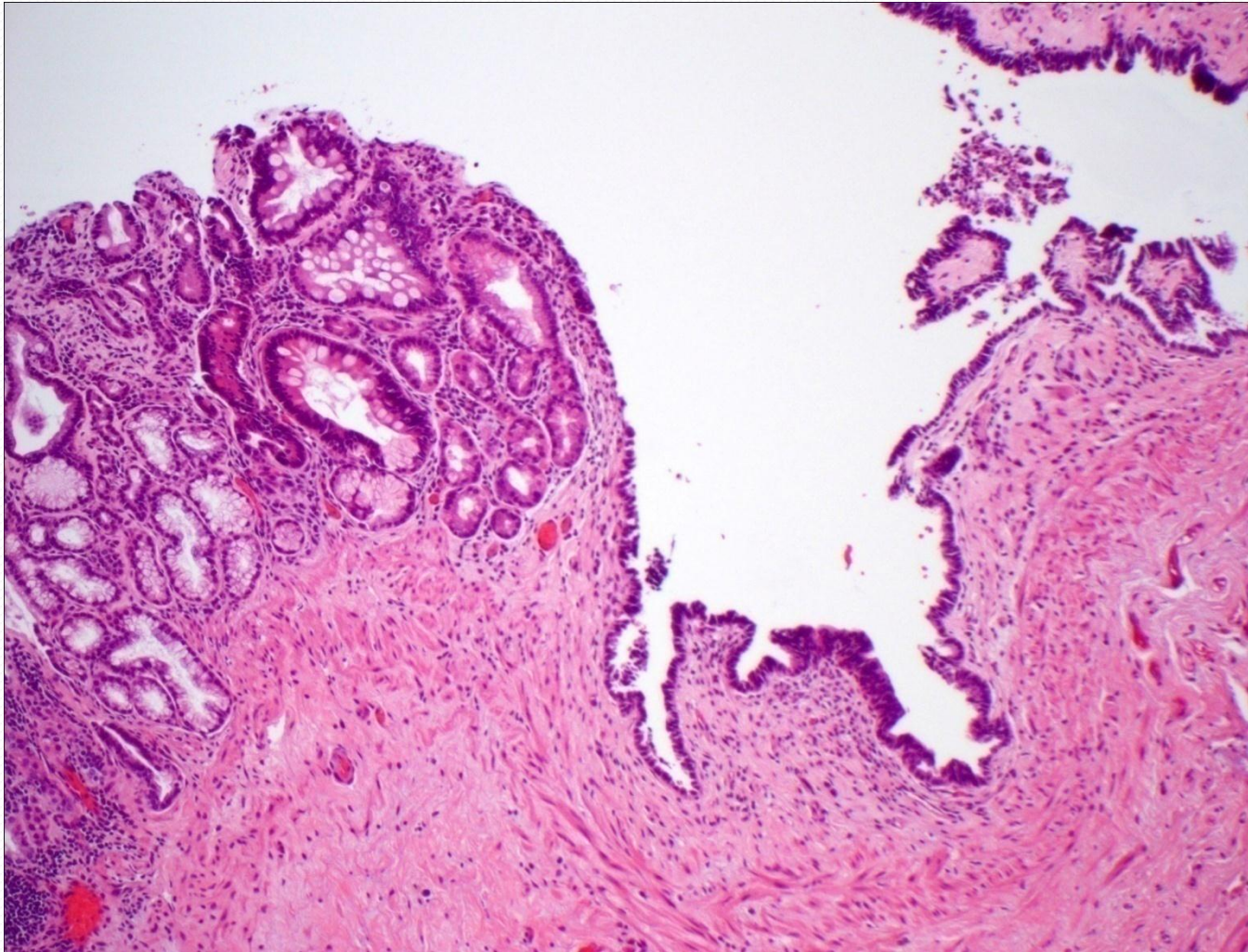


Gastric and Enteric cysts

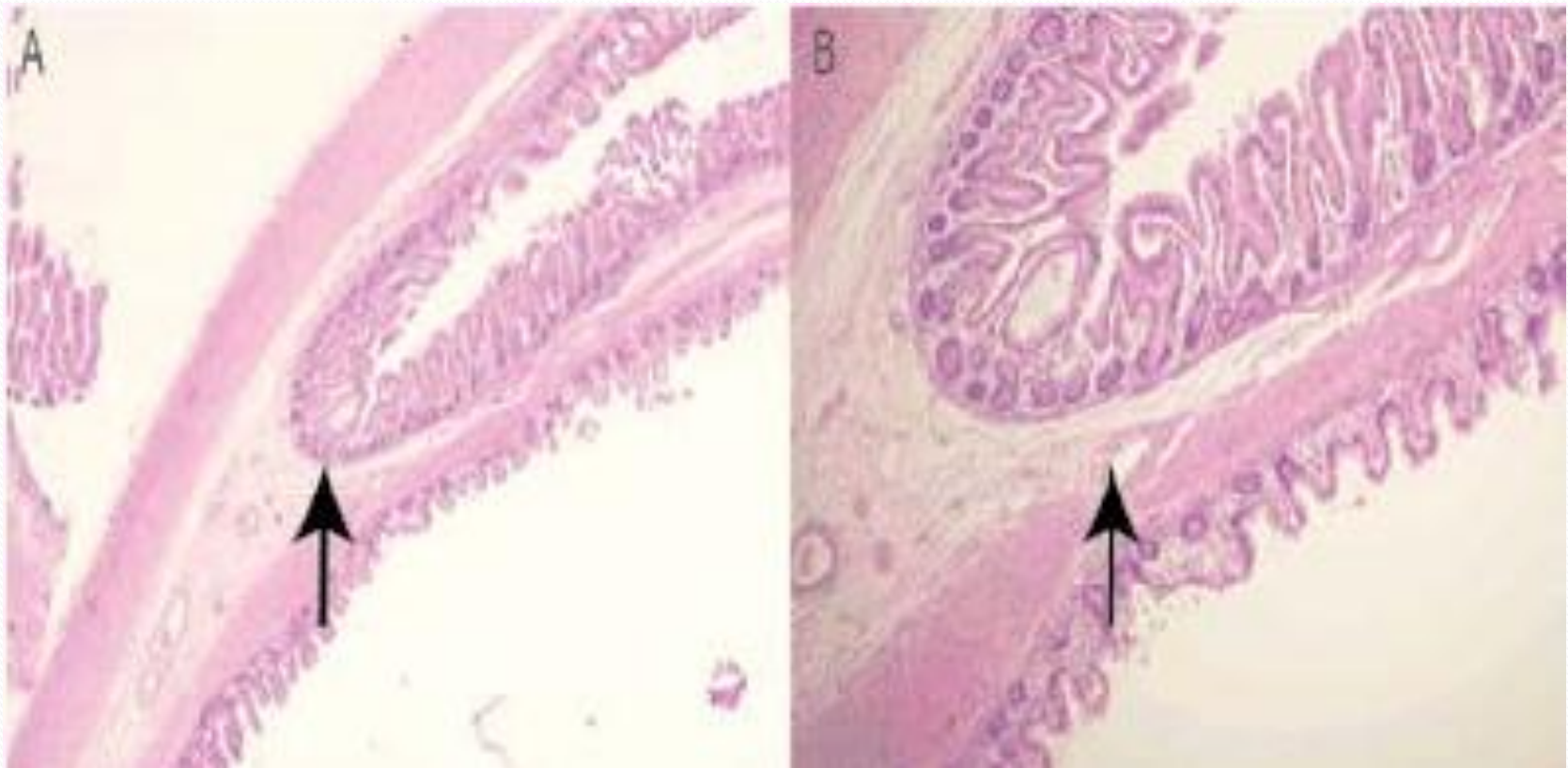
- **Gastric and enteric cysts** usually are located *in posterior mediastinum in paravertebral location.*
- They attached to the wall of the esophagus or even embedded within its muscle layer.
- Nearly all cases are associated with vertebral malformations.

- The **gastric type** is made up of the same coats as the stomach, whereas the **enteric type** simulates the wall of normal intestine.
- Combined forms occur and are designated as **gastroenteric cysts**.
- Nerve fibers and ganglia are often present in both of them.

Gastric Cyst



Multiple Enteric Duplication Cysts



Pancreatic cysts and pseudocysts

- **Pancreatic cysts and pseudocysts** may have a primarily mediastinal presentation.
- Knowing the tendency of mediastinal germ cell tumors to contain pancreatic tissue, it is assumed that some pseudocysts have teratomatous origin.

