

Systemic Pathology

Practical slides

Cardiovascular System

CARDIOVASCULAR SYSTEM

- *Slide 1: Coronary artery fresh thrombus*
- *Slide 2: Coronary artery organised thrombus*
- *Slide 3: Heart – Acute myocardial infarction*
- *Slide 4: Heart – Healed infarct*

SLIDE 1

Coronary artery fresh thrombus

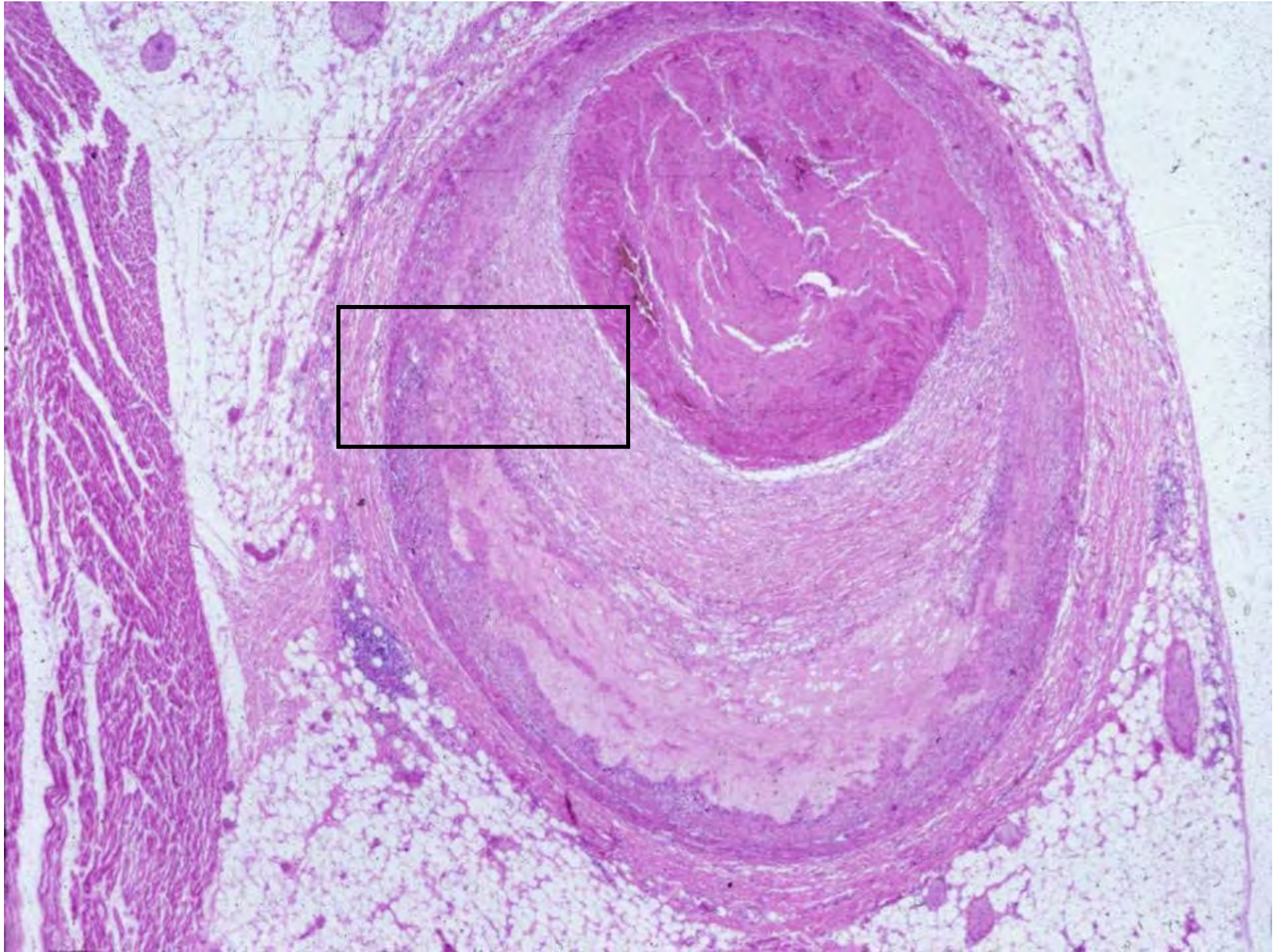
A 60-yr-old man collapsed and died after complaining of chest pain. He had diabetes mellitus for several years.



Fresh thrombus within coronary artery.

- Arterial lumen filled with reddish thrombus



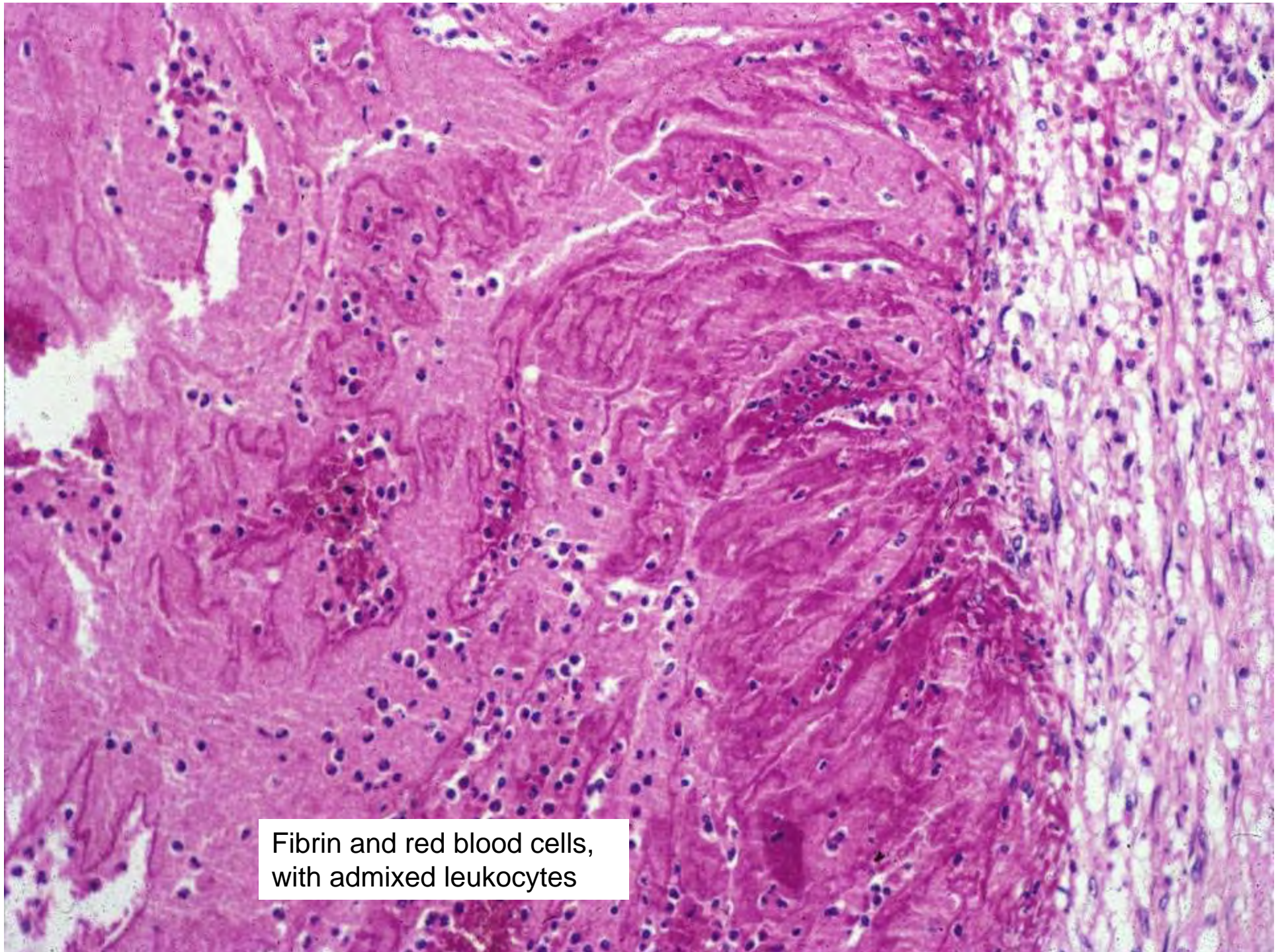




Fibrin and red blood cells

This histological section, stained with hematoxylin and eosin (H&E), shows a dense area of tissue. The upper right portion of the image is characterized by a thick, eosinophilic (pink) mass, which is identified as fibrin. Within this mass, there are numerous small, dark, round to oval structures representing red blood cells. The surrounding tissue consists of a network of spindle-shaped cells, likely fibroblasts, embedded in a pink-stained extracellular matrix. The overall texture is granular and somewhat disorganized, typical of a healing or inflammatory process.

Fibroblasts and
extracellular matrix
material



Fibrin and red blood cells,
with admixed leukocytes

SLIDE 2

*Coronary artery organised
thrombus*





A histological section of a blood vessel, likely an artery, stained with hematoxylin and eosin (H&E). The vessel lumen is partially occluded by a large, eosinophilic (pink) thrombus. Within the thrombus, there are several smaller, irregular spaces or lumina, which are the result of recanalisation. The vessel wall is visible as a thick, pink-stained layer surrounding the lumen. The overall structure is circular, and the surrounding tissue appears to be connective tissue or muscle.

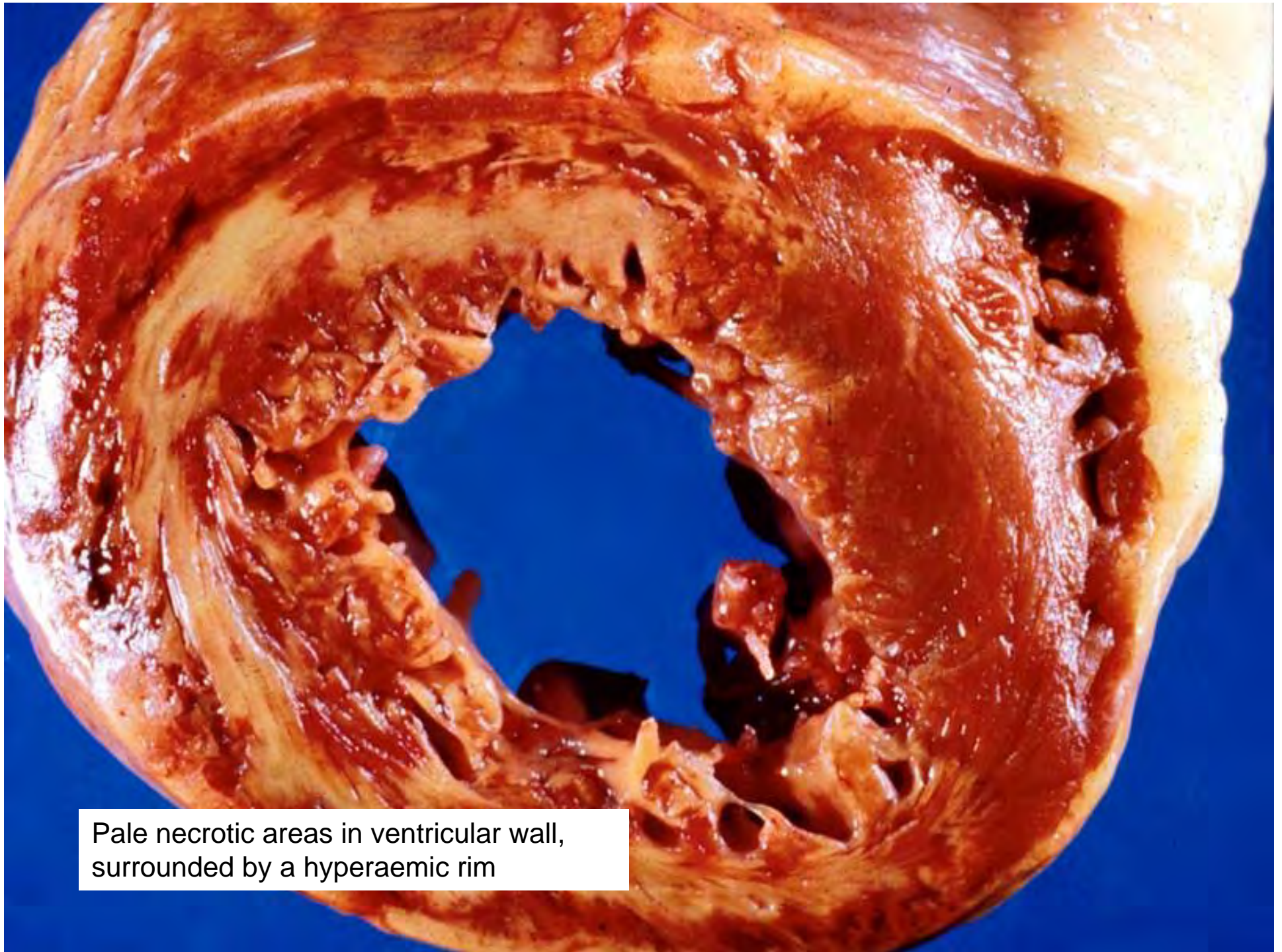
Recanalisation

– Formation of new lumina

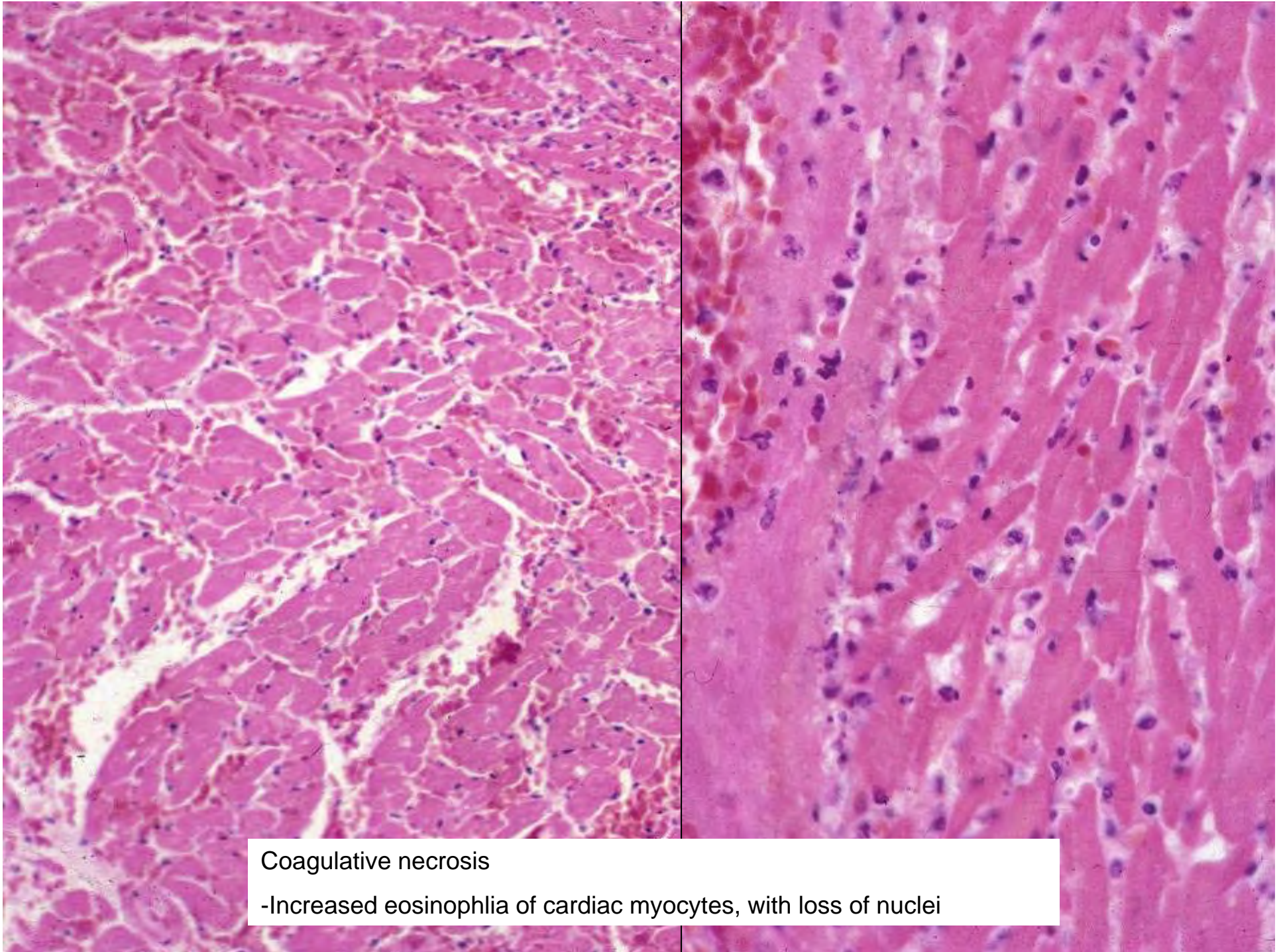
SLIDE 3

Acute myocardial infarction

A 55-yr-old man collapsed whilst jogging and died soon after. He had several episodes of severe crushing chest pain before. An autopsy was done.

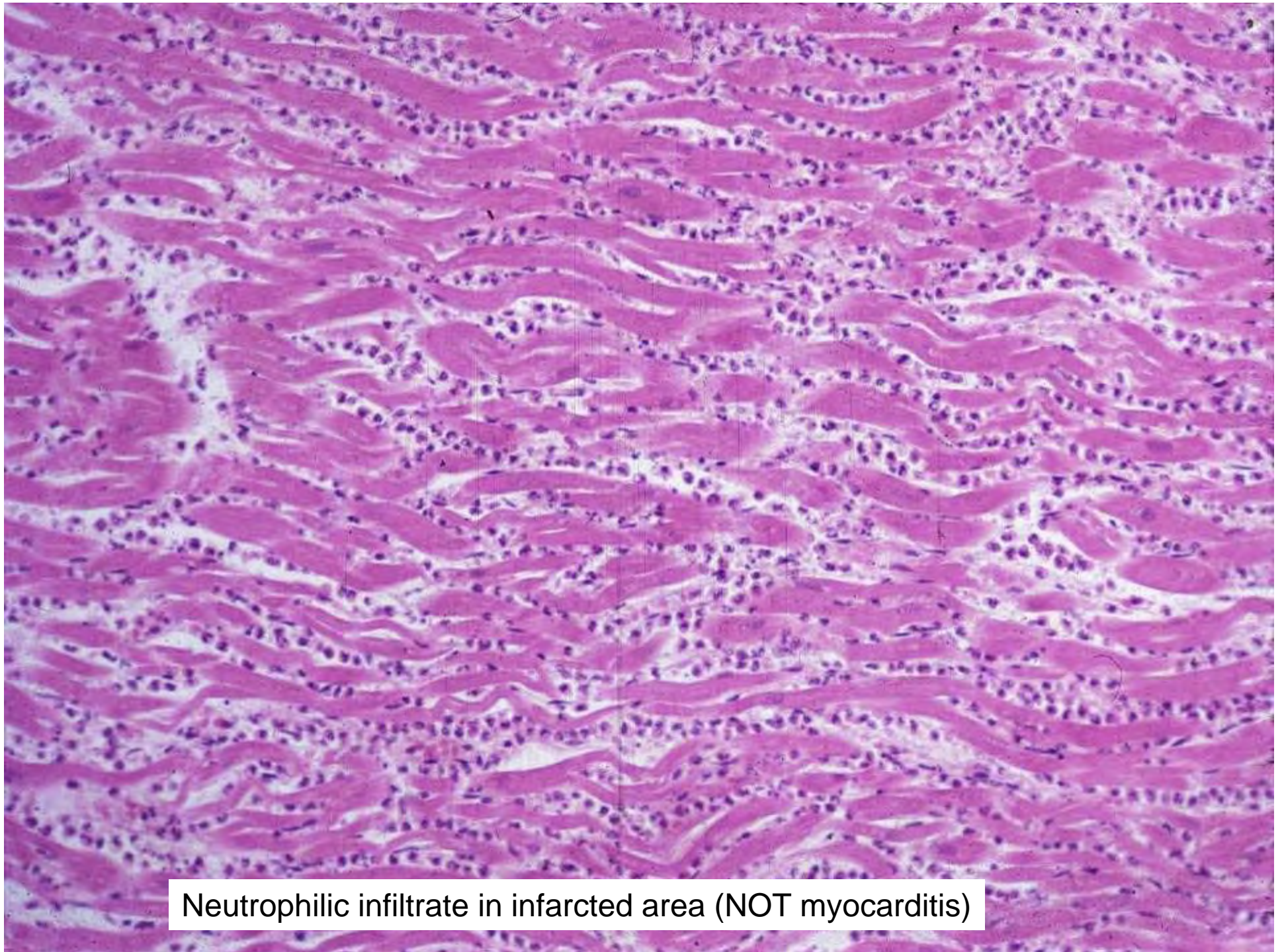


Pale necrotic areas in ventricular wall,
surrounded by a hyperaemic rim



Coagulative necrosis

-Increased eosinophilia of cardiac myocytes, with loss of nuclei




Neutrophilic infiltrate in infarcted area (NOT myocarditis)

SLIDE 4

Healed myocardial infarct

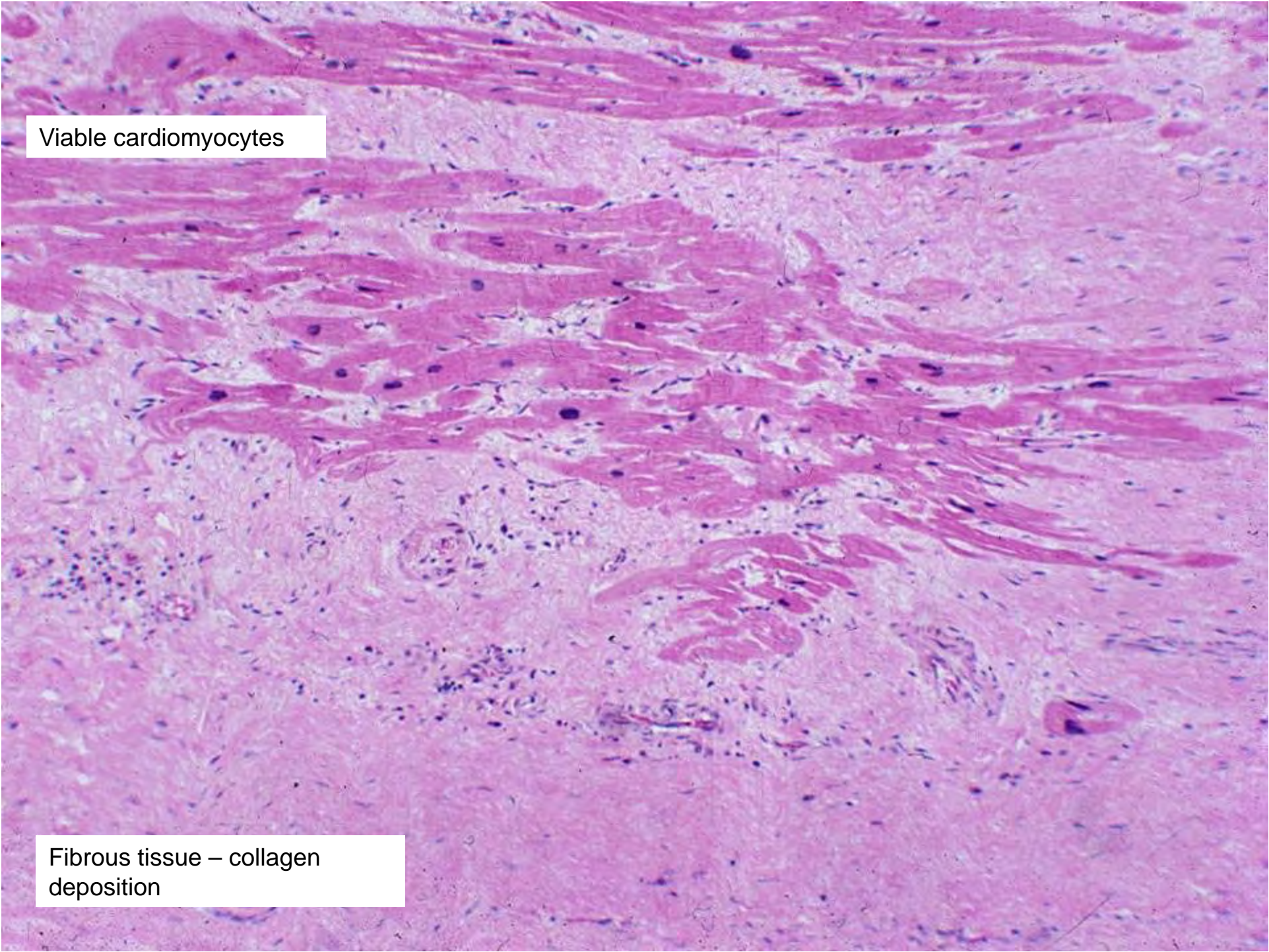


Thinned, fibrotic ventricular wall (old healed infarct)



A histological section of myocardium stained with hematoxylin and eosin (H&E). The image shows a large area of pale, eosinophilic (pink) tissue, which is indicative of fibrosis. This fibrotic area is replacing the normal myocardial tissue, which would typically show more intense pink staining and distinct cellular structures. The fibrosis is located in the upper right portion of the image, extending towards the center. The surrounding myocardium shows some degree of disorganization and loss of normal architecture.

Paler area of fibrosis in myocardium,
replacing viable cardiomyocytes



A histological section of cardiac tissue stained with hematoxylin and eosin (H&E). The image displays elongated, pink-stained cardiomyocytes with visible striations, interspersed with lighter, pink-stained fibrous tissue. The fibrous tissue contains numerous small, dark-stained nuclei, indicating collagen deposition. The overall structure shows a mix of viable muscle cells and fibrotic areas.

Viable cardiomyocytes

Fibrous tissue – collagen
deposition

Respiratory System

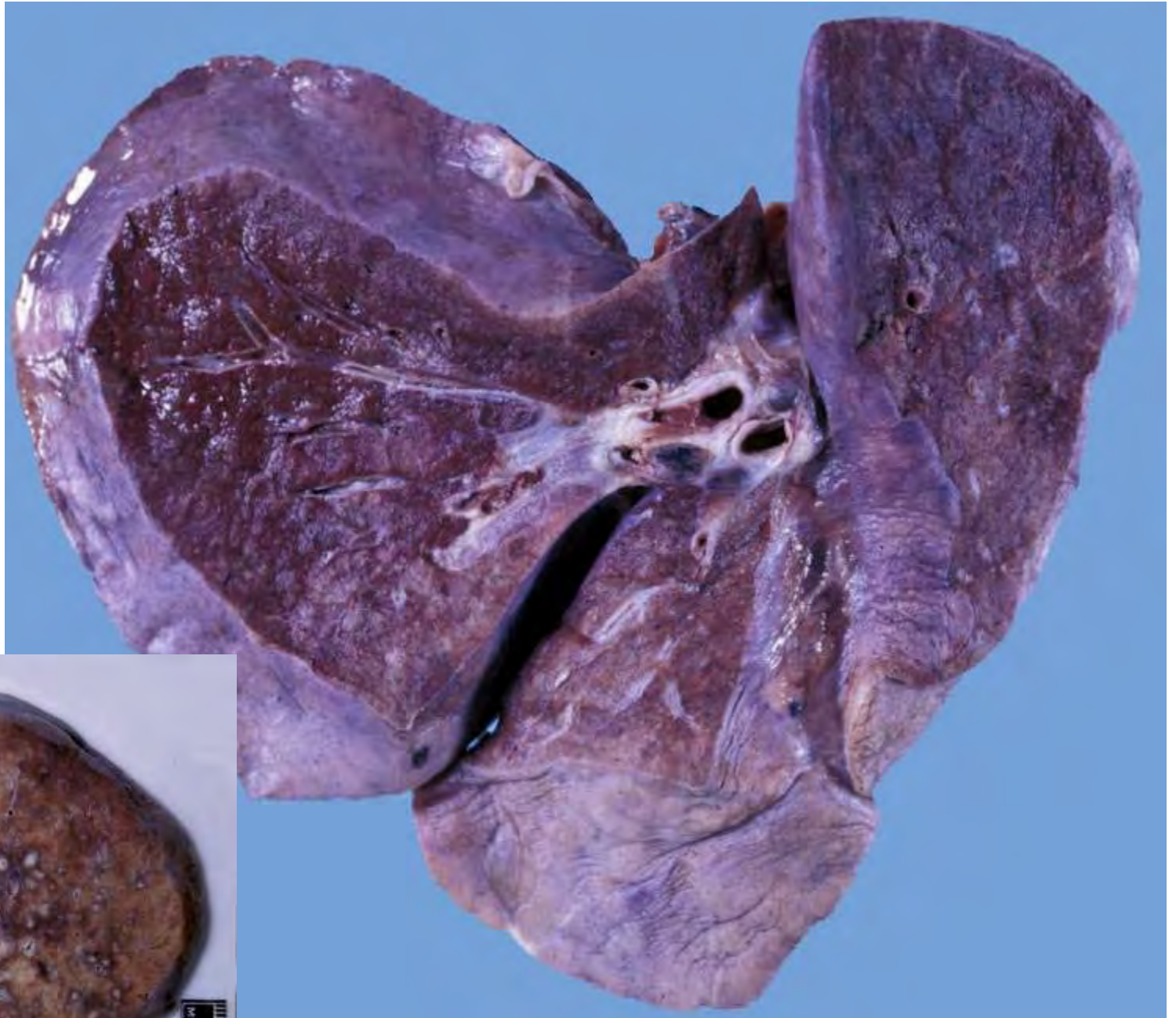
RESPIRATORY SYSTEM

- *Slide 5 : Lung – Bronchopneumonia*
- *Slide 6 : Lung – Miliary tuberculosis*
- *Slide 7 : Lung – Abscess*
- *Demo slide : Lung – Chronic venous congestion*

SLIDE 5

Bronchopneumonia

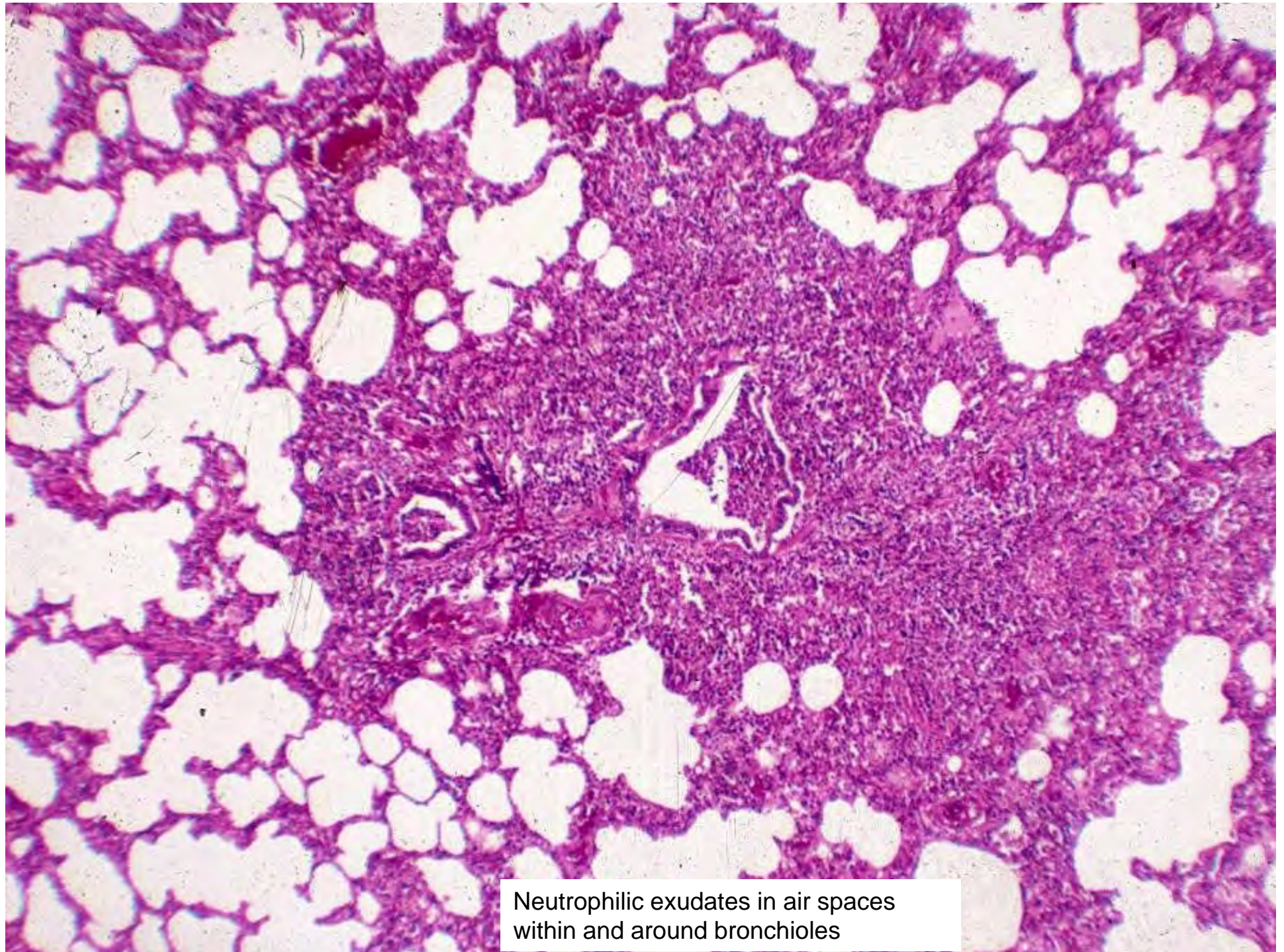
A 70 yr old bed-ridden man was found dead in his one-room flat. An autopsy was performed.



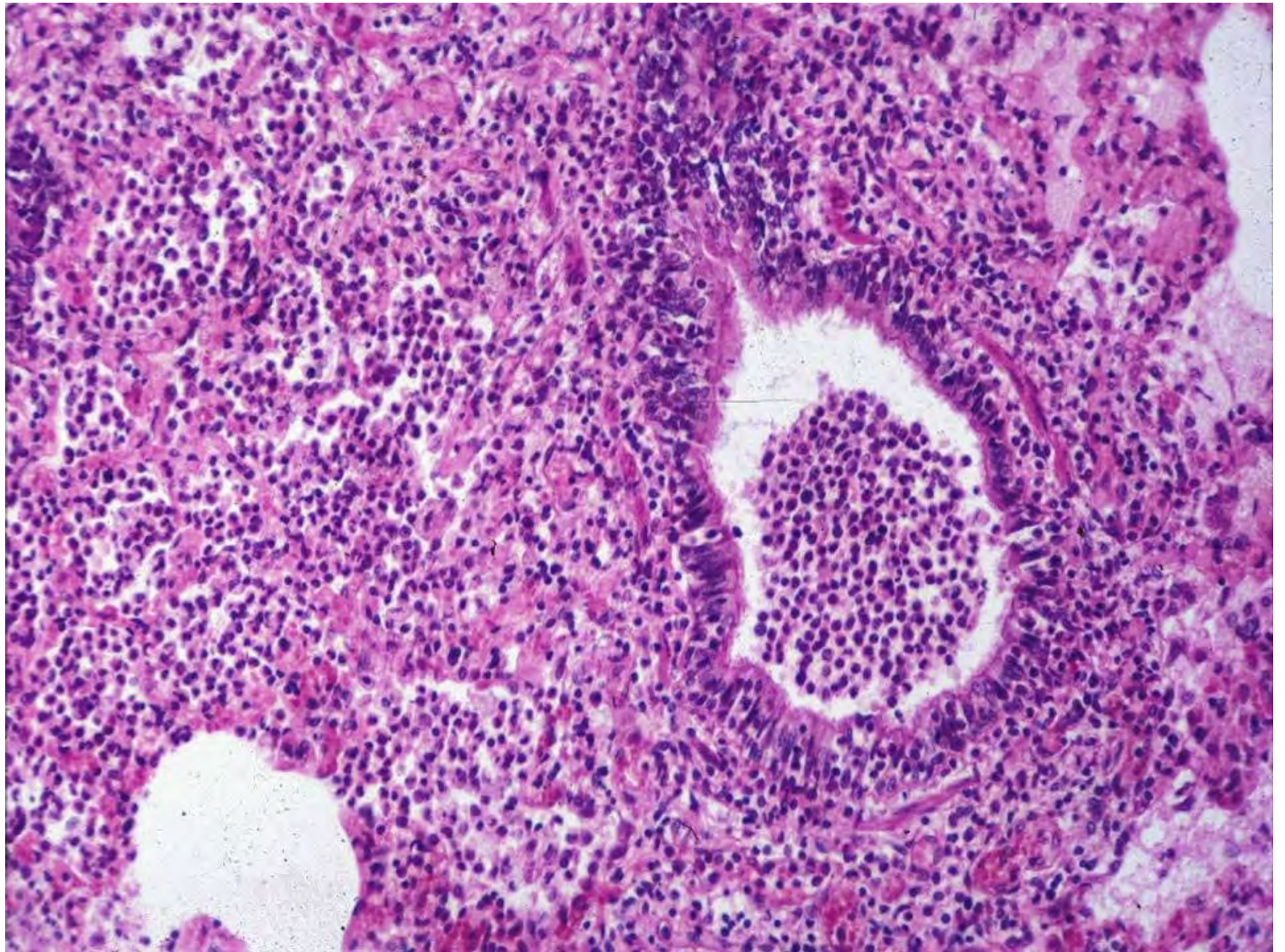
Areas of pale, solid consolidation
around bronchioles



Cellular infiltrates within and around bronchioles

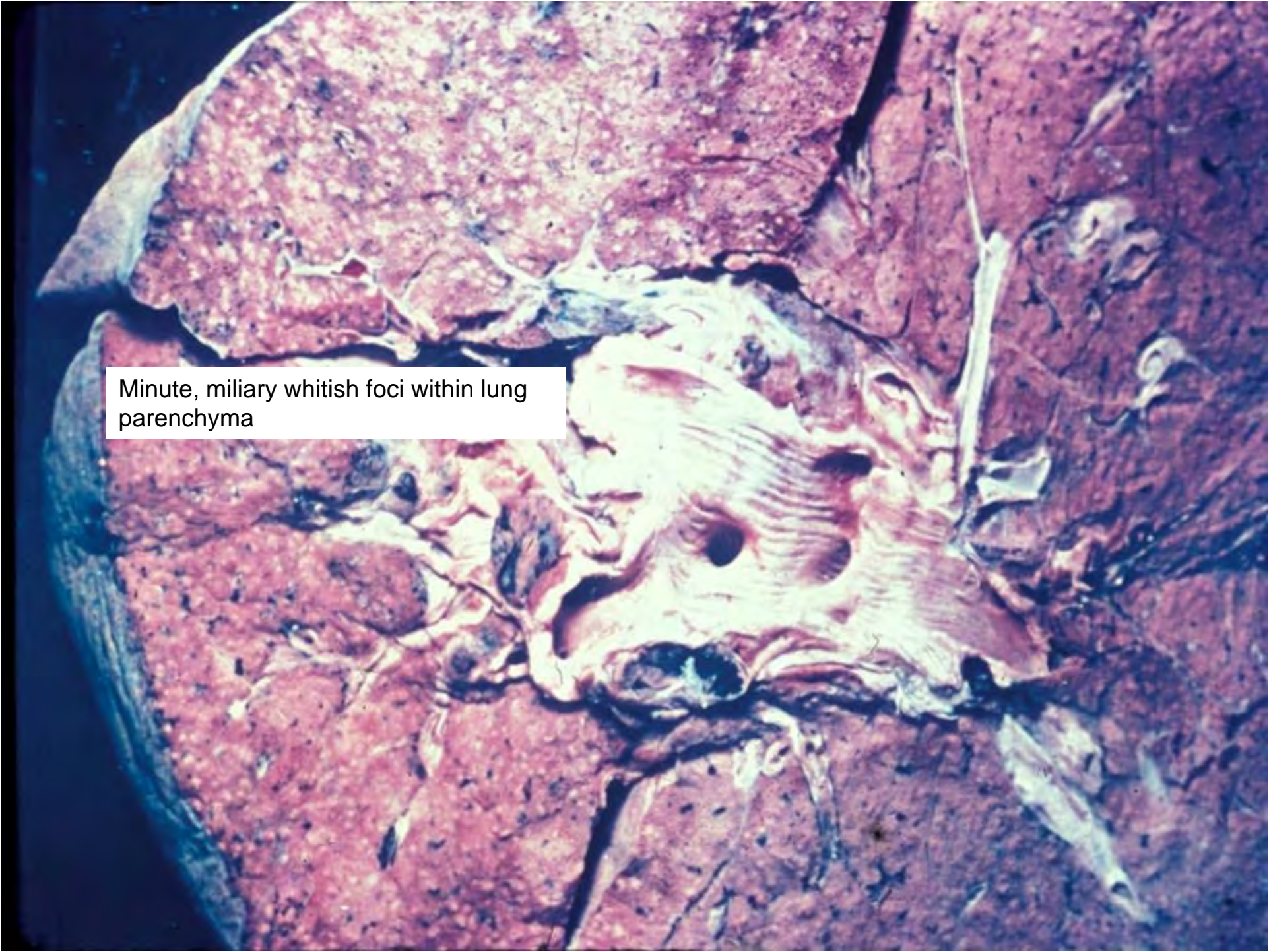


Neutrophilic exudates in air spaces
within and around bronchioles



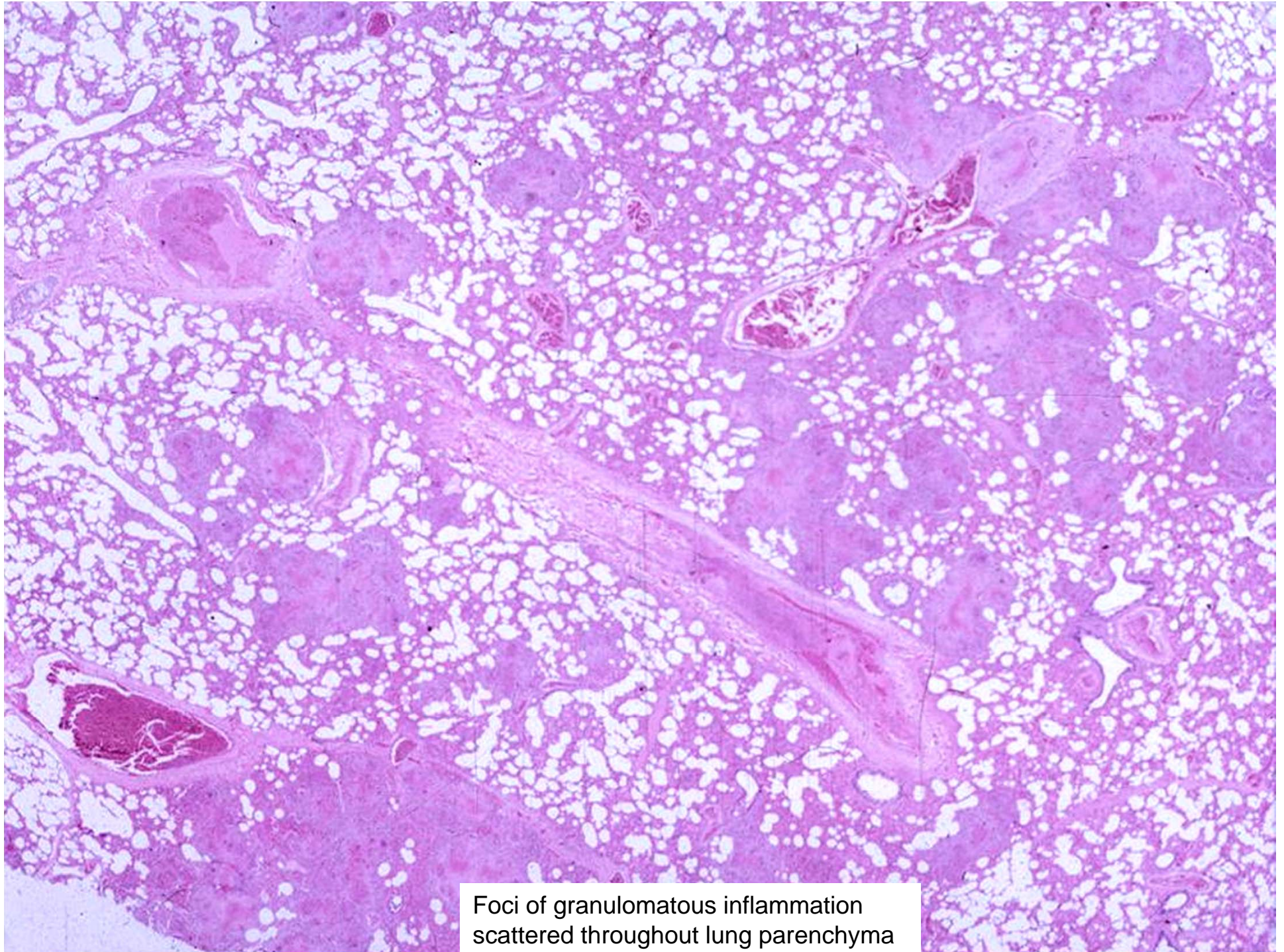
SLIDE 6

Miliary tuberculosis

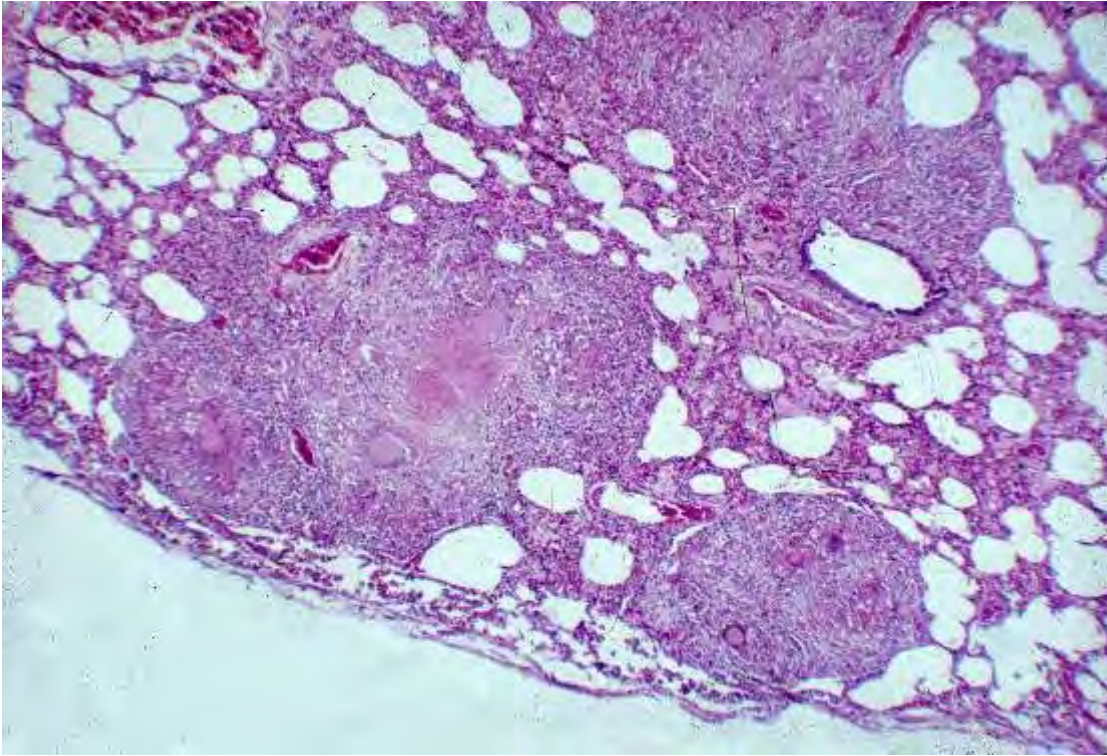


Minute, miliary whitish foci within lung parenchyma

This is a gross specimen of a lung, likely from a patient with miliary tuberculosis. The lung is cut open, revealing the internal structure. The surface and internal parenchyma are covered with numerous small, white, pinpoint-sized nodules, which are the miliary foci. These nodules are distributed throughout the lung tissue, particularly visible in the central and peripheral regions. The overall color of the lung is a reddish-pink, typical of fresh tissue. The branching of the bronchi and the surrounding connective tissue are also visible.