Pancreatic Pseudocyst

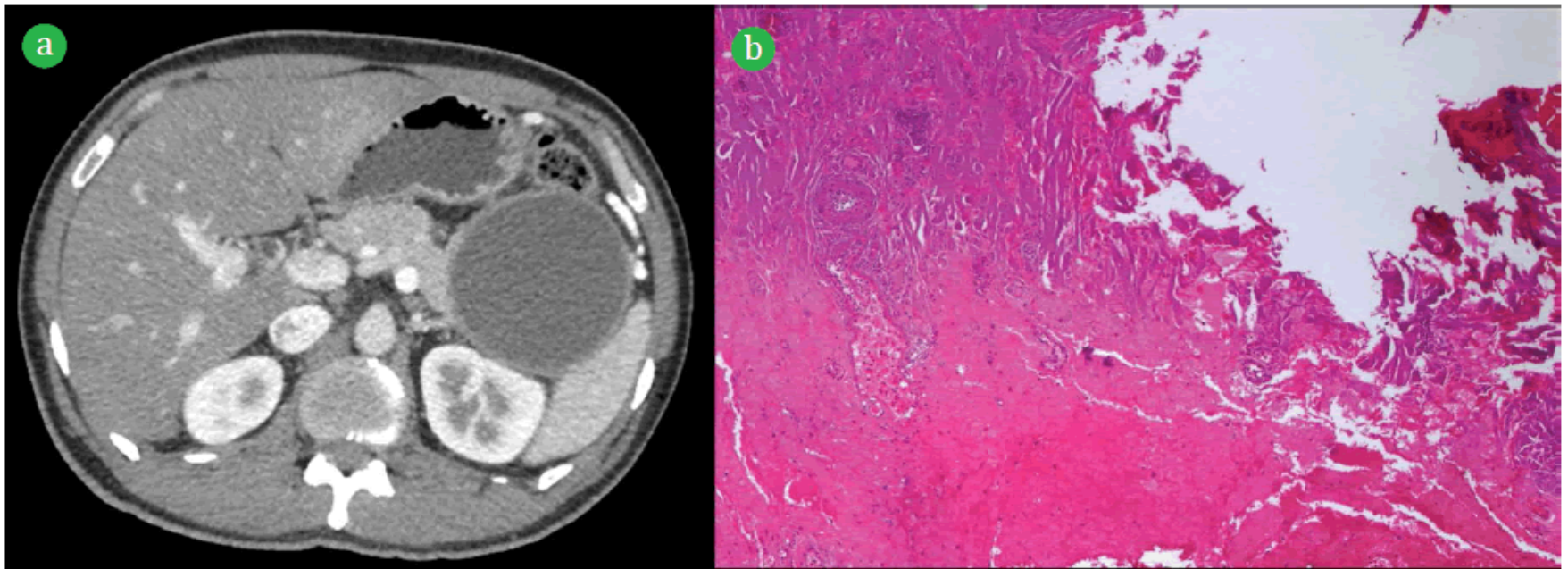