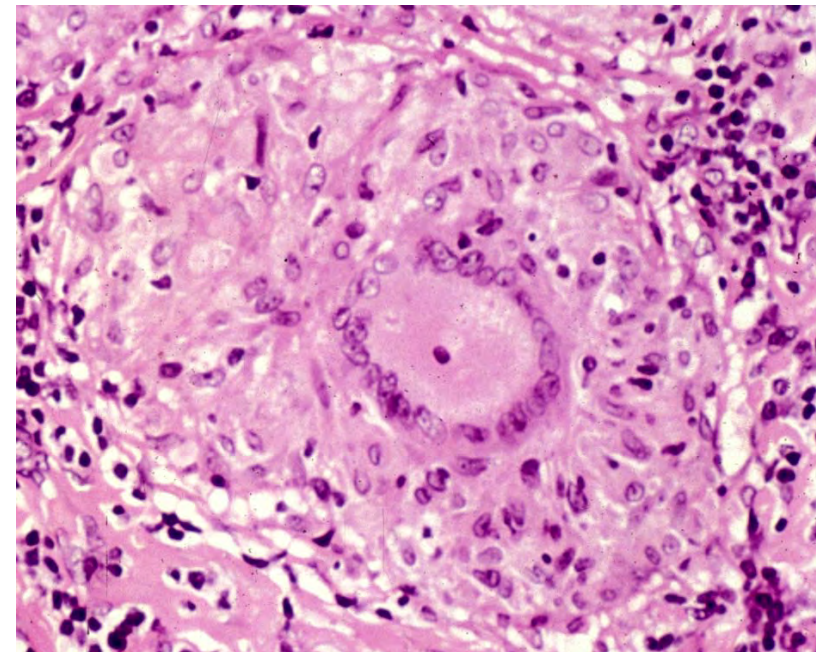
Foci of granulomatous inflammation
scattered throughout lung parenchyma



Granulomas

-Collections of epithelioid histiocytes

Also present: scattered Langerhans' giant cells and lymphocytes



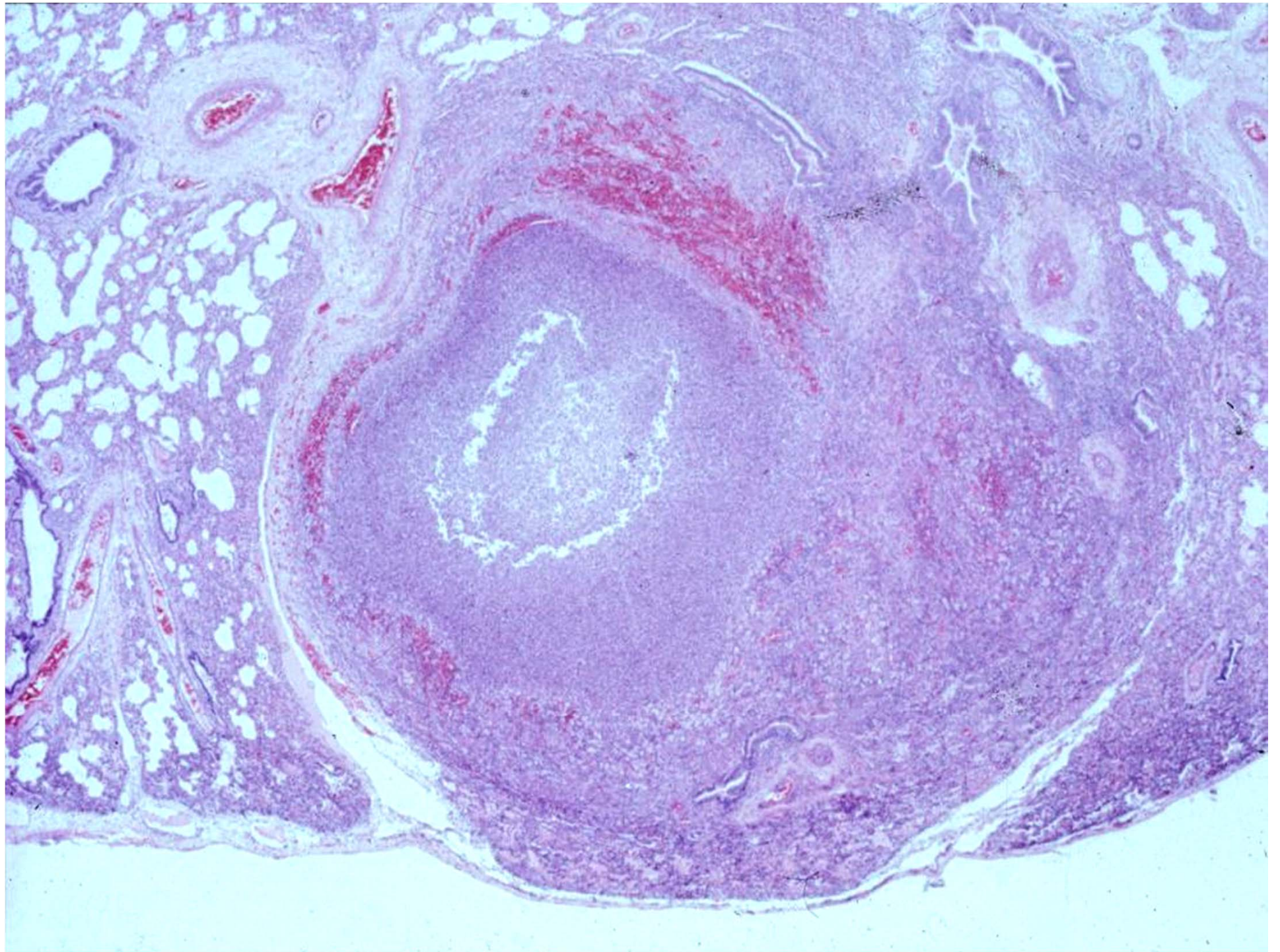
SLIDE 7

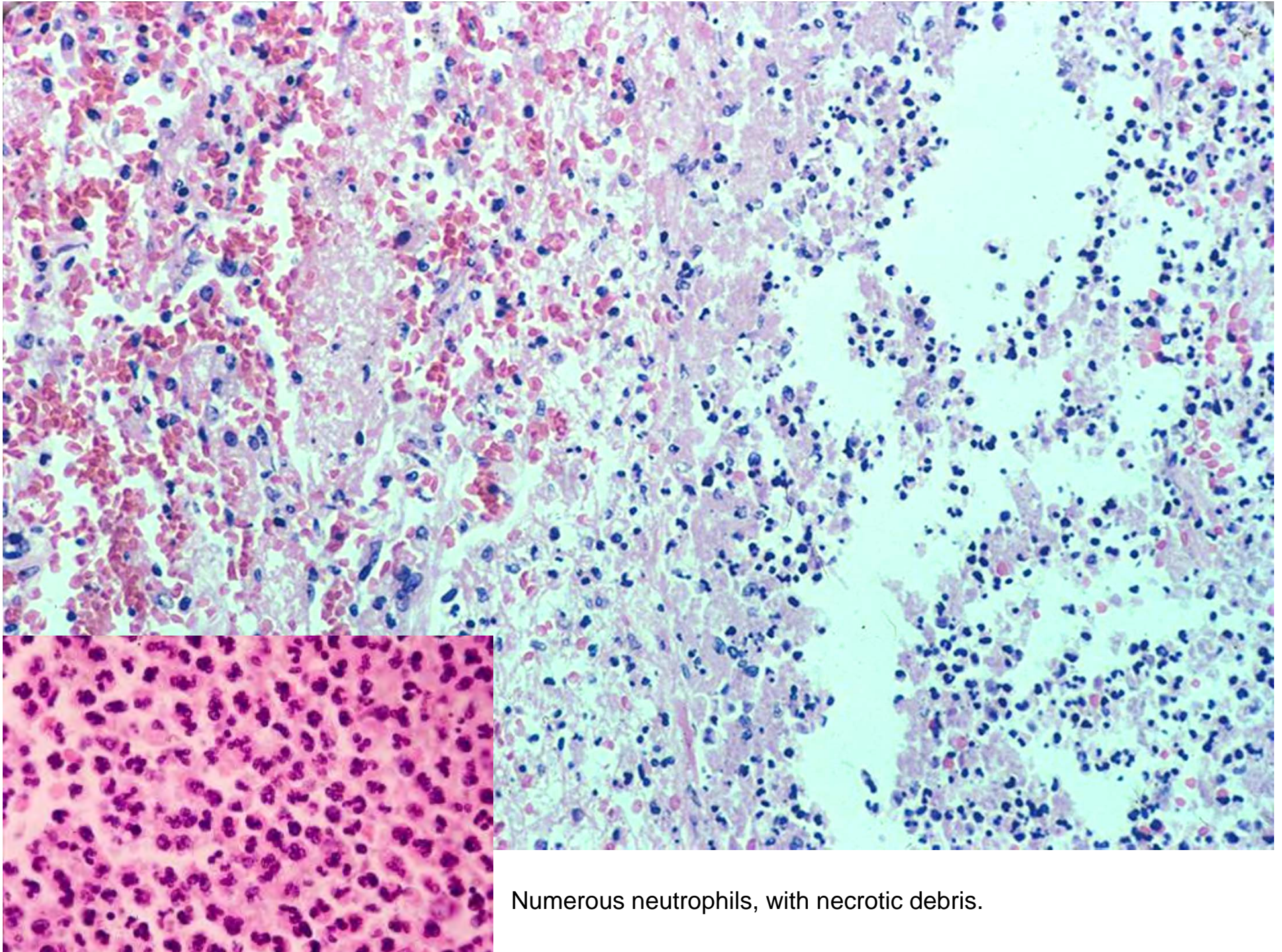
Lung – Abscess

A 60 yr old alcoholic with poor dentition presented with cough productive of copious purulent sputum and fever.



Localised cavity containing purulent material.

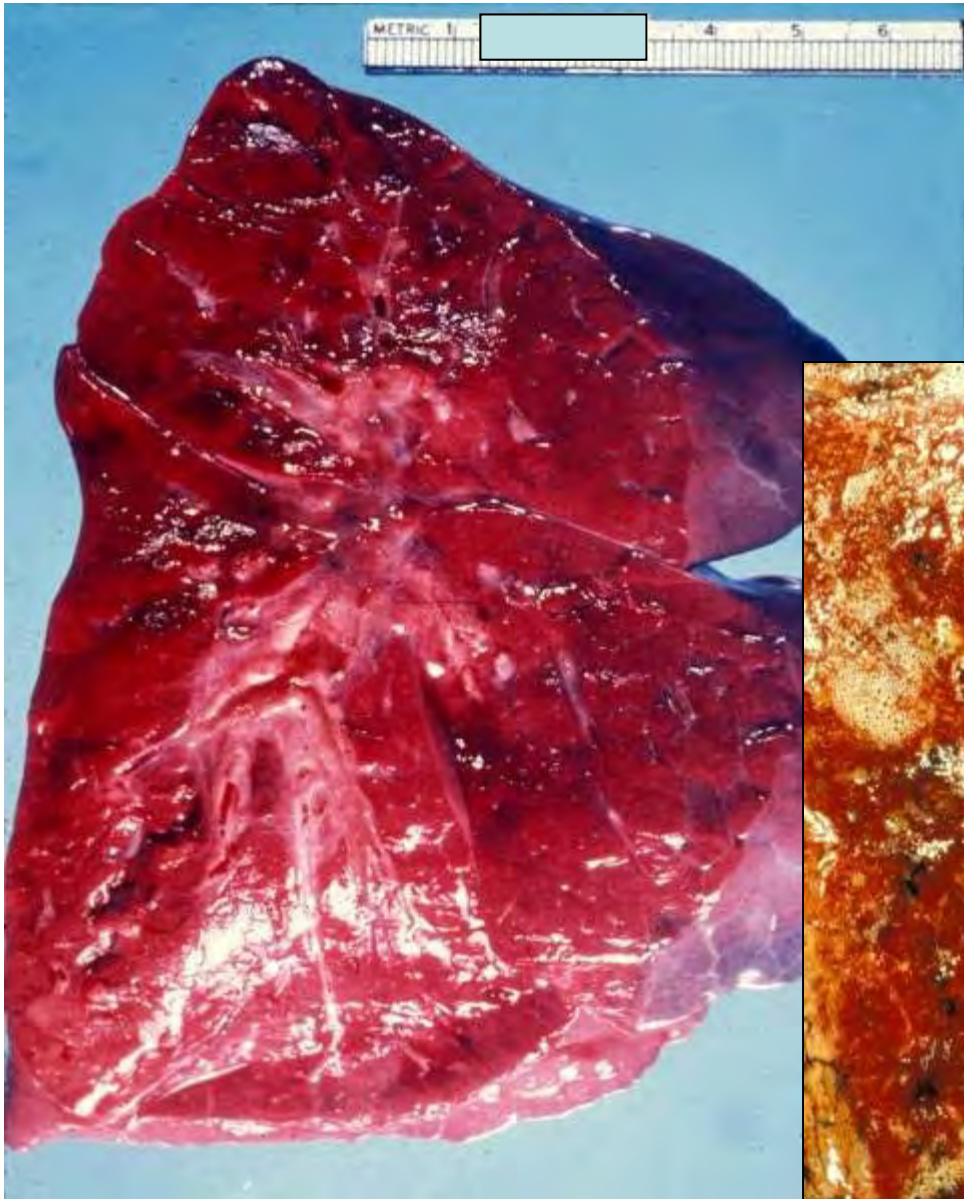




Numerous neutrophils, with necrotic debris.

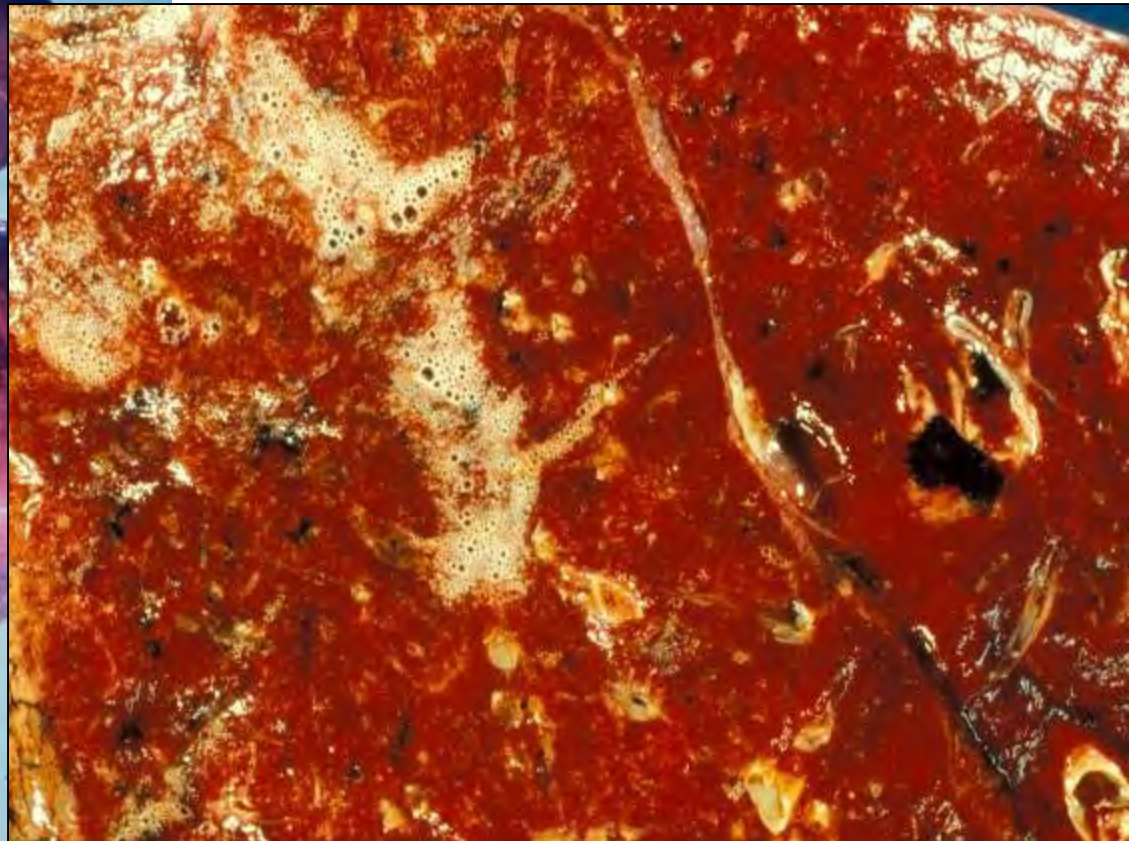
*Demo slide : Lung – Chronic
venous congestion*

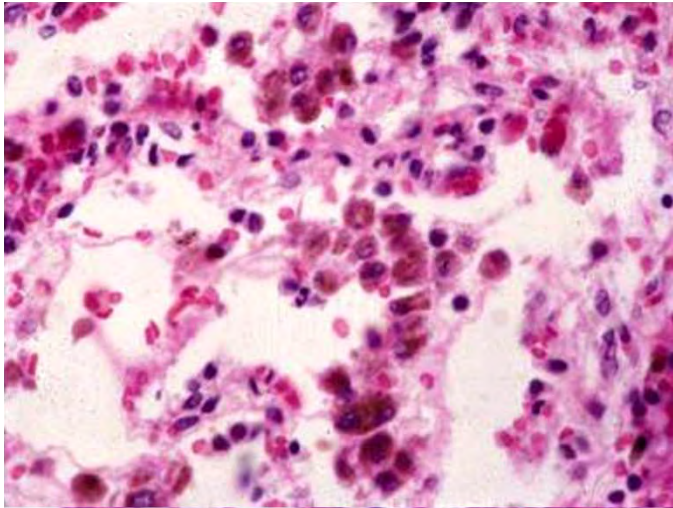
Lung: Chronic venous congestion



Lung is heavy and dark reddish due to congestion.

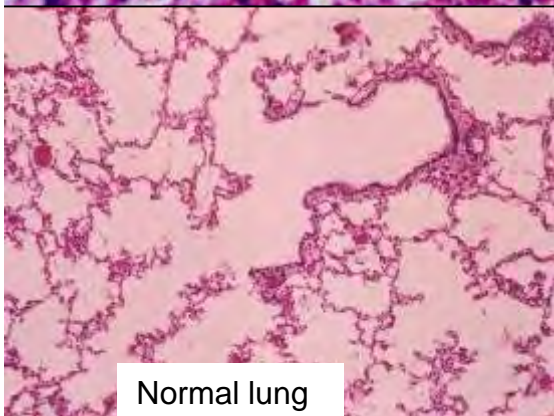
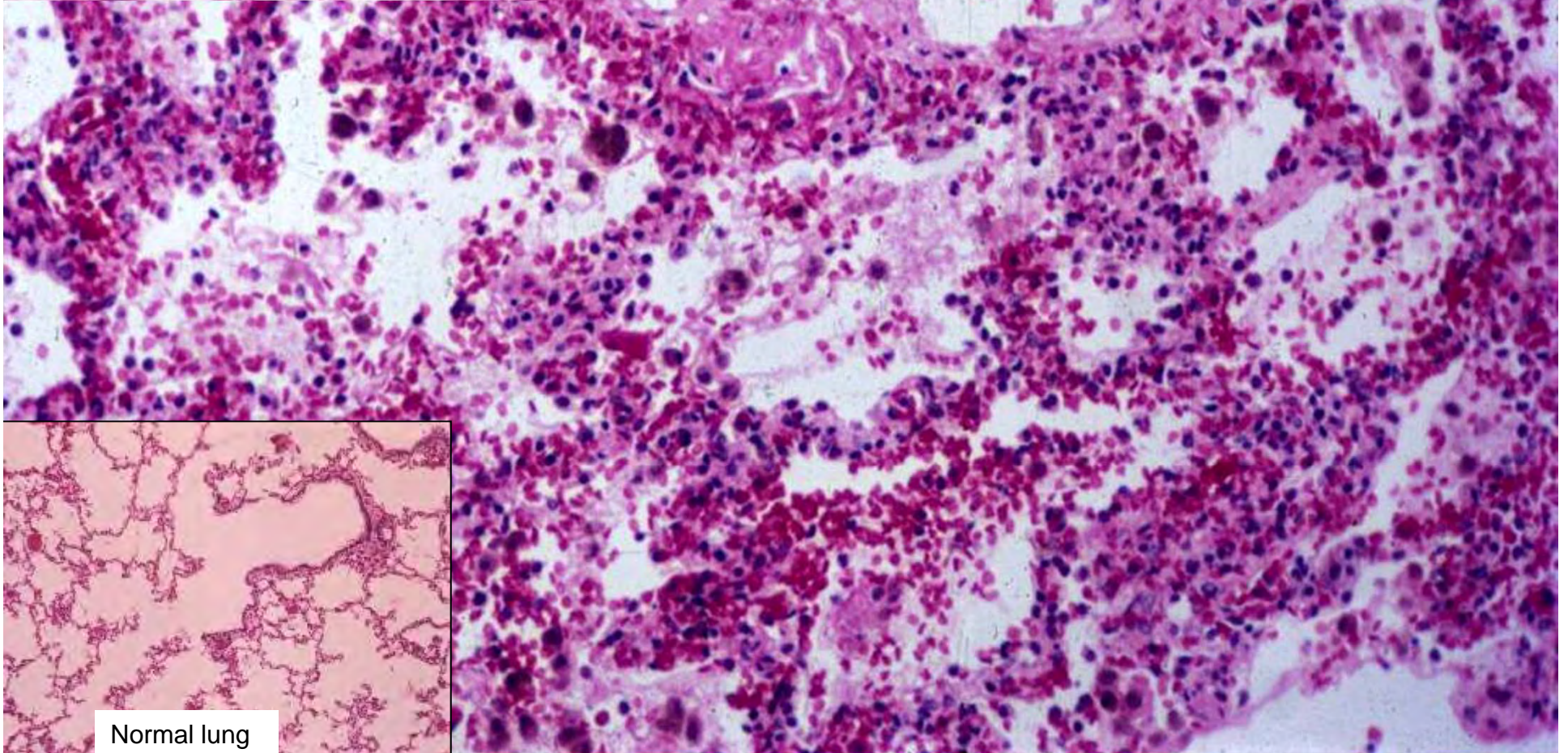
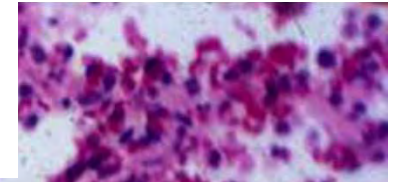
Below: Air spaces fill with fluid, releasing frothy material when squeezed.





Alveolar septa – thickened by engorged capillaries

Alveolar spaces – oedema fluid and
haemosiderophages ('heart failure cells') within



Normal lung

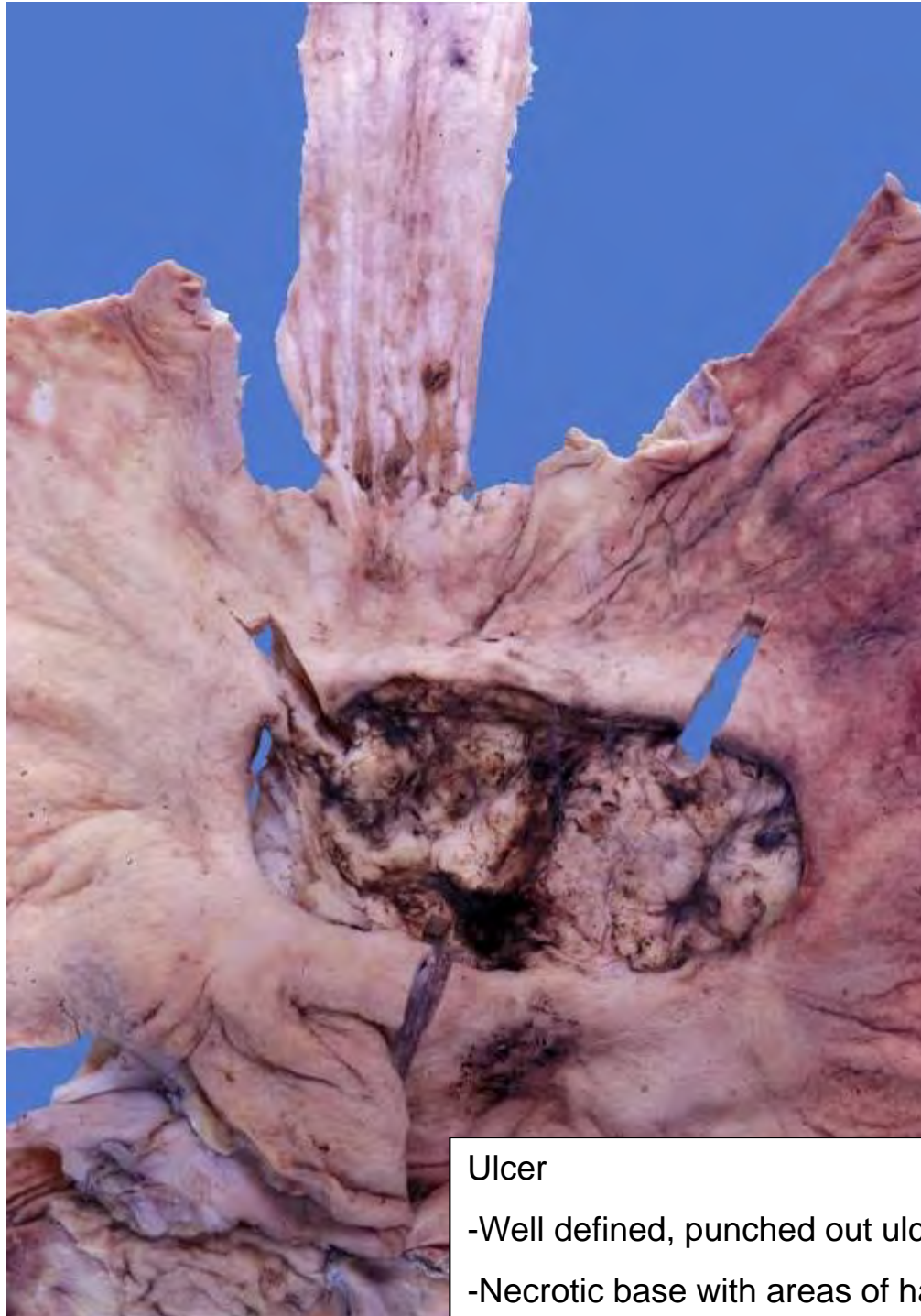
Gastrointestinal System

GASTROINTESTINAL SYSTEM

- *Slide 8 : Stomach – Chronic peptic ulcer*
- *Slide 9 : Appendix – Acute appendicitis*
- *Demo slide : Stomach – Adenocarcinoma*

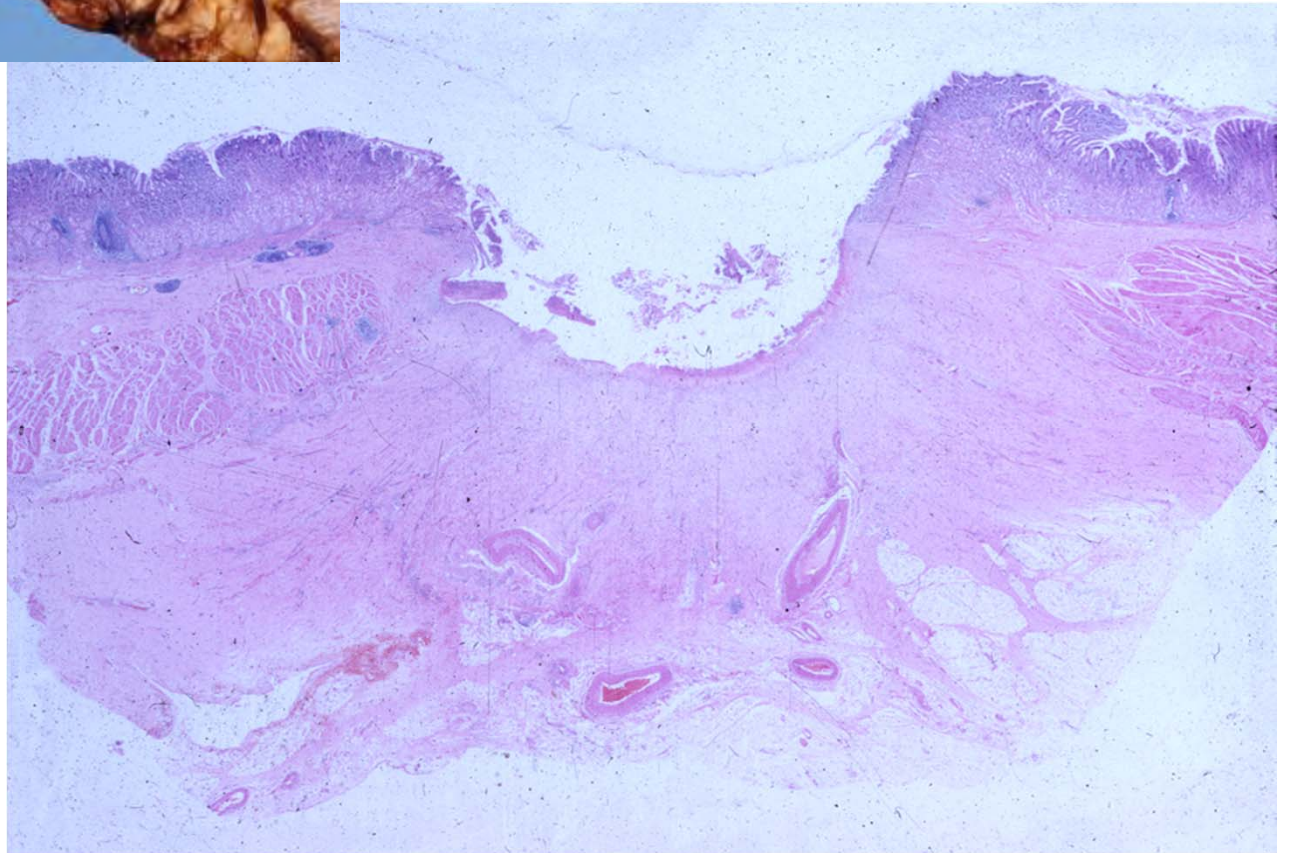
SLIDE 8

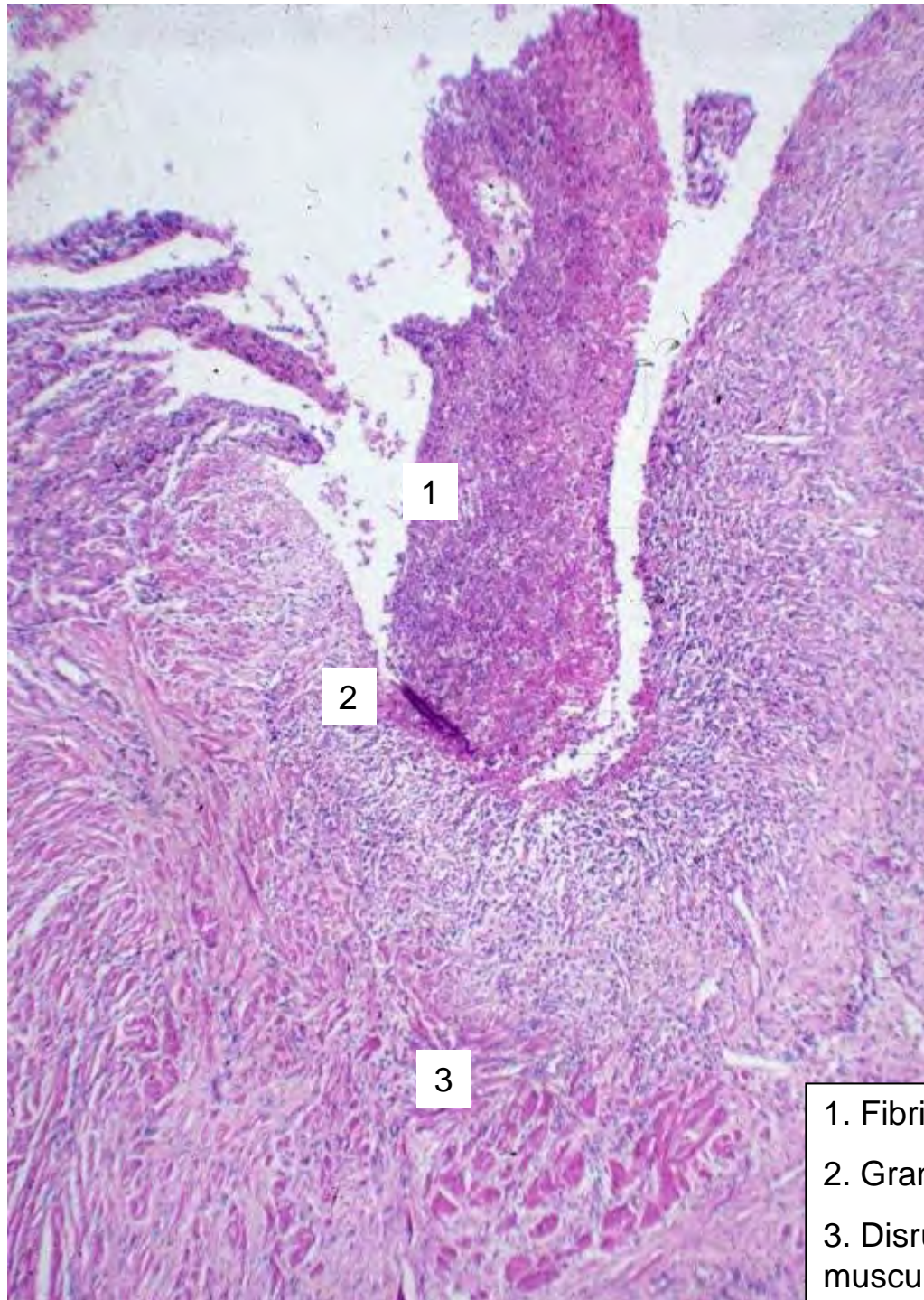
Chronic peptic ulcer



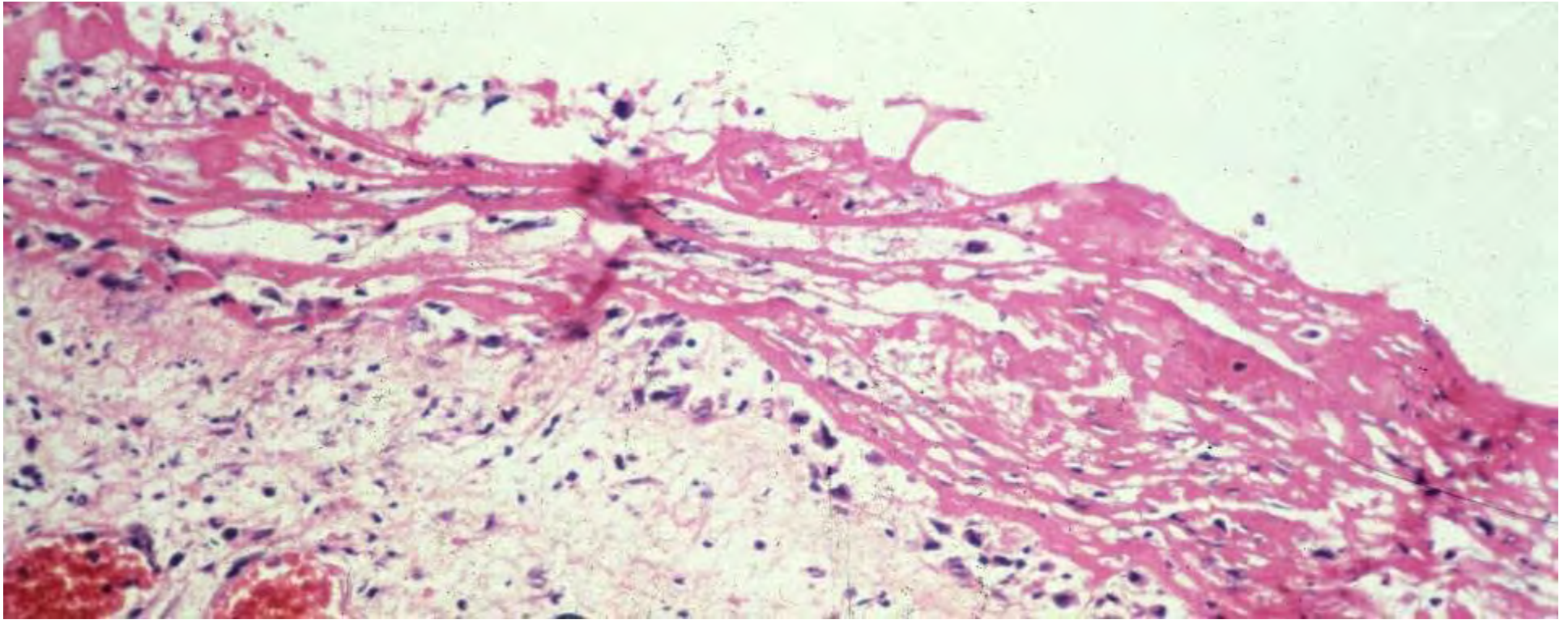
Ulcer

- Well defined, punched out ulcer
- Necrotic base with areas of haemorrhage





1. Fibrinopurulent ulcer exudate
2. Granulation tissue in base
3. Disrupted smooth muscle of muscularis propria



FIBRINOPURULENT SURFACE EXUDATE

SLIDE 9

Acute appendicitis

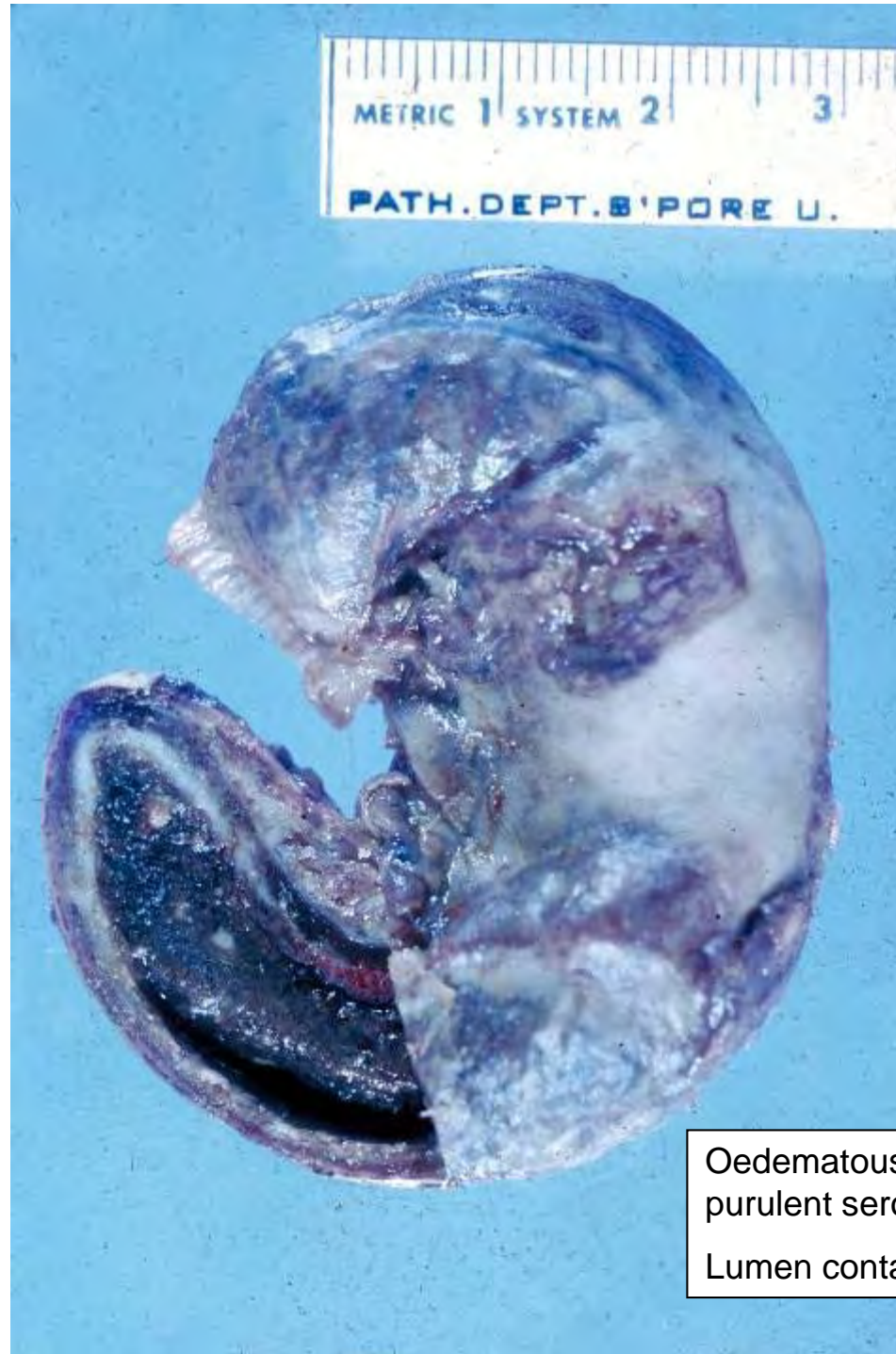
A 10 year old girl was admitted to the Emergency service with a 3-day history of right iliac fossa pain associated with fever.

She was nauseous and vomited several times.

Examination revealed severe abdominal tenderness.

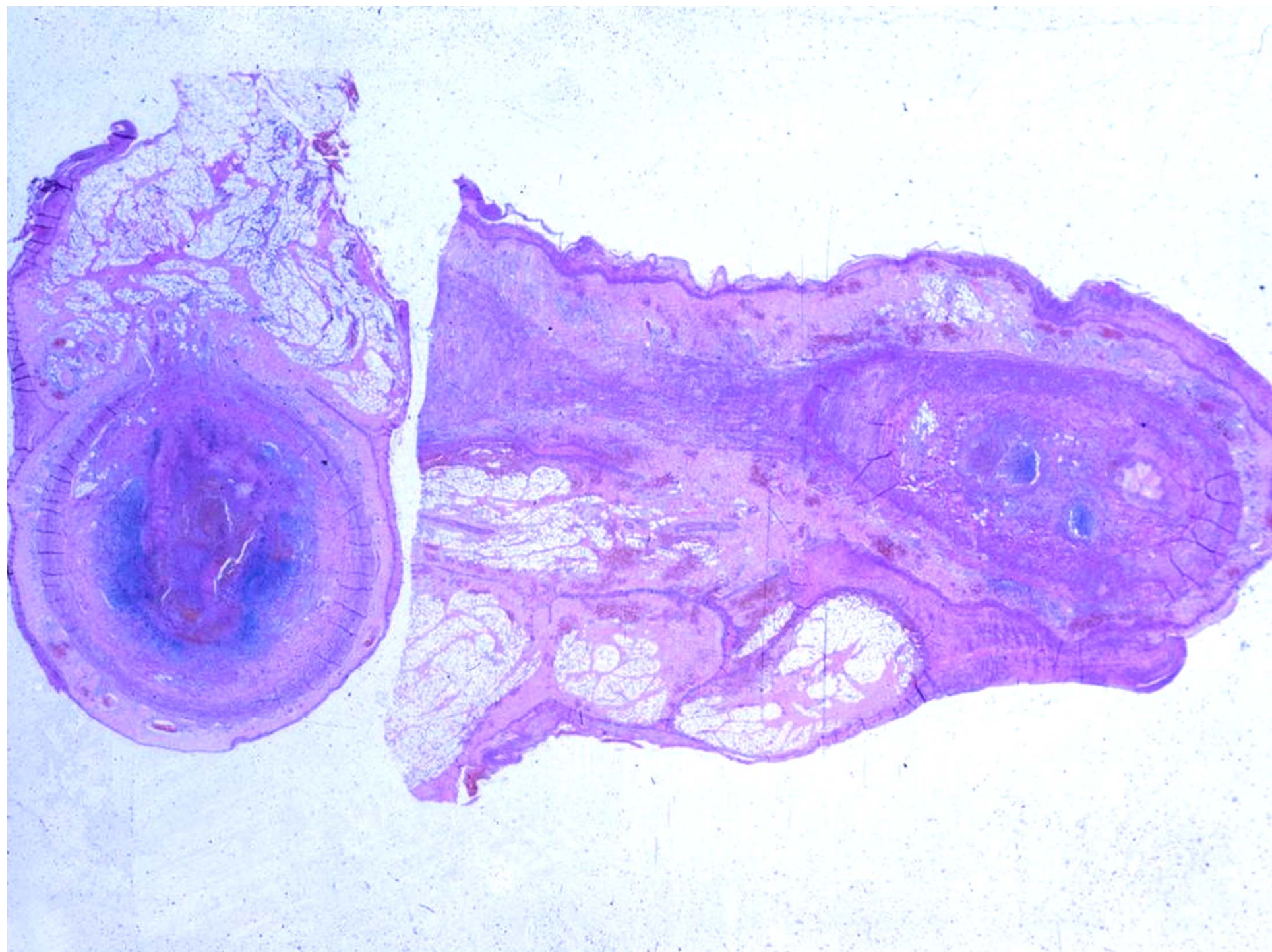
On auscultation, bowel sounds were absent.

An emergency operation was performed.

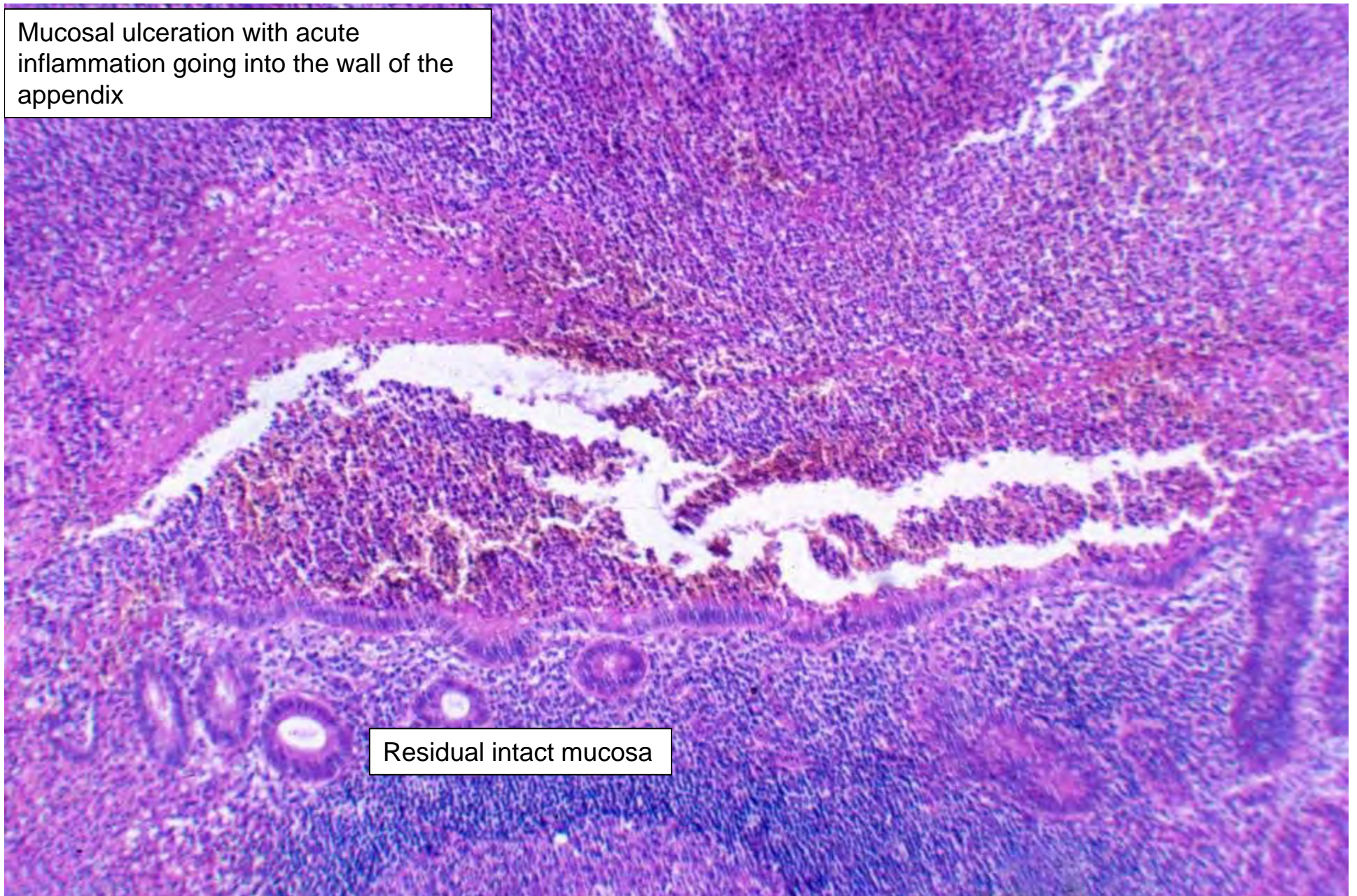


Oedematous, turgid appendix with
purulent serosal exudate

Lumen contains faecal material

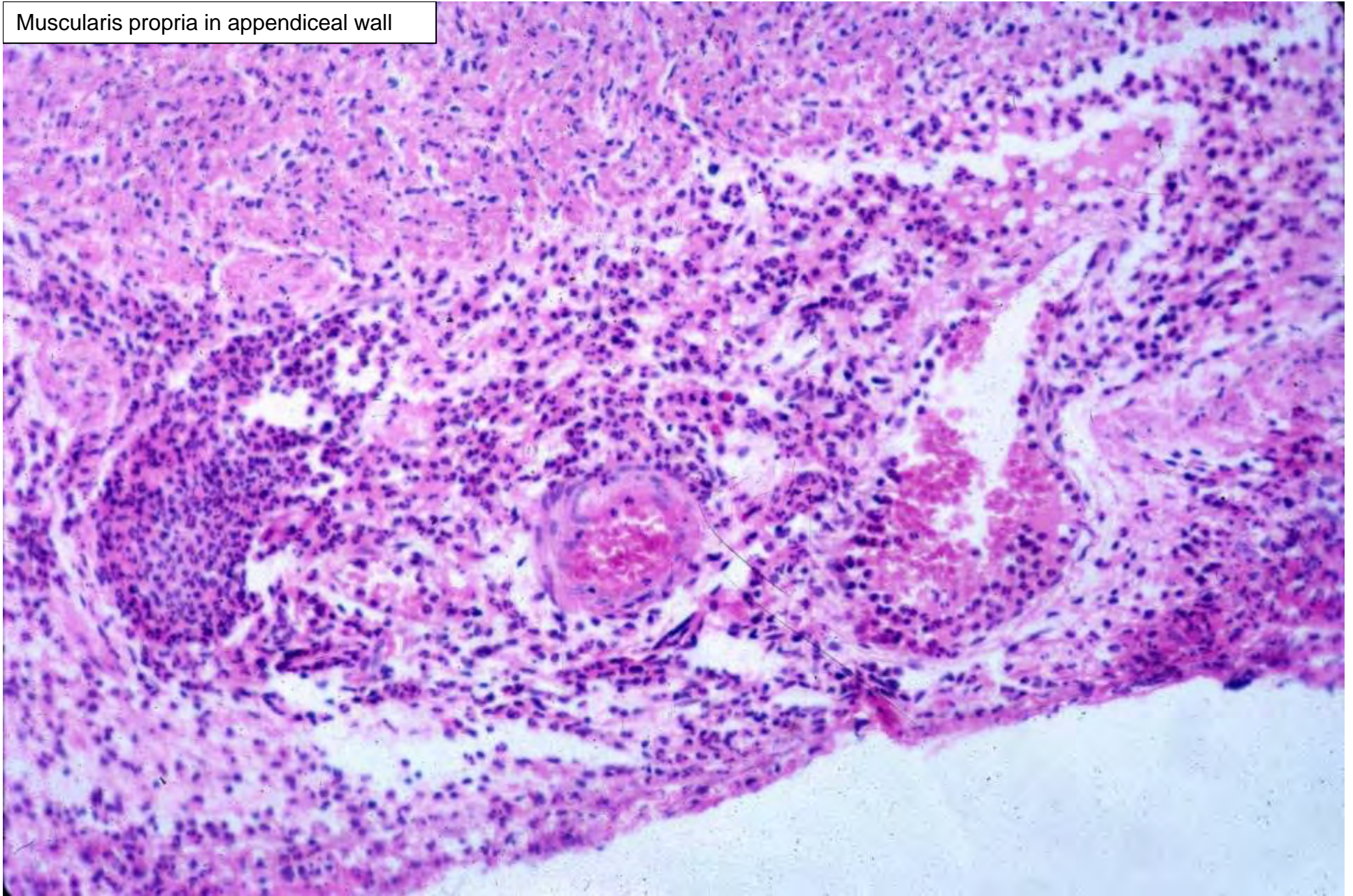


Mucosal ulceration with acute inflammation going into the wall of the appendix



Residual intact mucosa

Muscularis propria in appendiceal wall

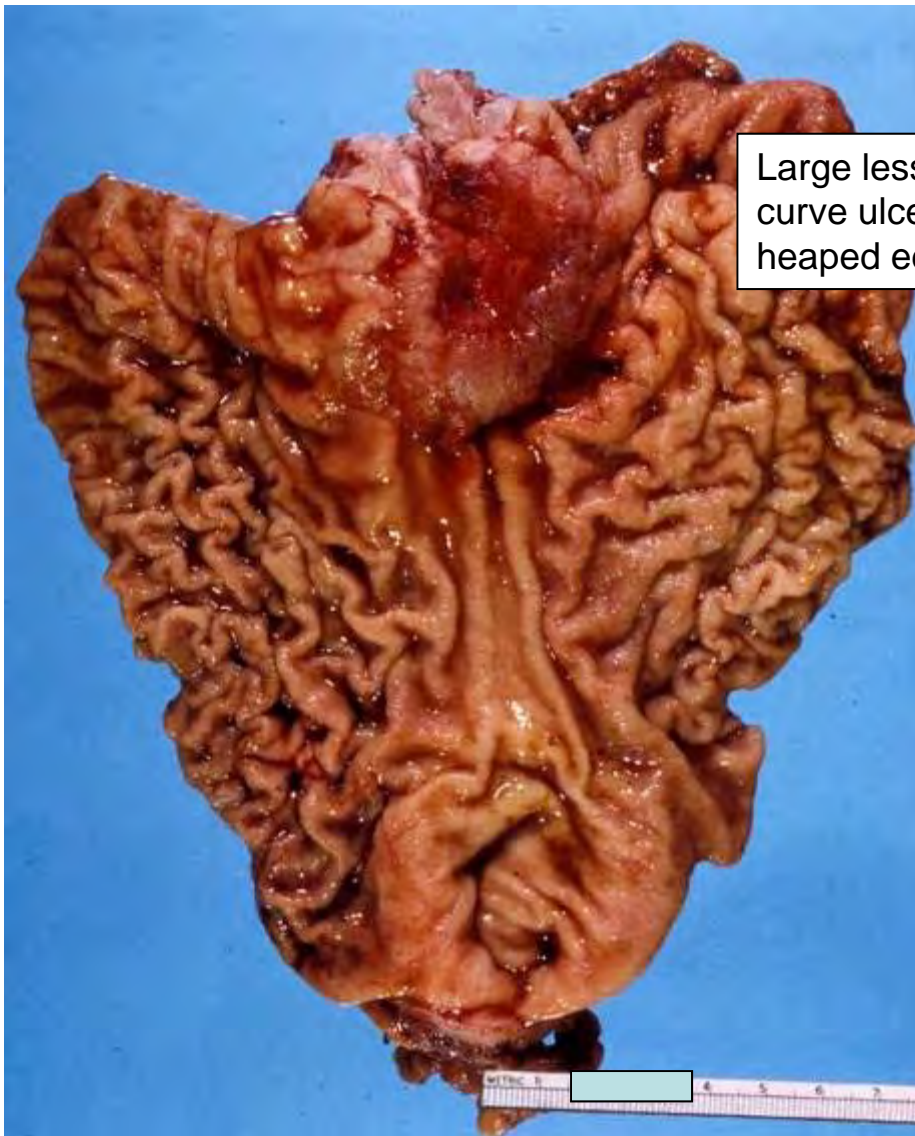


Fibrinopurulent serosal exudate

Demo slide : Stomach – Adenocarcinoma

A 66 year old man went to his GP for his bi-annual health check. He complained of a feeling of discomfort and mild epigastric pain after meals for the last 5 months and occasional nauseous feeling in the last month, He has lost 7 kg over 2 months. An endoscopic examination was carried out with multiple gastric biopsies, following which a gastrectomy was performed.