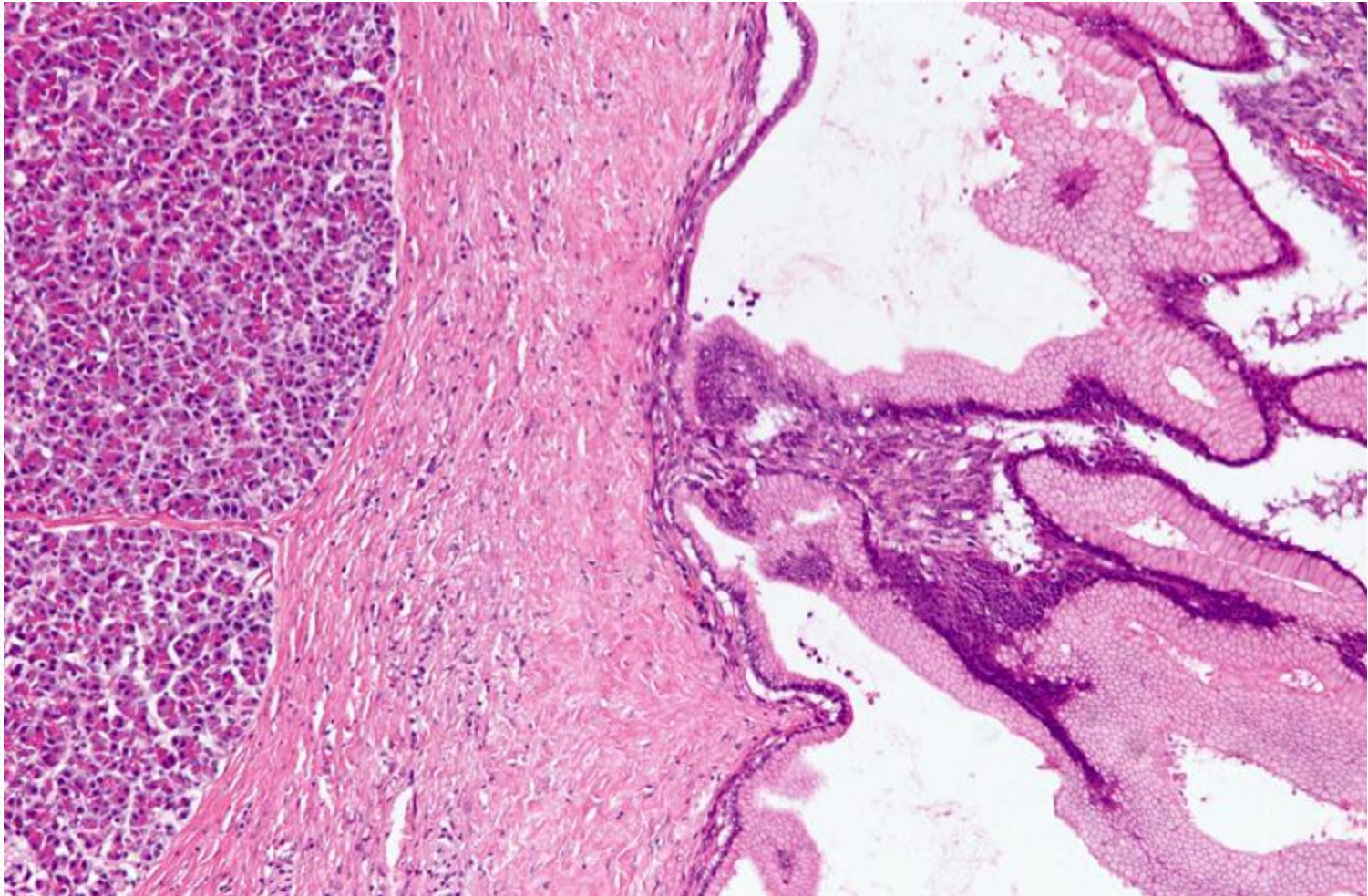