Stomach: Adenocarcinoma

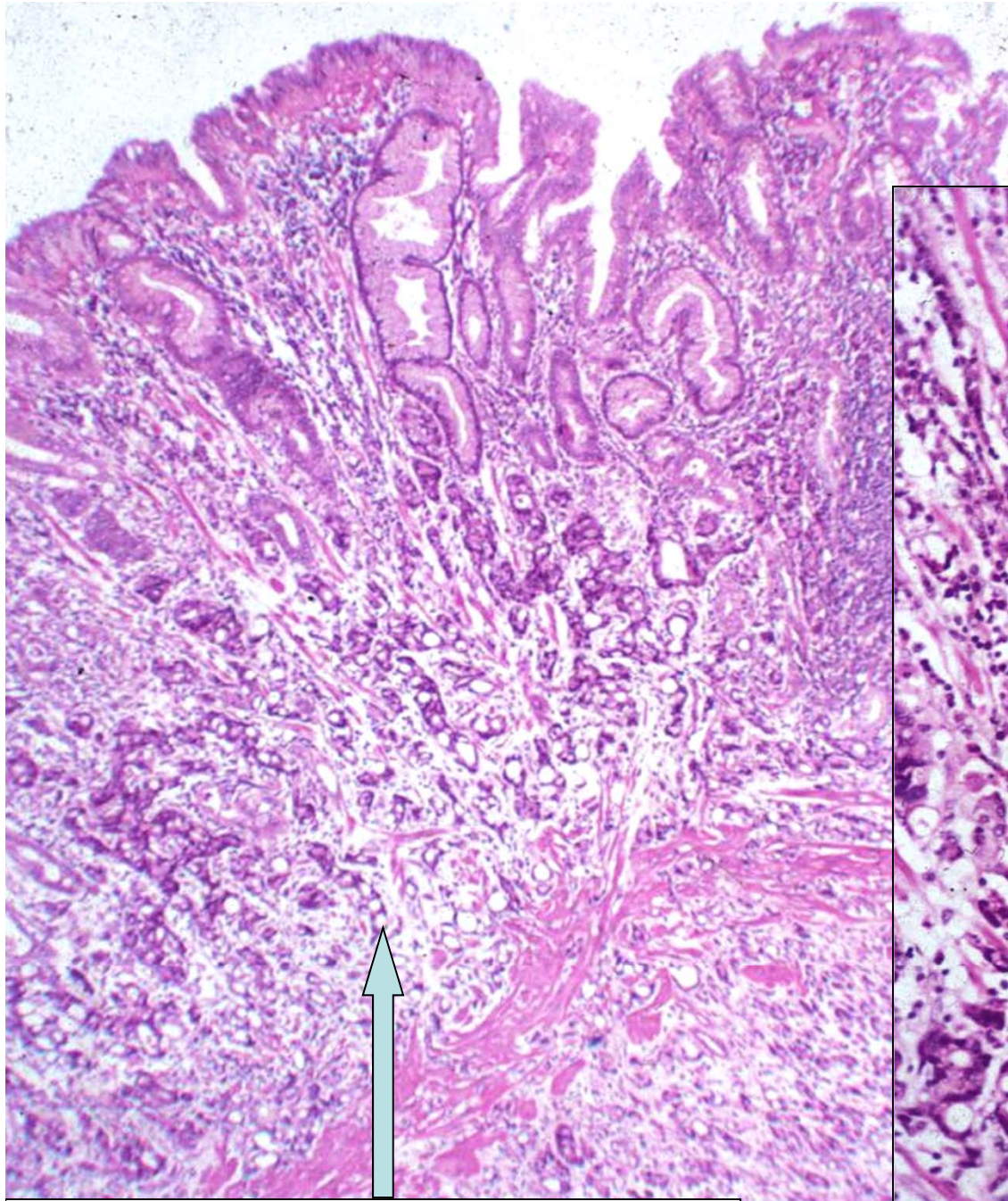


Large lesser
curve ulcer with
heaped edges

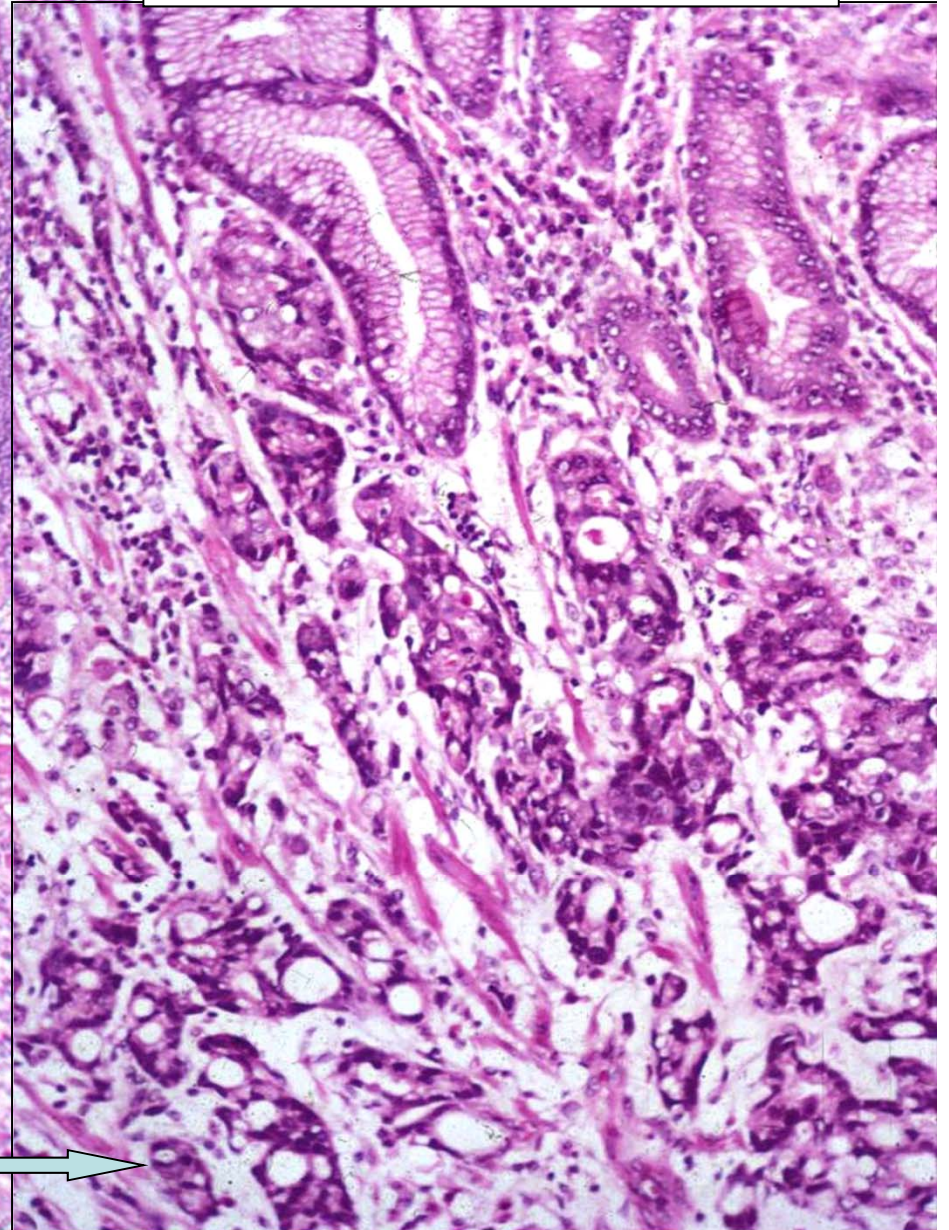


-Diffuse thickening of the stomach wall
with narrowing of the luminal space
-Wall thickened by pale, ill-defined mass

Linitus plastica



Benign glands near mucosal surface



Malignant glands infiltrating into submucosa and beyond muscularis mucosae

Hepatobiliary System, Pancreas

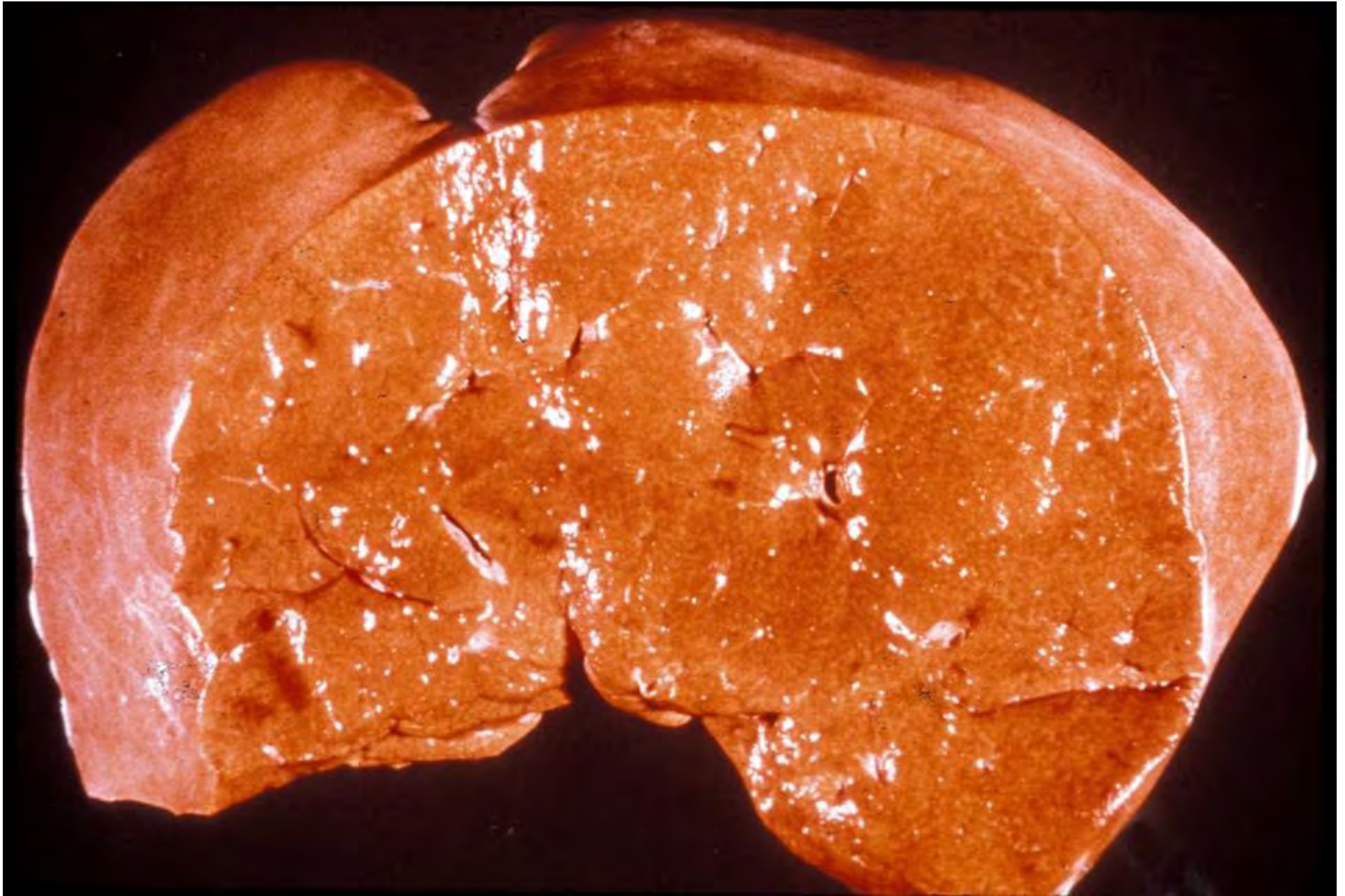
HEPATOBIILIARY SYSTEM, PANCREAS

- *Slide 11 : Liver – Fatty change*
- *Slide 12 : Liver – Chronic venous congestion*
- *Slide 13 : Liver – Cirrhosis*
- *Demo slide : Liver – Metastases
(Secondary adenocarcinoma)*

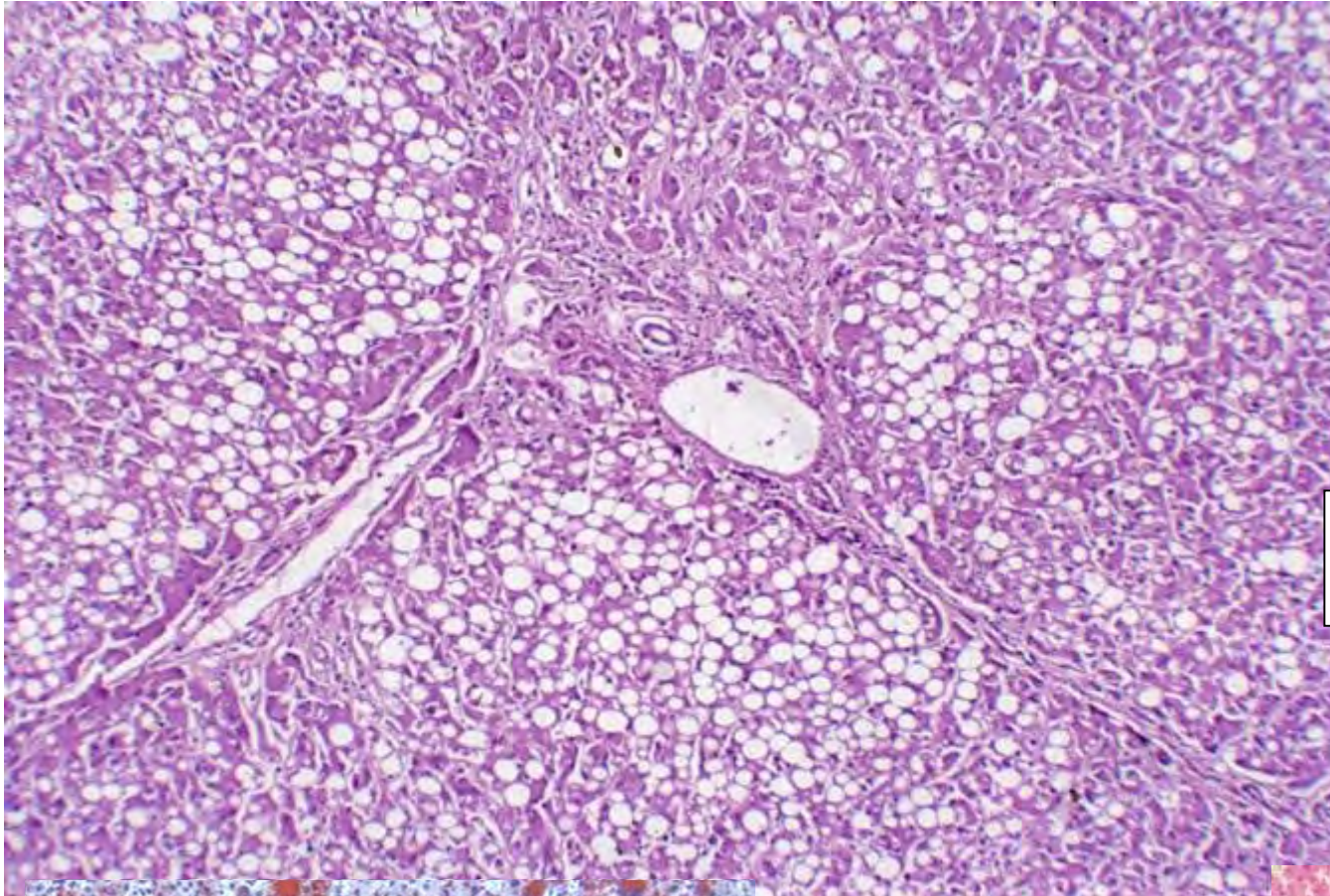
SLIDE 11

Fatty change

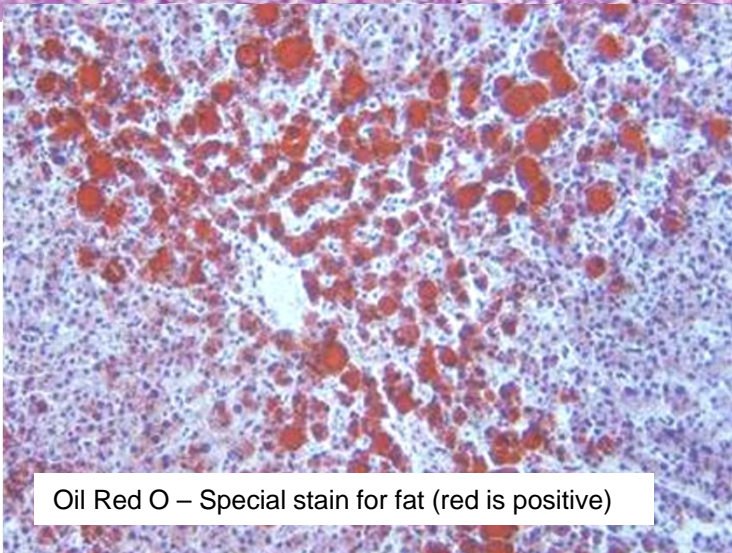
A 58 year old known alcoholic is found to have an enlarged liver on abdominal examination.



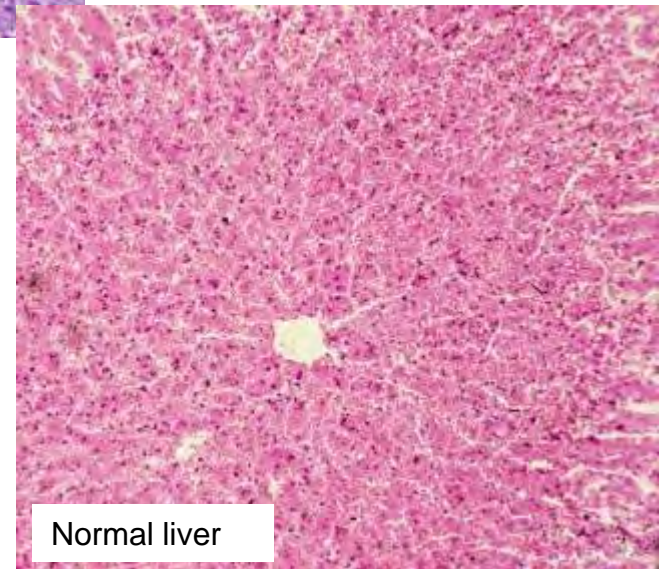
Enlarged, yellowish pale liver
No discrete lesions seen



Enlarged hepatocytes containing empty fat vacuoles, pushing the nuclei to the periphery



Oil Red O – Special stain for fat (red is positive)

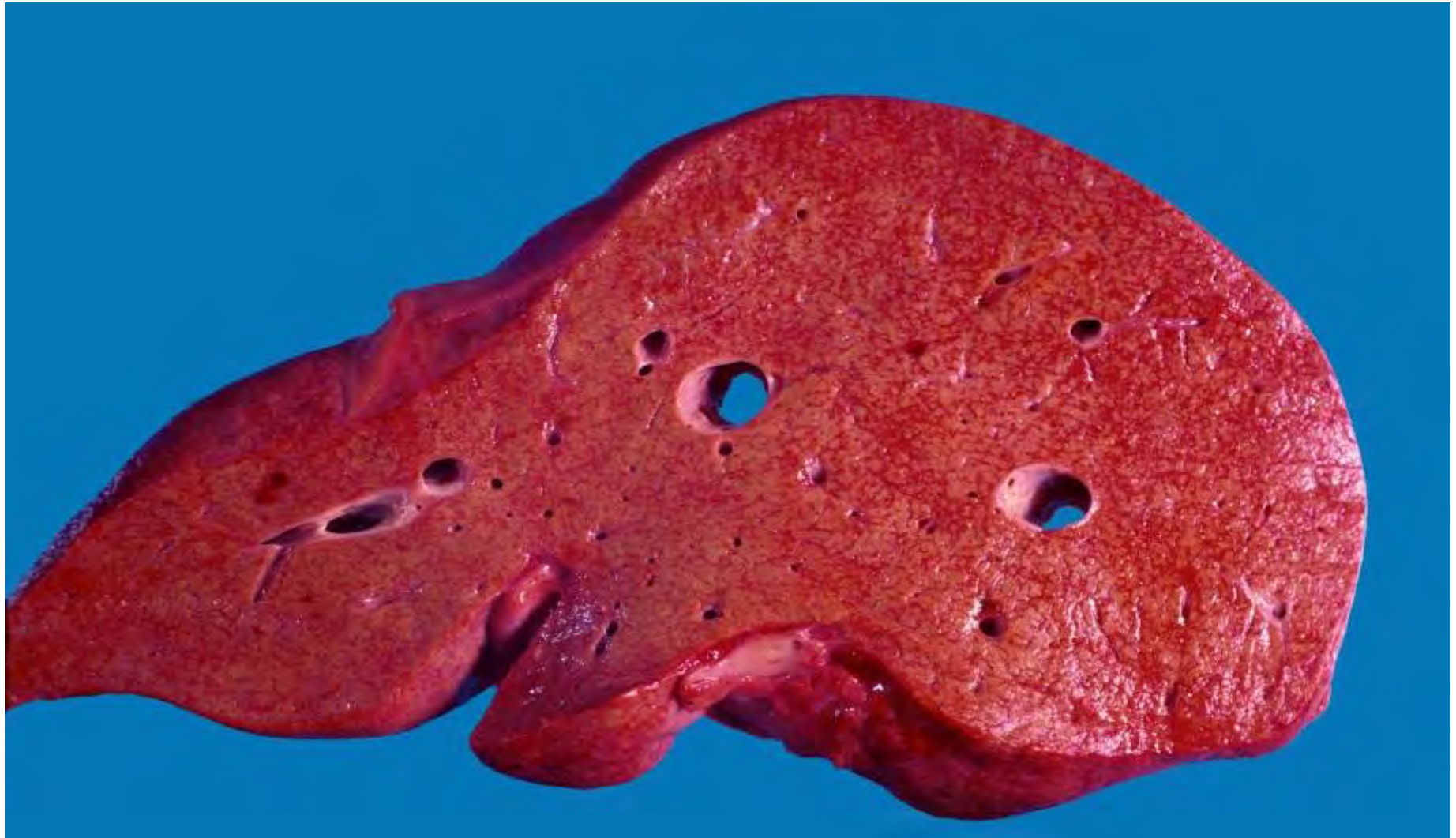


Normal liver

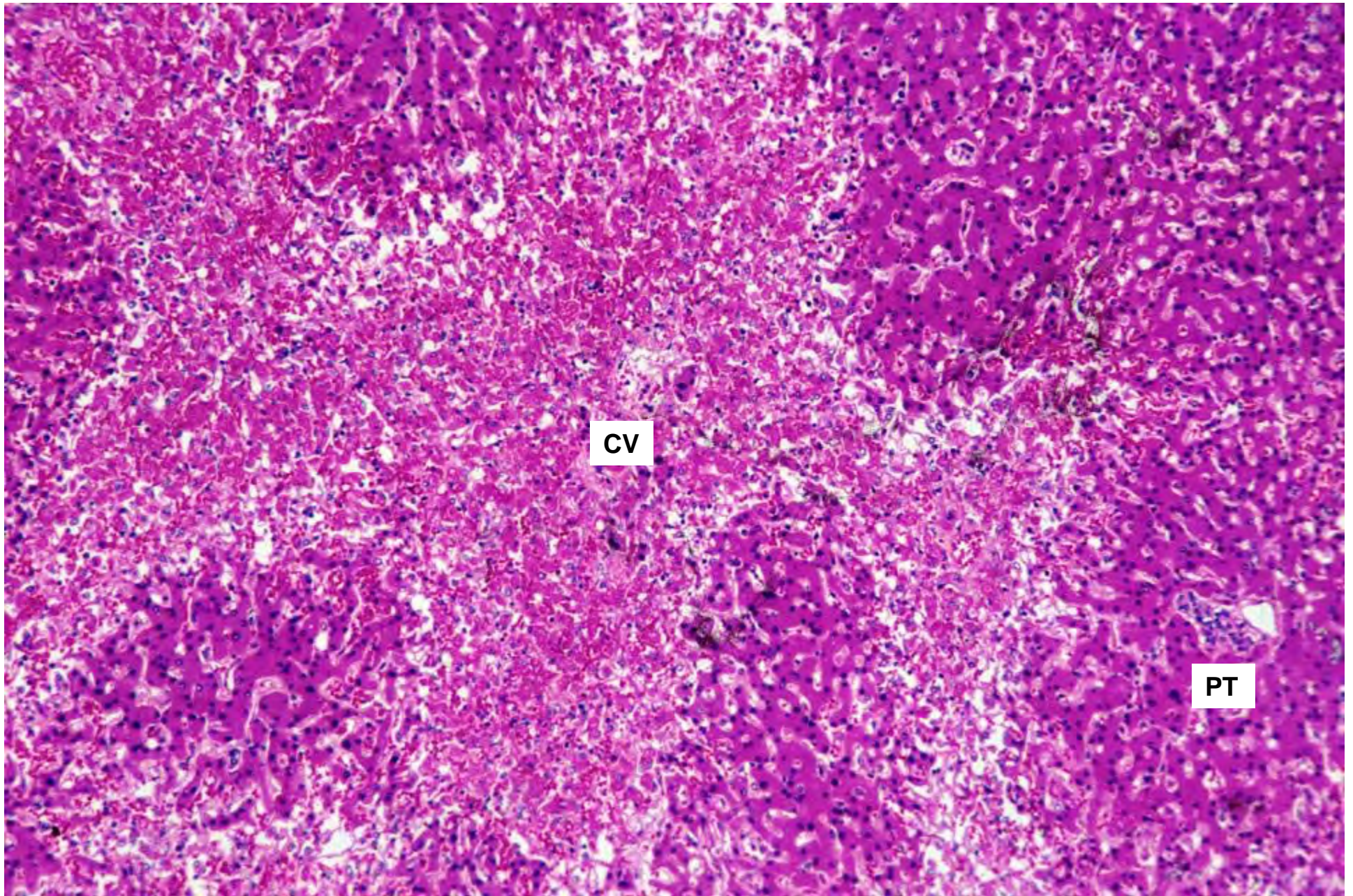
SLIDE 12

Chronic venous congestion

A 40-yr-old woman who had been suffering from chronic rheumatic valvular disease since adolescence developed progressive breathlessness before she died. An autopsy revealed amongst other findings an enlarged congested liver.



Enlarged, dark reddish liver
Nutmeg appearance – centrilobular dark reddish congested areas



Sinusoids filled with blood
Necrosis of centrilobular hepatocytes (periportal hepatocytes spared)

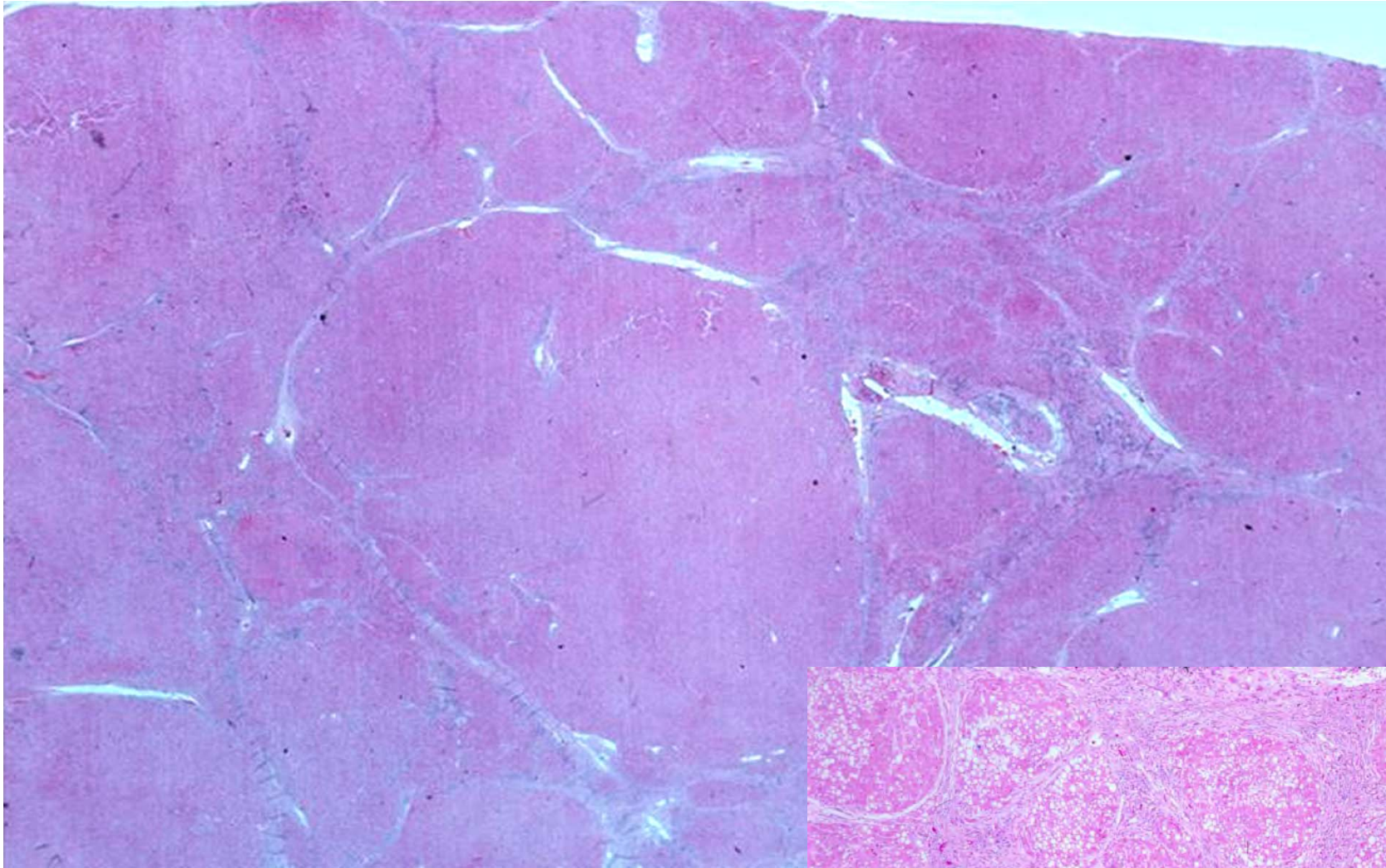
SLIDE 13

Cirrhosis

A 60-year-old man had a long history of chronic liver disease. He presented with jaundice and a massive bout of gastrointestinal bleeding before he died.

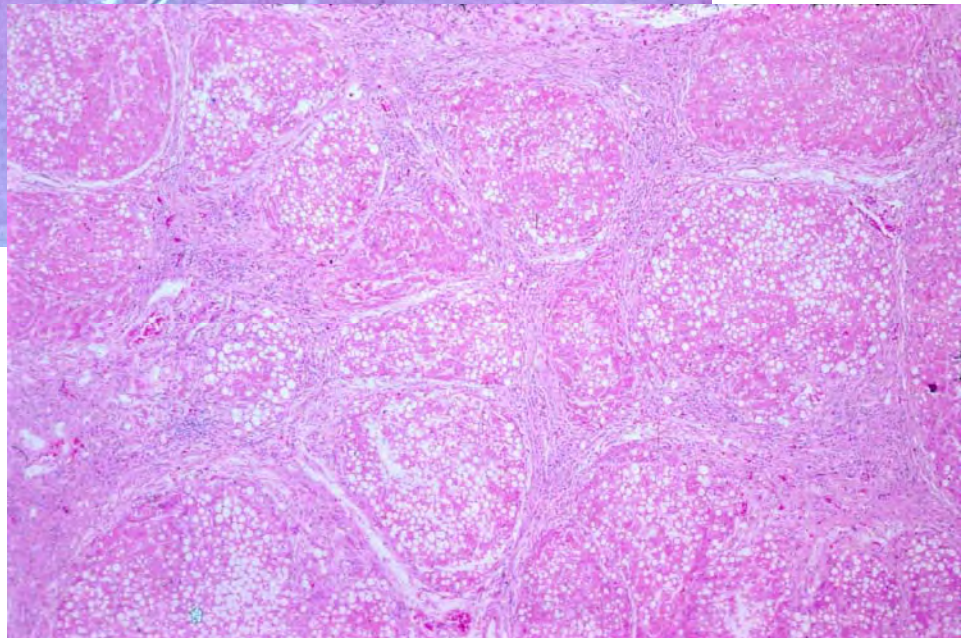


Nodular, firm liver
Often shrunken
Diffusely affected



Nodules of regenerating hepatocytes surrounded by fibrous tissue.

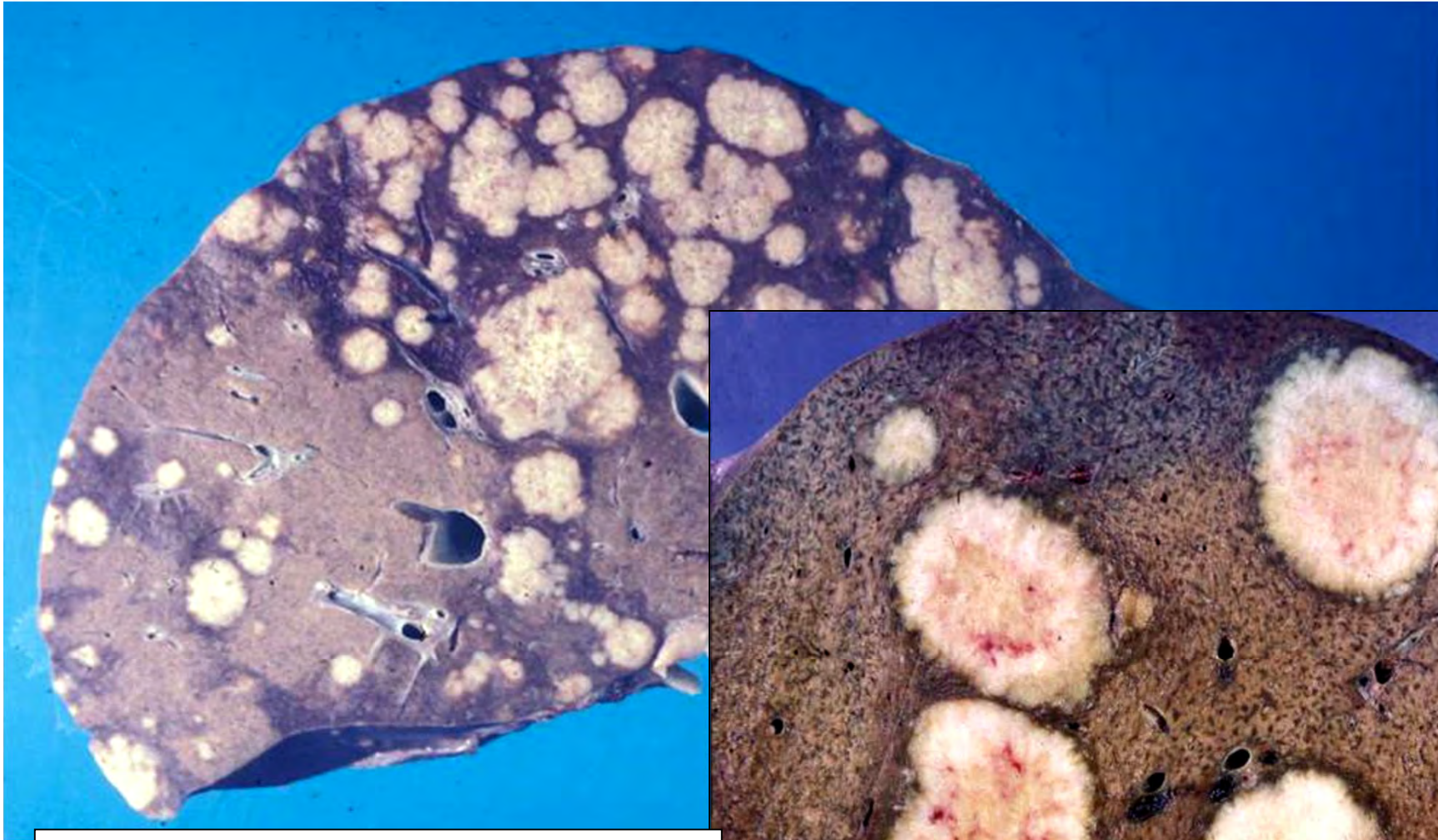
Proliferating bile ducts may be seen within the fibrous septa.



Demo slide : Liver – Metastases (Secondary adenocarcinoma)

*A 57 yr old woman was noted to have
liver enlargement 3 months after
resection of a colonic carcinoma.*

Liver: Metastases (Adenocarcinoma)



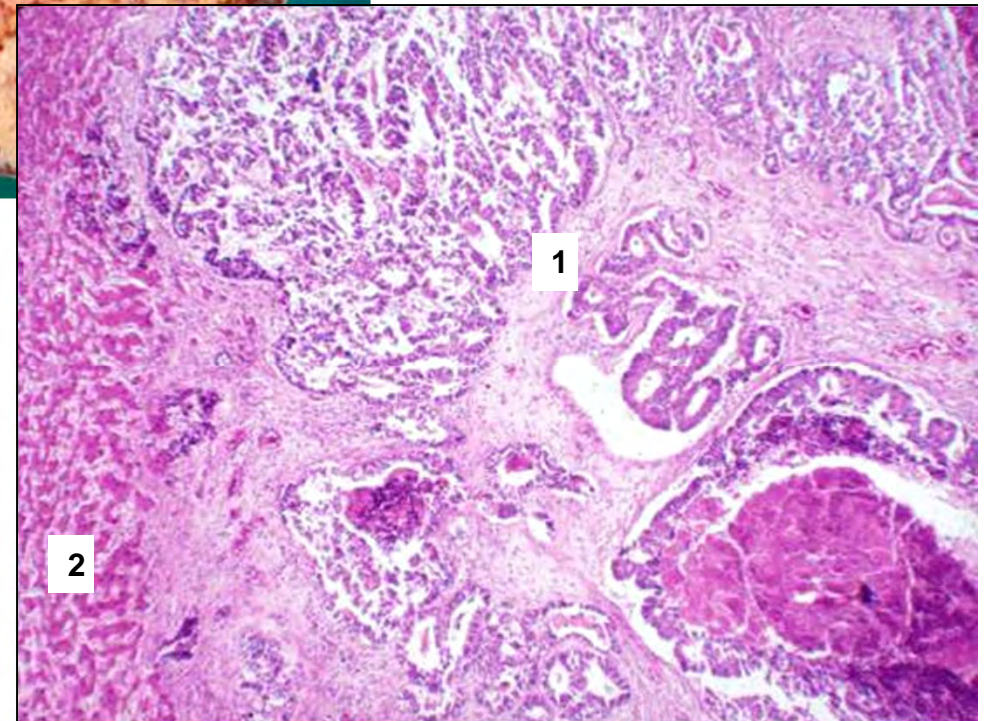
Multiple rounded, fleshy pale tumour nodules within liver . Some nodules show central necrosis.

Normal intervening hepatic parenchyma





1. Metastatic adenocarcinoma : Irregular glands lined by malignant columnar cells surrounded by a desmoplastic stroma
2. Non-neoplastic liver (hepatocytes)



Endocrine System (Thyroid)

THYROID (ENDOCRINE)

- *Slide 23 : Thyroid – Follicular adenoma*
- *Demo slide : Thyroid – Papillary carcinoma*

SLIDE 23

Follicular adenoma

A 42 year old lady went for a routine health check and 4.5 cm-diam. lump was detected in the anterior aspect of the neck. After cytological examination, the surgical removal of the gland was carried out. The surgical specimen showed a well-circumscribed brownish, fleshy mass. The rest of the thyroid gland was normal.



Small rim of residual
non-neoplastic thyroid
tissue

Well circumscribed, pale encapsulated nodule

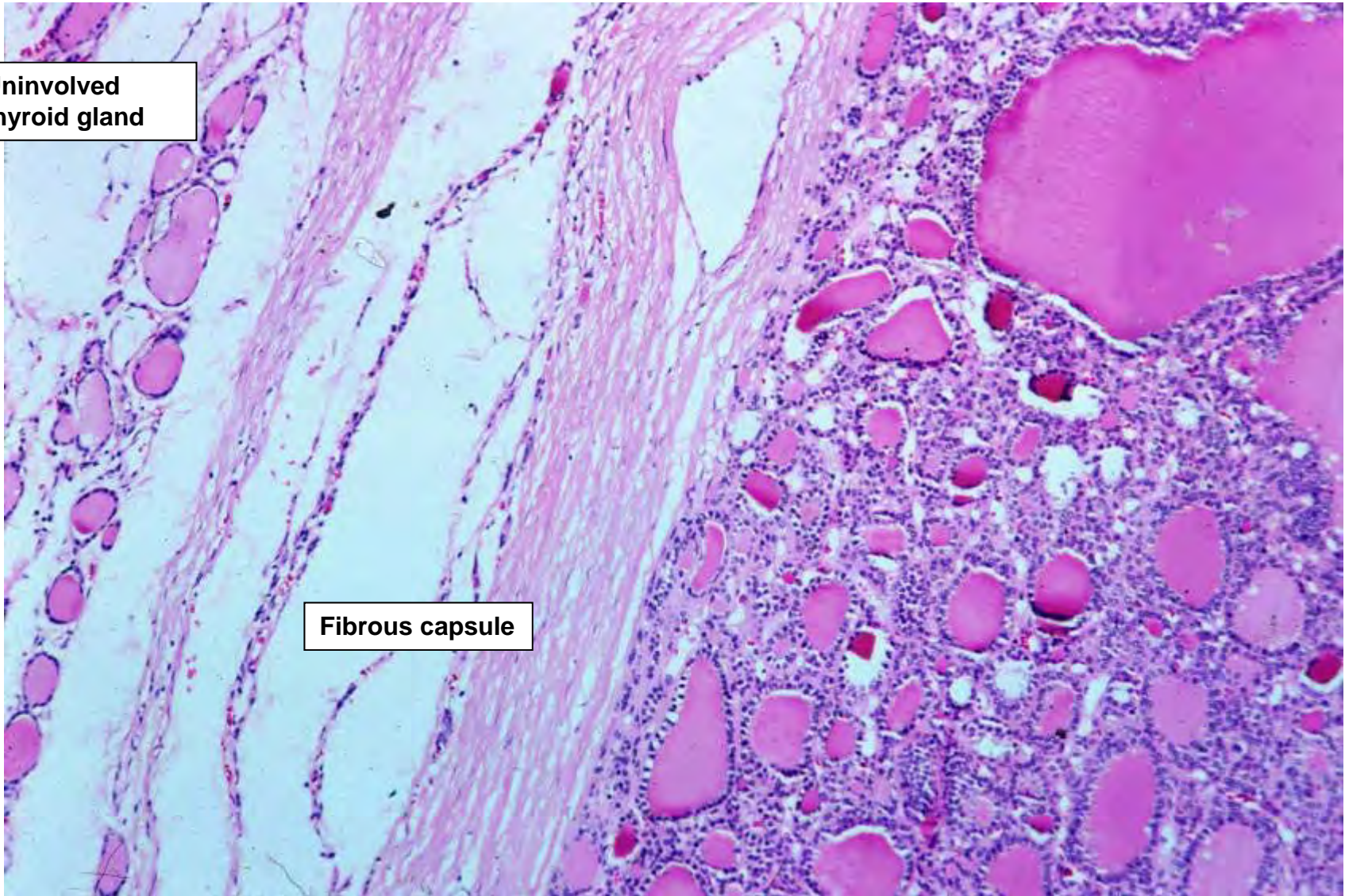
Fibrous capsule – encircling entire nodule



**Uninvolved
thyroid gland**

Fibrous capsule

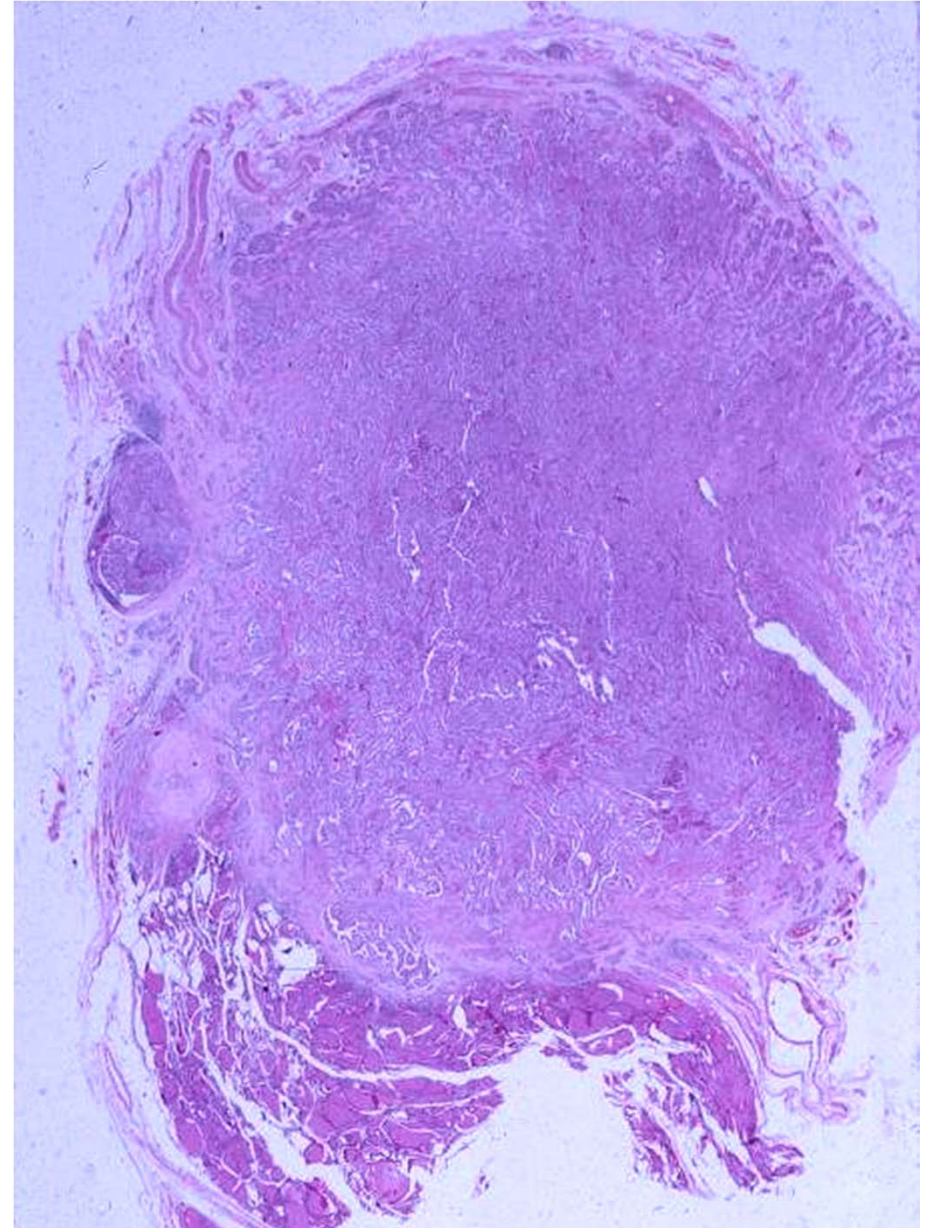
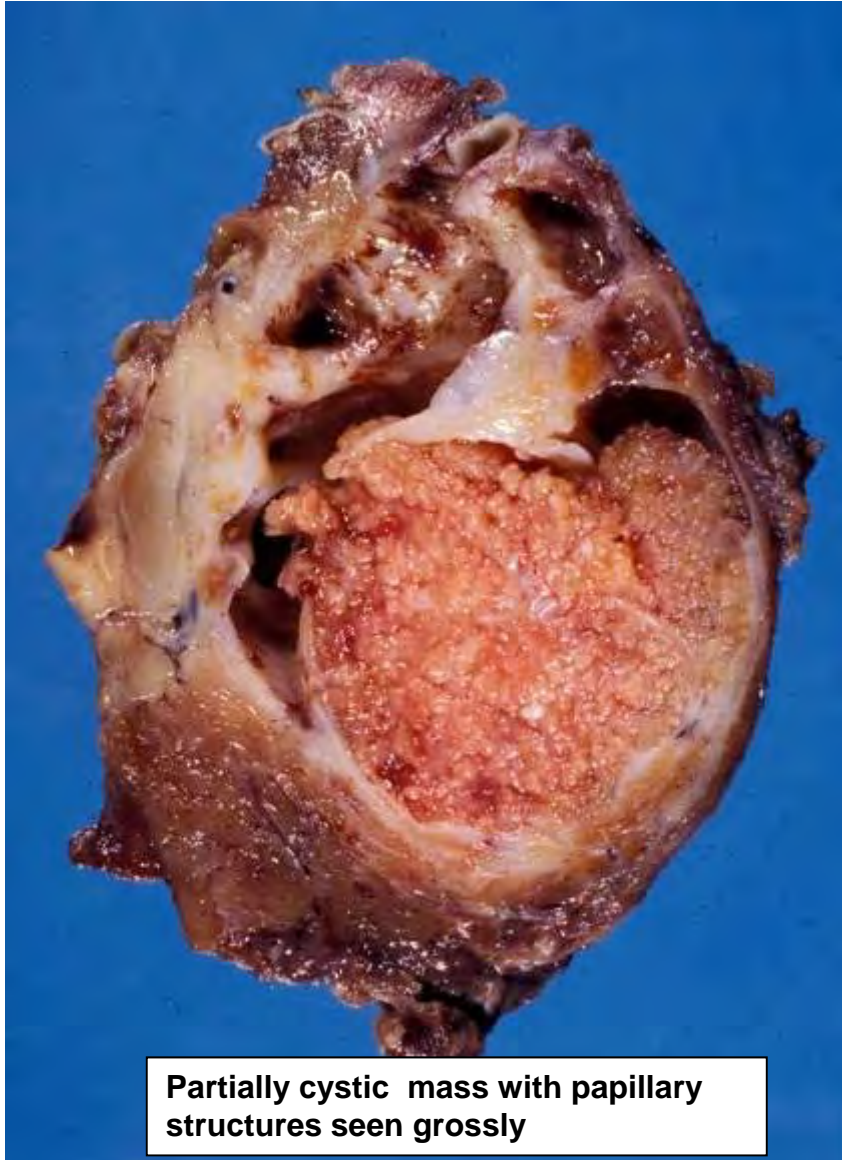
Nodule – Predominantly small follicles containing little colloid. Occasional larger follicles seen.