Figure 2. Pseudocyst in a 35-year-old male: (a). Axial CT image showing a well-defined unilocular cystic lesion with a well-defined wall without calcification, septations or solid component in a patient of prior history of pancreatitis. (b). Section of pseudocyst wall comprising of fibrocollagenous wall with inflammation and no lining epithelium (200X, HE).

Pancreatic Cyst



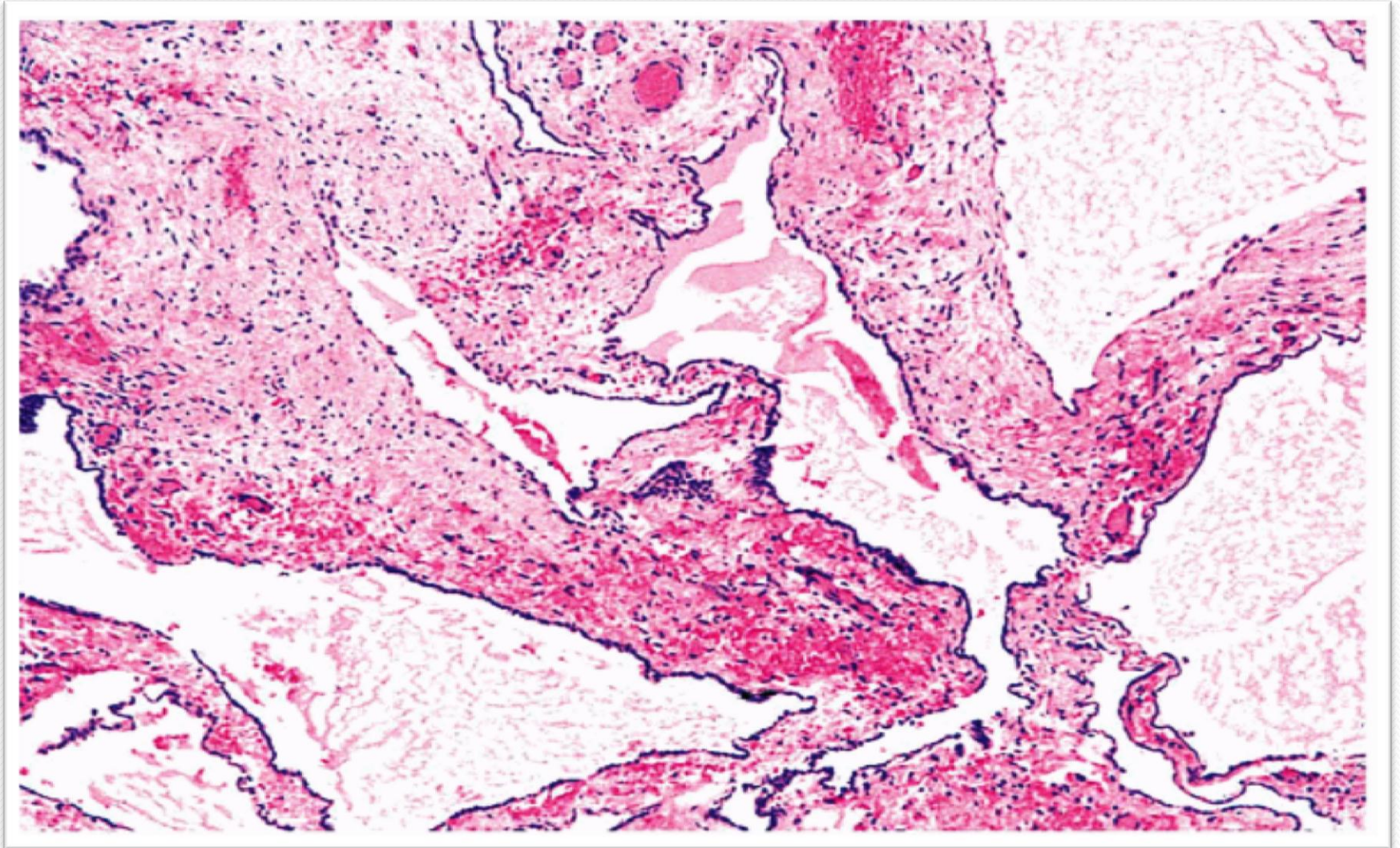
- Congenital cysts only exceptionally communicate with the tracheobronchial tree or the esophagus.
- ***Malignant change*** within them is very unusual, usually in the form of adenocarcinoma.
- ***Symptoms from these cysts*** depend on their size and location; they are related to pressure phenomena and consist of cough, dysphagia, recurrent pulmonary infection, dyspnea, pain, and rarely hemoptysis.

- Most bronchial, esophageal, and enteric cysts are *asymptomatic* and are found incidentally.
- In contrast, gastric and gastroenteric cysts are often symptomatic and even life-threatening because of the occurrence of *gastric secretion and hemorrhage, peptic ulcer, or perforation*.

Other Cysts

- **Thoracic duct cyst:** some of large lymph vessel represent ***cystic lymphangiomas***.
- A type of posterior mediastinal cyst occurring in adult women and lined by ER+ PR+ epithelium resembling *fallopian tube mucosa and smooth muscle-containing thin wall is of probable **müllerian origin***.
- **Adenomatoid tumor** may present as cystic mass in the ***anterior mediastinum***.

Lymphangioma



Thyroid and parathyroid lesions

- **Thyroid tumors and tumor-like conditions** can present as *superior mediastinal masses*.
- The most common pathological change in mediastinal thyroid glands is *nodular hyperplasia*, which can reach huge proportions and cause compression symptoms.

- This may occur in the form of independent nodules (*so-called parasitic or accessory nodules*).
- Malignant change in mediastinal thyroid (except for *papillary microcarcinomas*) is too *unusual*.

- Nodular hyperplasia probably does not arise from ectopic thyroid tissue but from cervical thyroid that is pulled down either into the anterior prevascular compartment or the retrotracheal compartment by the nodular enlargement (so-called '*posterior descending goiter*').
- This interpretation is supported by that these masses *retain their cervical blood supply through narrow pedicle.*

- **Parathyroid tumors and tumor-like conditions** can occur in the mediastinum, because the *embryological origin of parathyroid glands is intimately related to the thymus.*
- *Most of parathyroid adenomas* are found in the superior mediastinum and/or the anterior mediastinum.

- Because of their location, these adenomas can *grow to much larger size than their equivalents in the neck.*
- Like their cervical counterparts, *mediastinal parathyroid adenomas can be accompanied by heavy lymphocytic infiltrate.*
- Some *mediastinal parathyroid carcinomas are nonfunctioning.*
- **Parathyroid cysts** of the mediastinum are located in the *antero-superior compartment*, and are often *functioning.*



Thank you