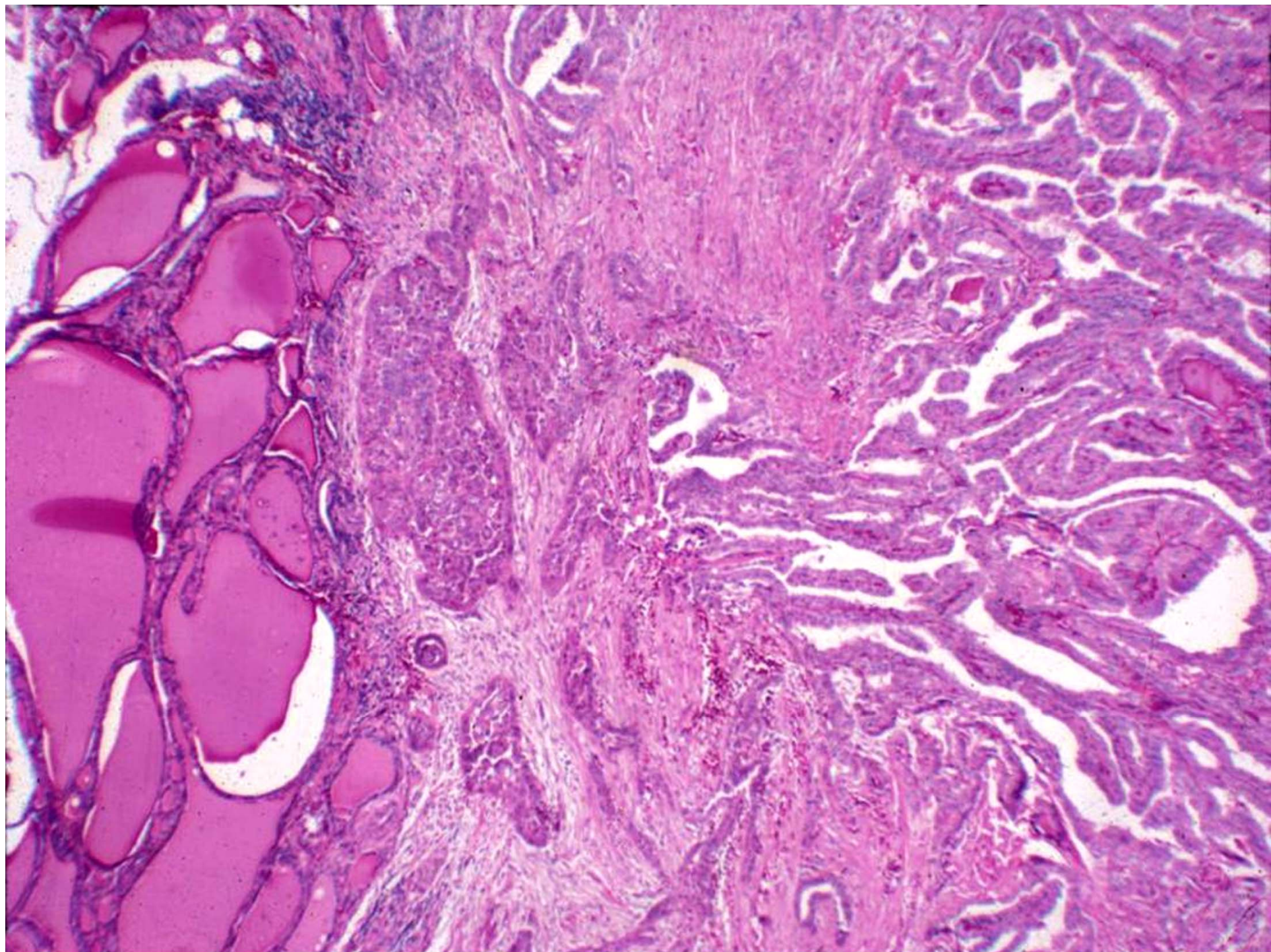


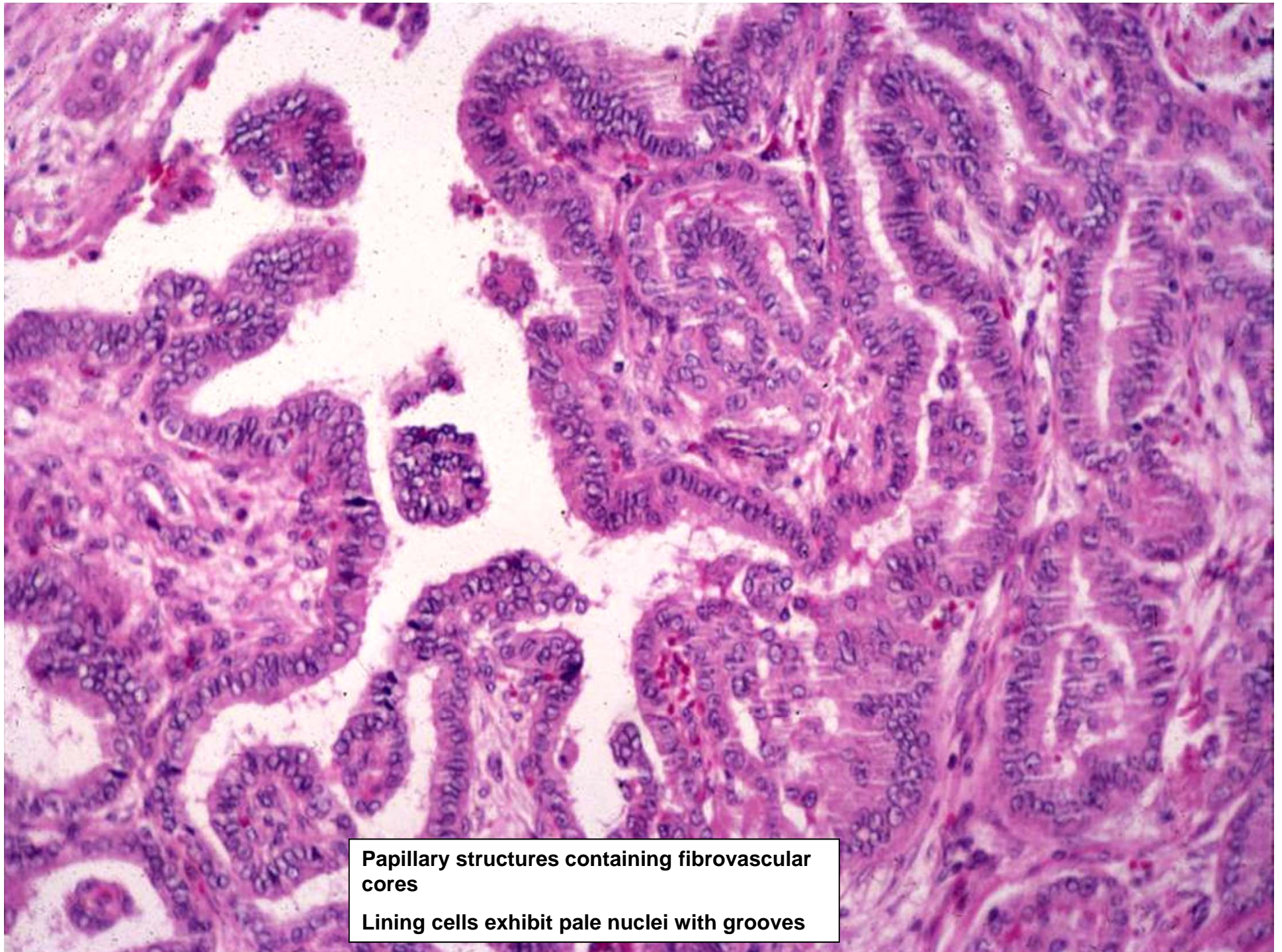
Demo slide : Thyroid – Papillary carcinoma

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Thyroid: Papillary carcinoma







Papillary structures containing fibrovascular cores

Lining cells exhibit pale nuclei with grooves

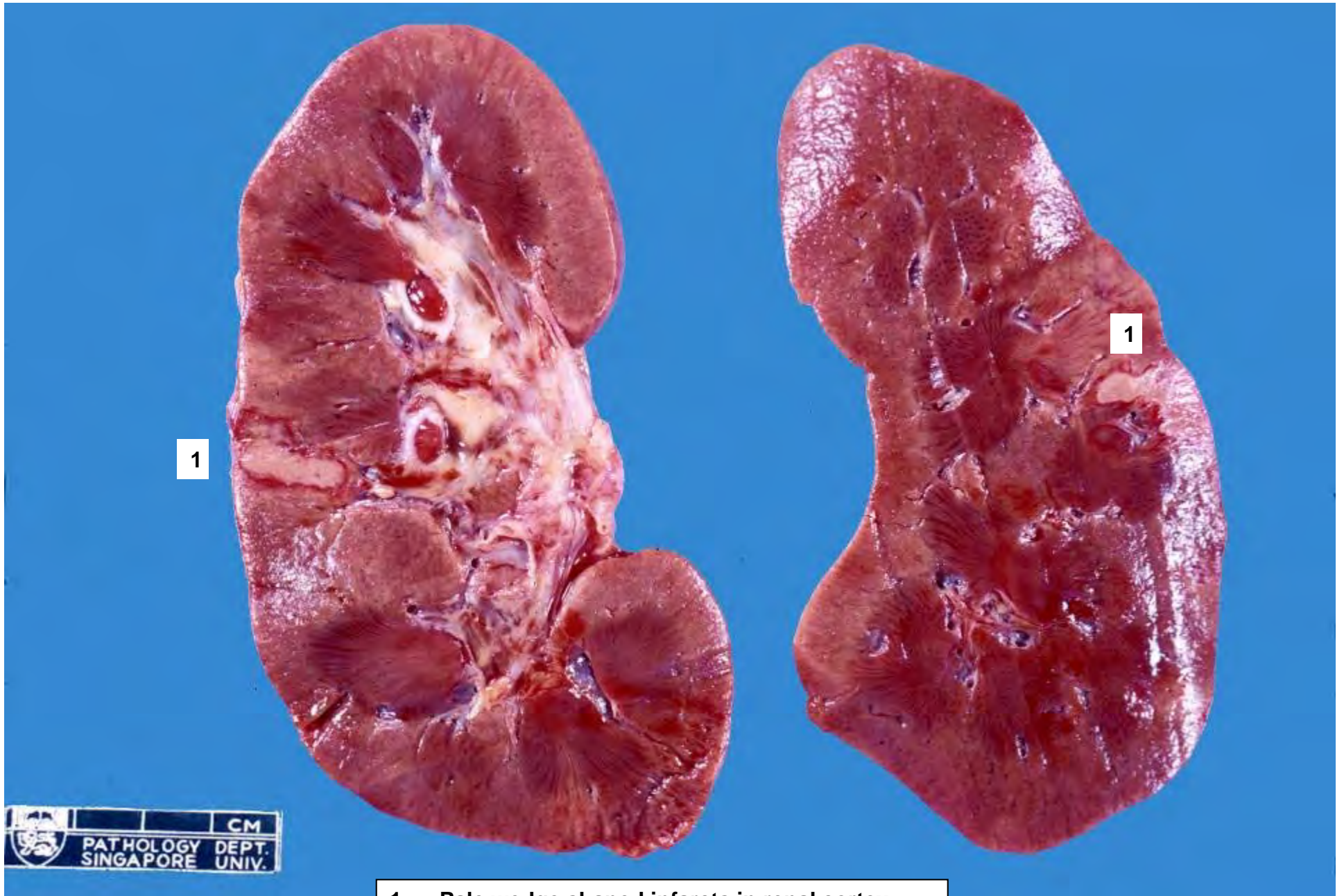
Urogenital System, Male Genital Tract

UROGENITAL SYSTEM, MALE GENITAL TRACT

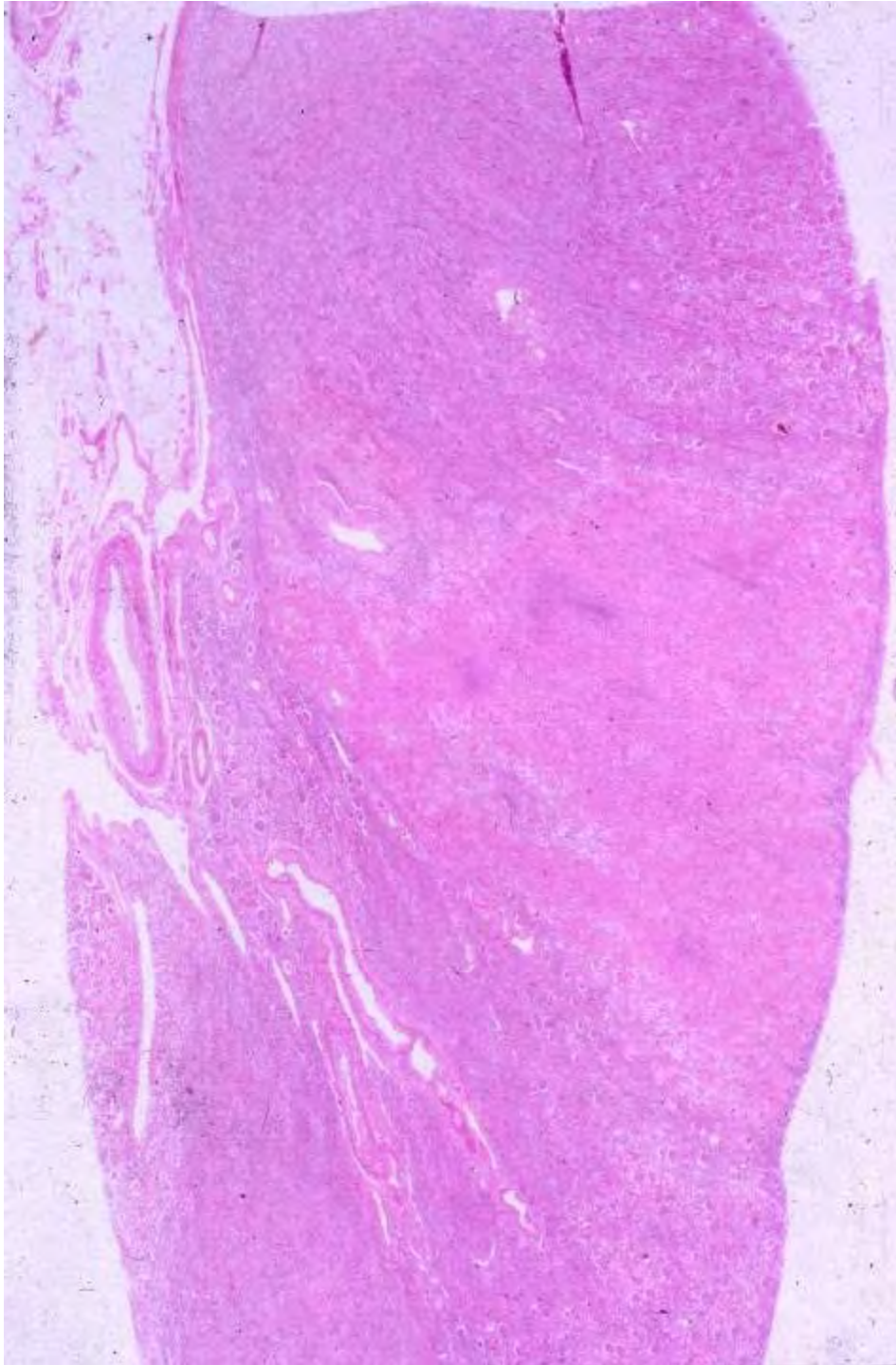
Slide 17 : Kidney – Infarct

Demo slide : Kidney – End stage kidney

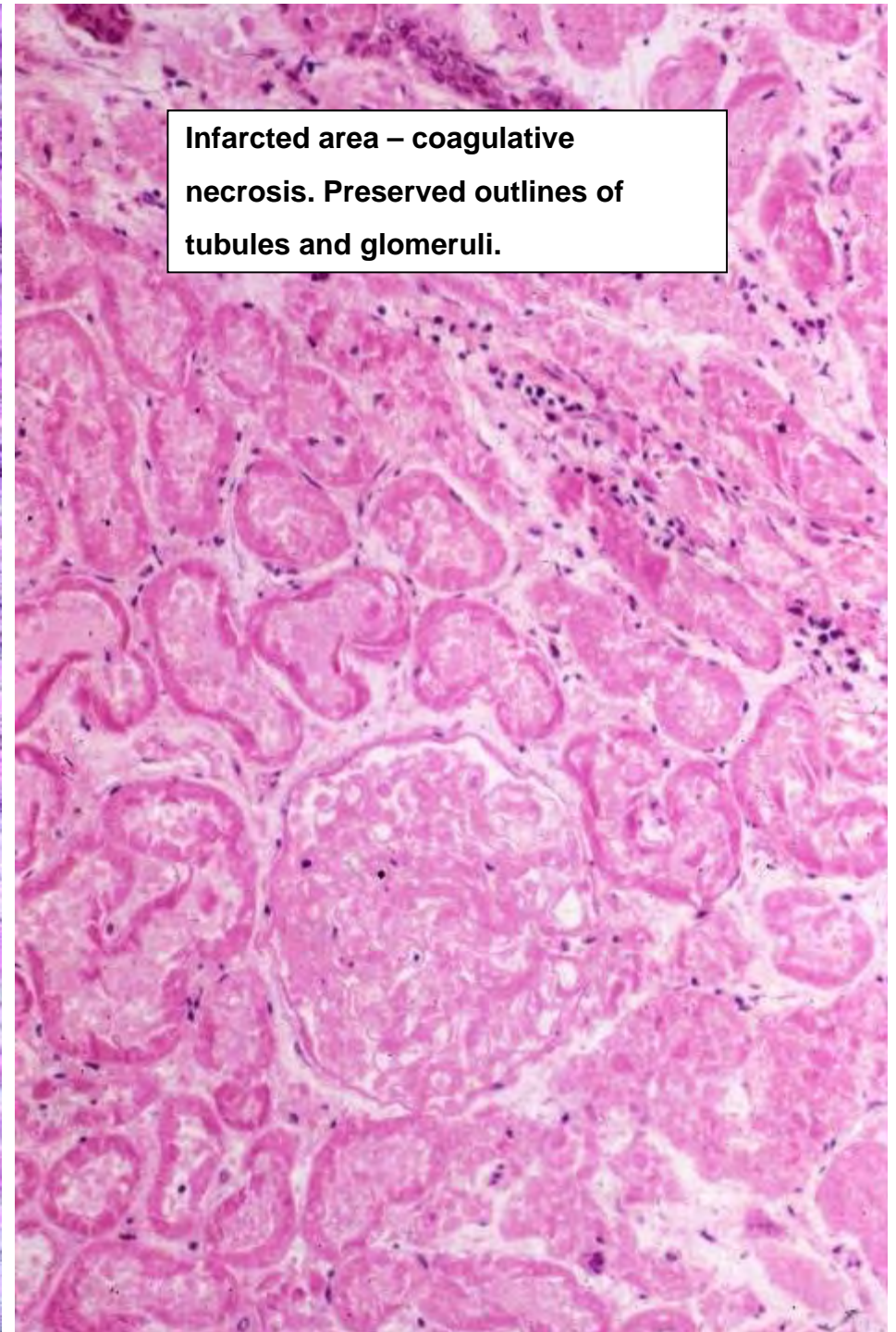
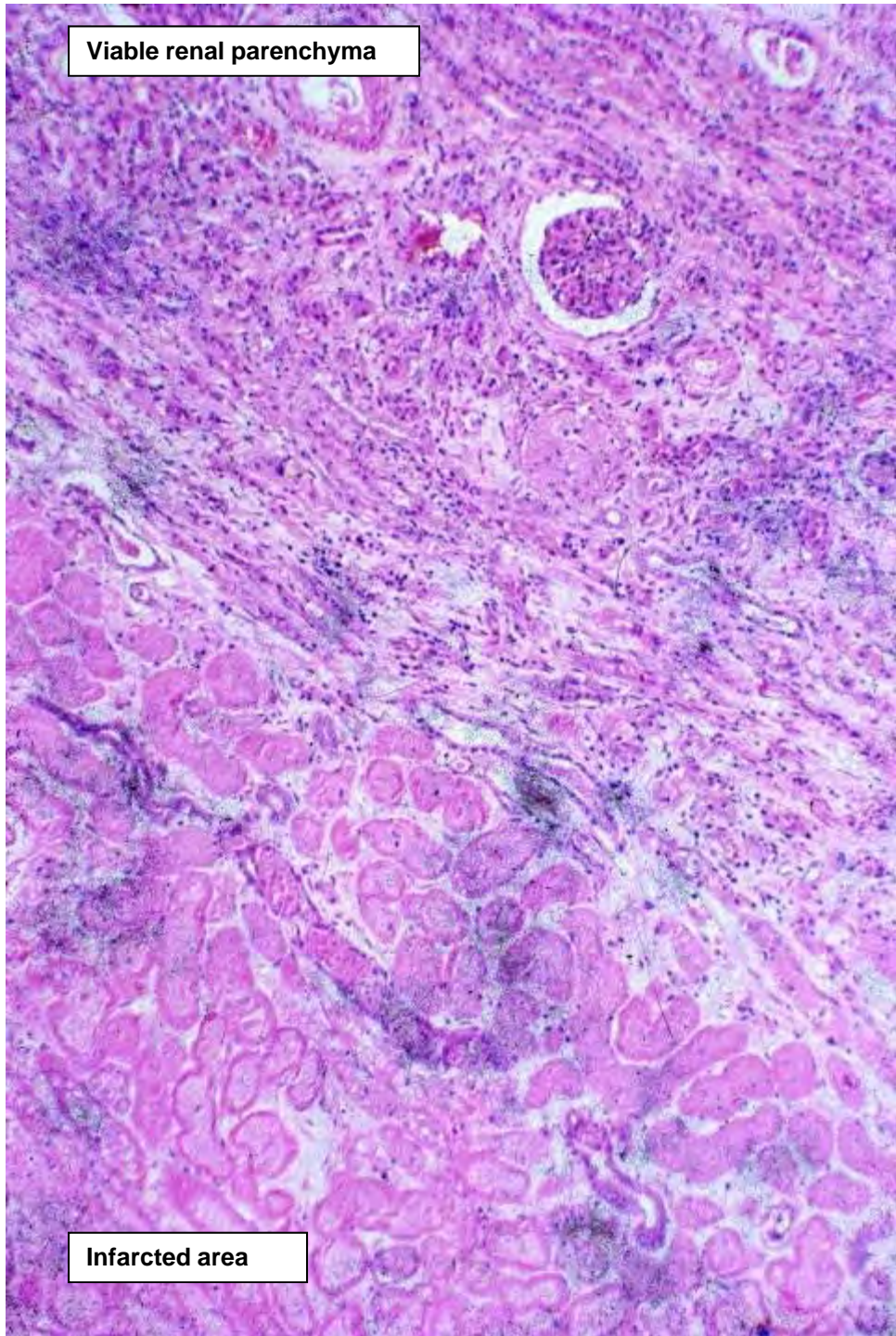
SLIDE 17
Renal infarct



1. Pale wedge shaped infarcts in renal cortex, surrounded by a rim of hyperaemic tissue.



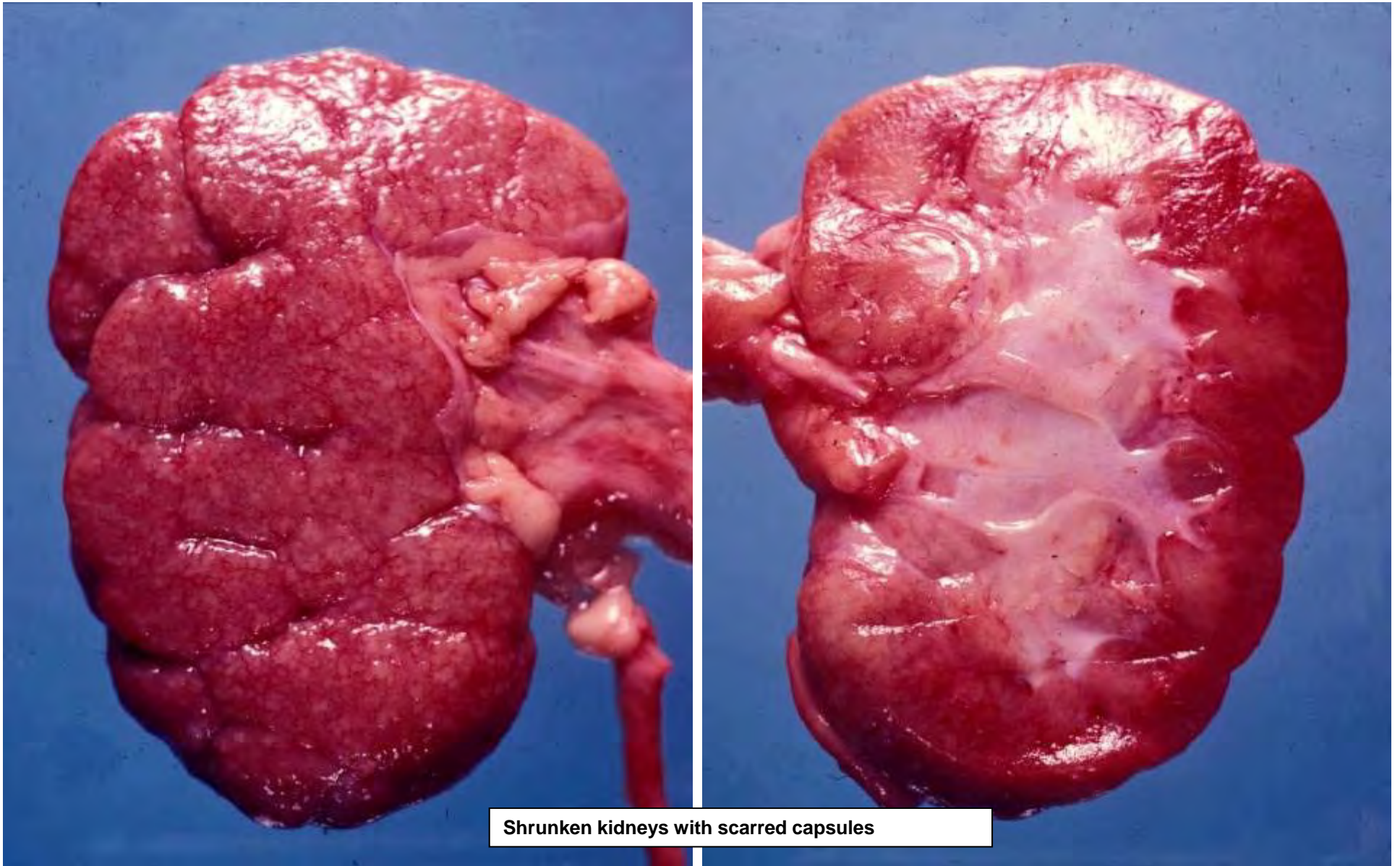
Infarct – paler, wedge shaped area

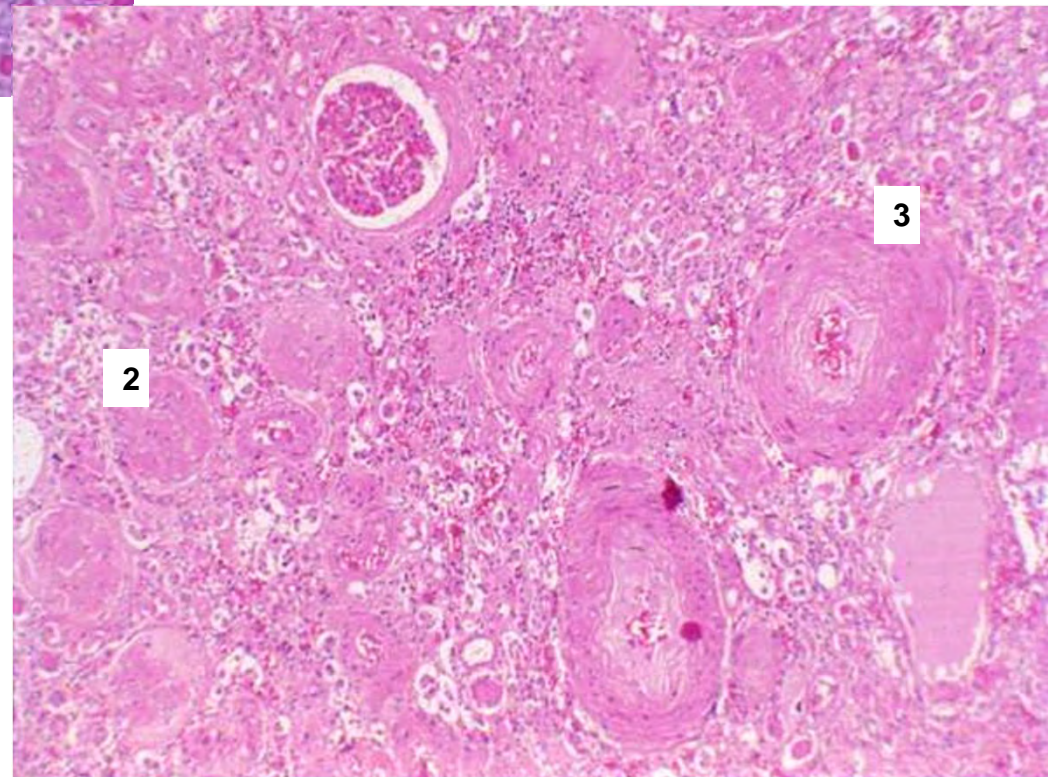
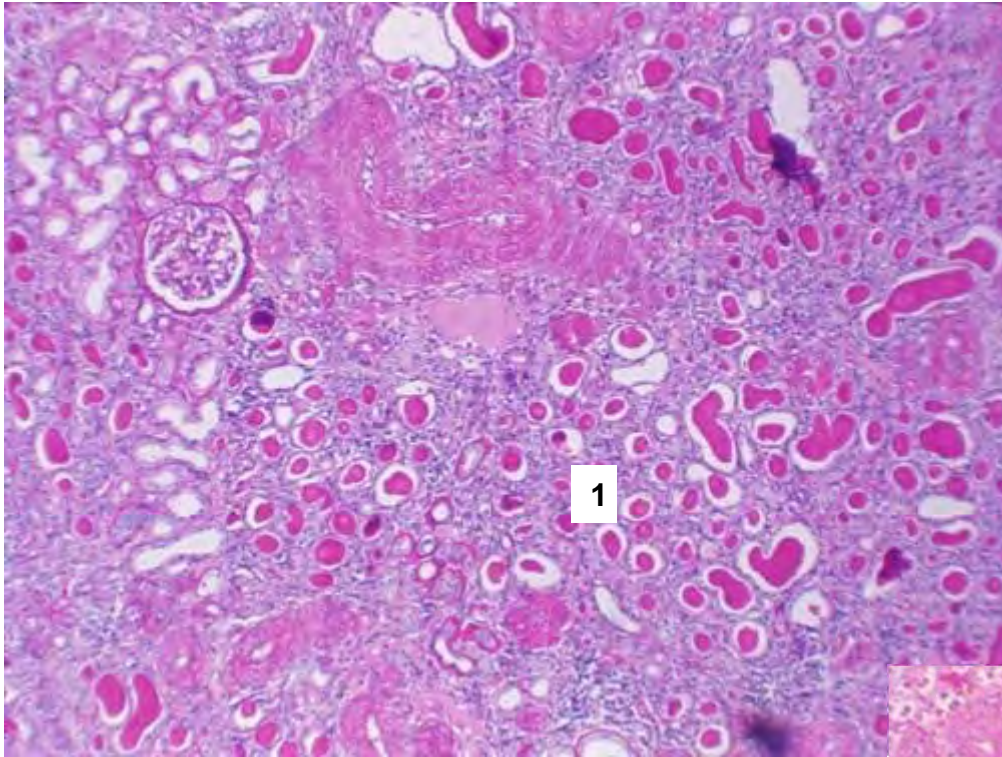


Demo slide : Kidney – End stage kidney

A 65-yr-old man succumbed to chronic renal failure. He had a long history of hypertension. An autopsy was performed.

Kidney: End-stage changes





1. Tubules dilated with pinkish casts ('thyroidisation')
2. Glomeruli are sclerotic
3. Vessel walls thickened

The findings are non-specific.

Breast

BREAST

- *Slide 18 : Breast – Fibrocystic change*
- *Slide 19 : Breast – Invasive ductal carcinoma*

SLIDE 18

Fibrocystic change

A 40-yr-old woman noted a vague mass in each breast, associated with tenderness premenstrually. No history of oral contraception.

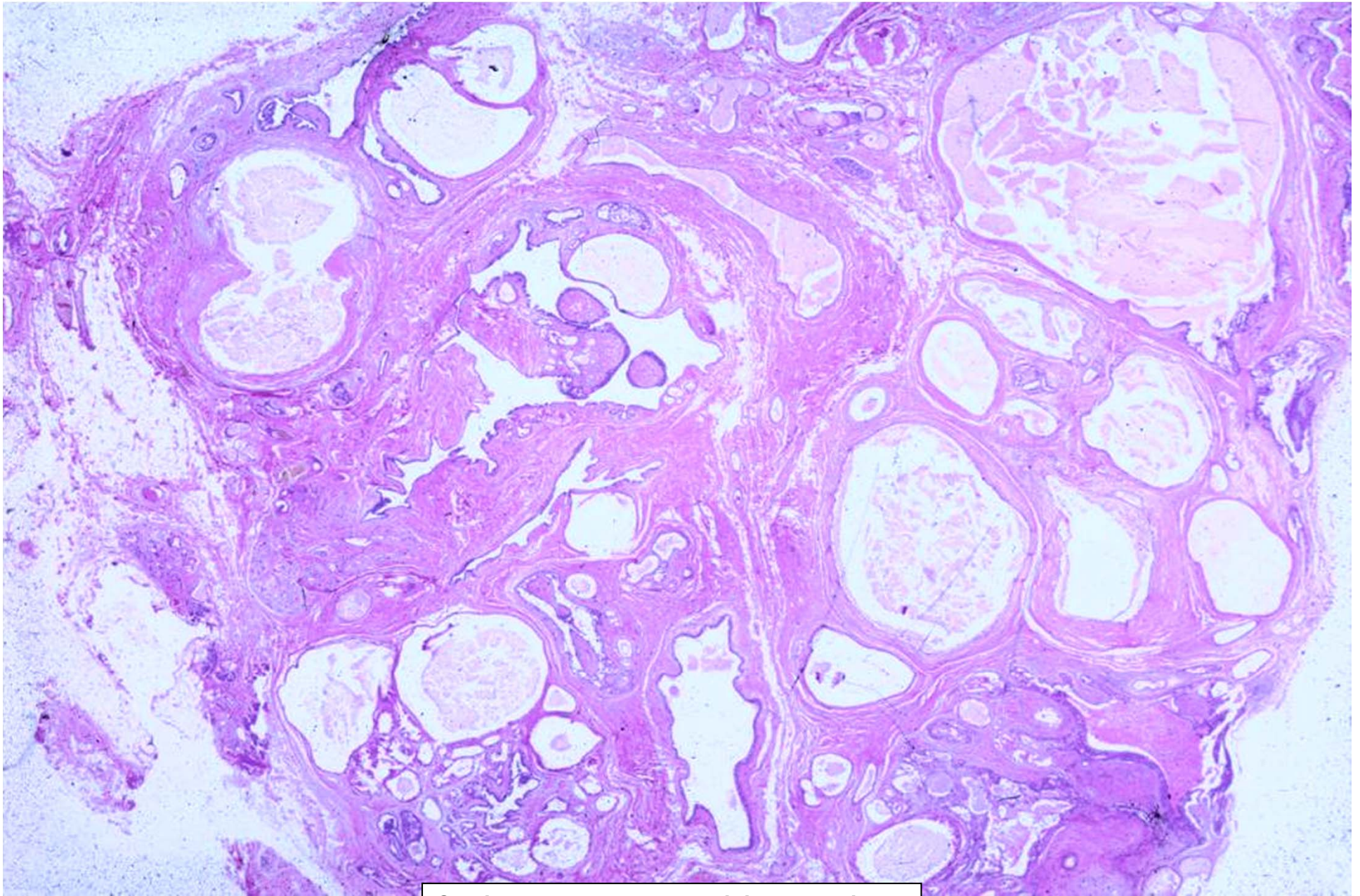
Positive family history of breast cancer.

Palpation revealed bilateral ill-defined nodularity which was more marked in the upper outer quadrant of the left breast. This area was biopsied.

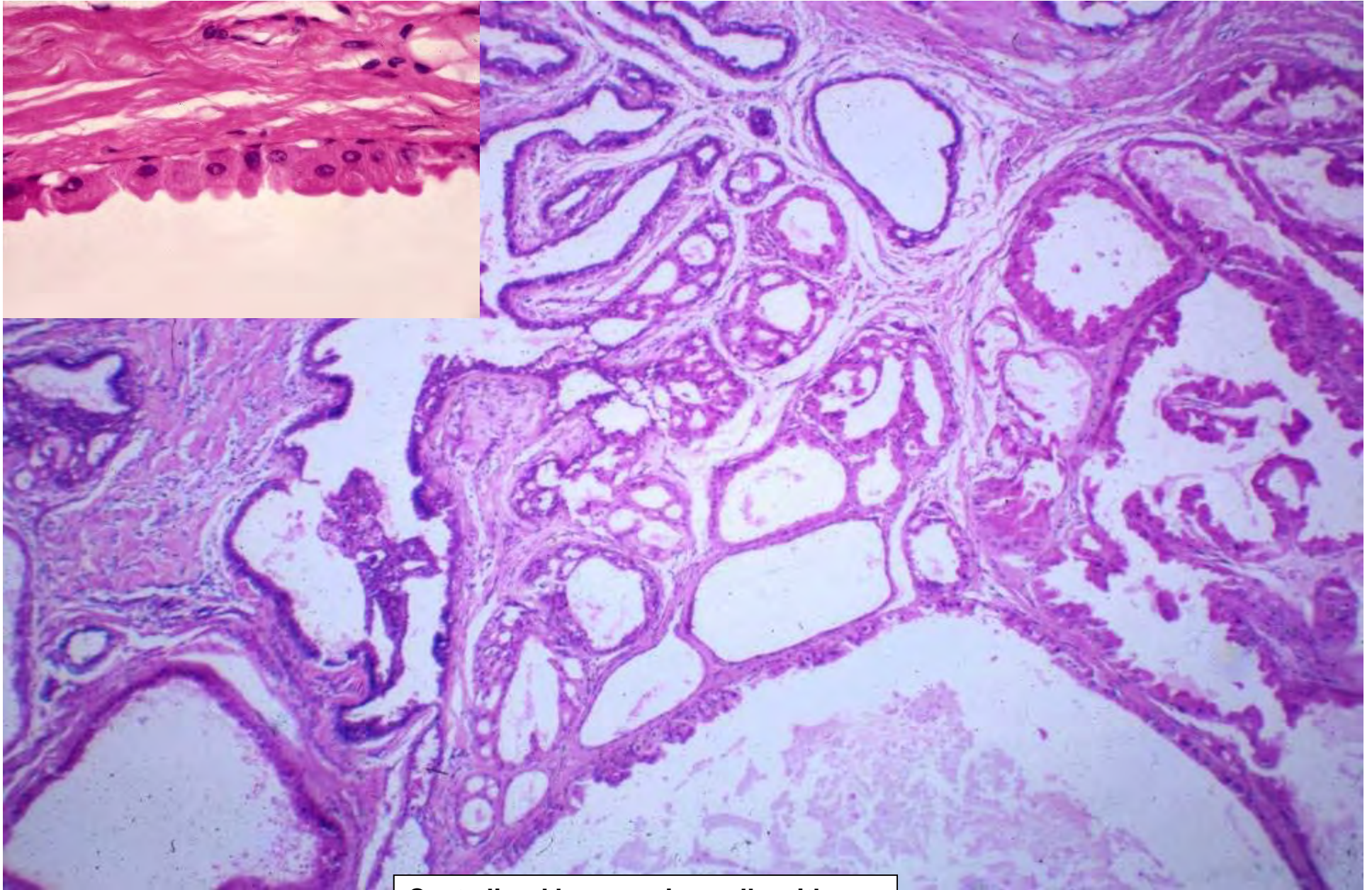


Cysts within fibrous appearing breast parenchyma

Sometimes cysts have a bluish appearance – 'blue-domed cysts'



Cystic ductal spaces containing secretions



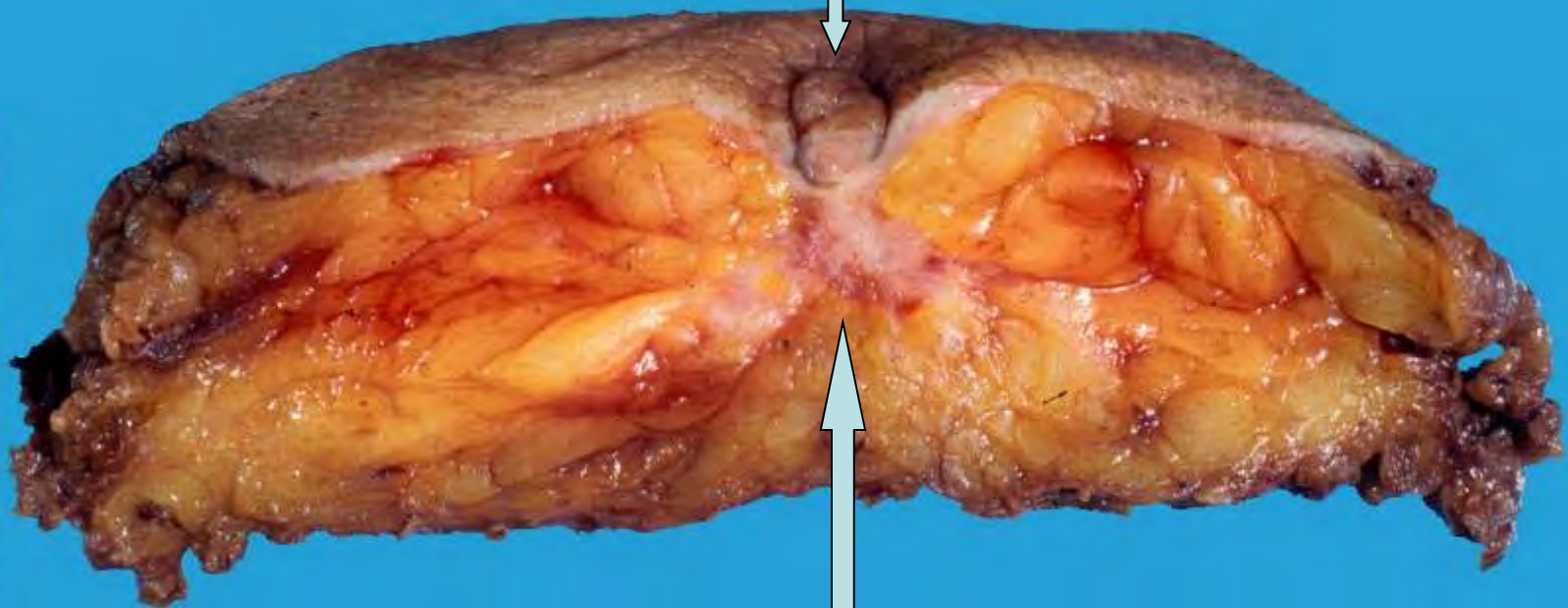
Cysts lined by apocrine cells with abundant eosinophilic (pink) cytoplasm

SLIDE 19

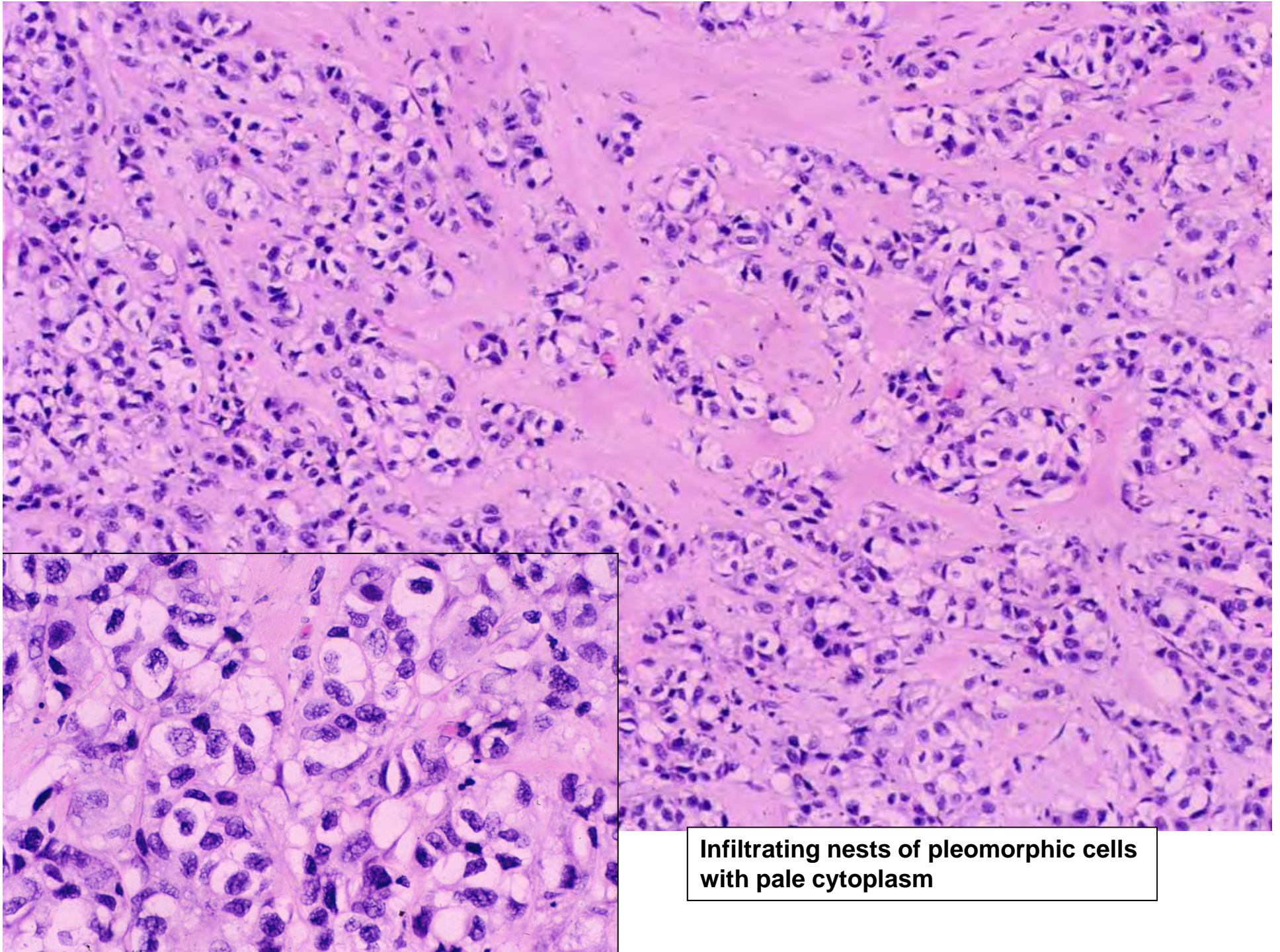
Invasive ductal carcinoma

A 55-yr-old postmenopausal woman was found to have a 2.5 cm- diam., hard, irregular, non-mobile mass in the right breast.

Nipple



Irregular spiculated mass just below nipple



**Infiltrating nests of pleomorphic cells
with pale cytoplasm**

Lymphoreticular System

LYMPHOID SYSTEM

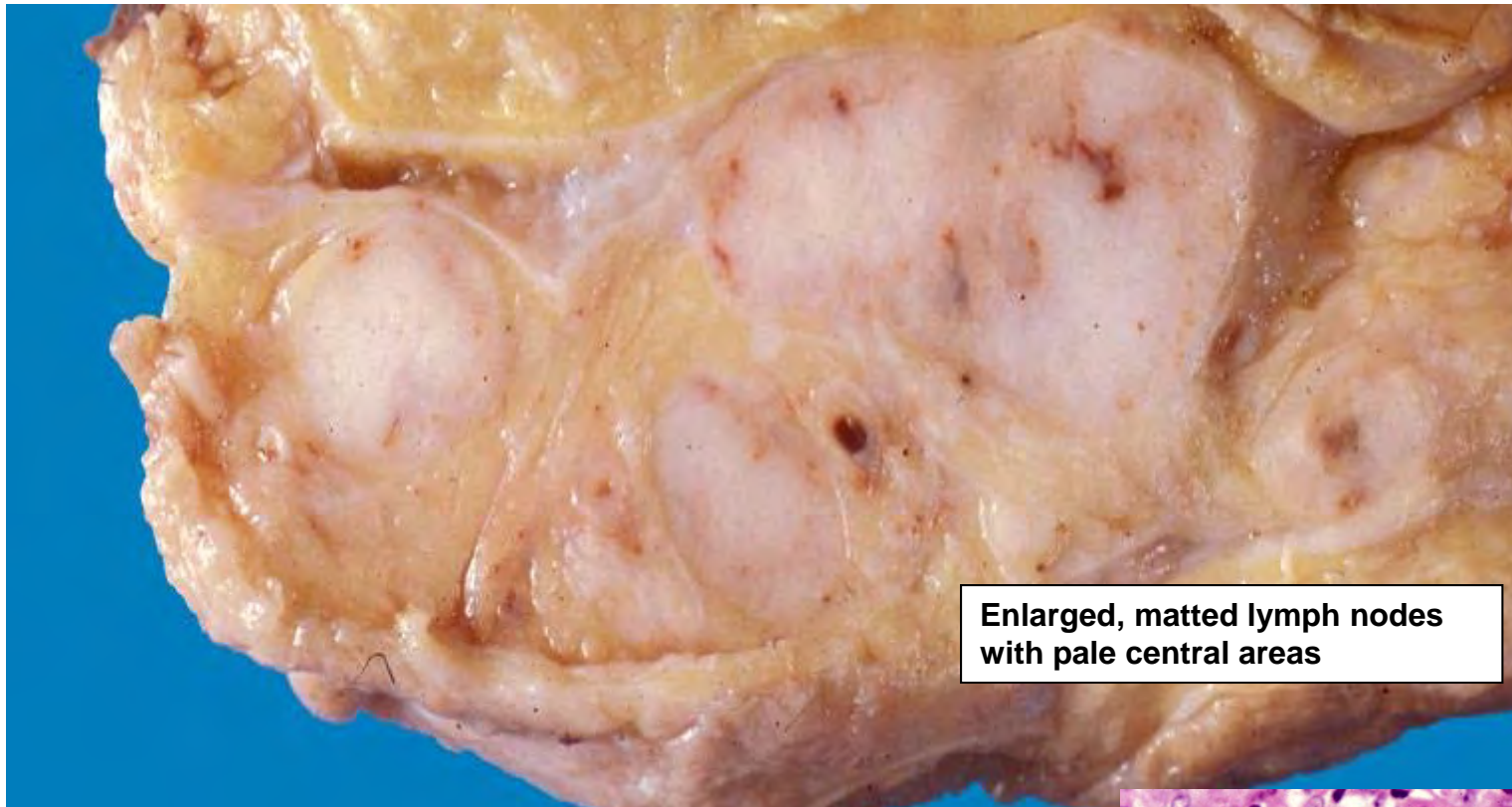
- *Slide 14 : Lymph node – Tuberculosis*
- *Slide 15 : Lymph node – Metastases
(Secondary squamous cell carcinoma)*
- *Slide 16 : Lymph node – Non-Hodgkin
lymphoma, diffuse*

SLIDE 14

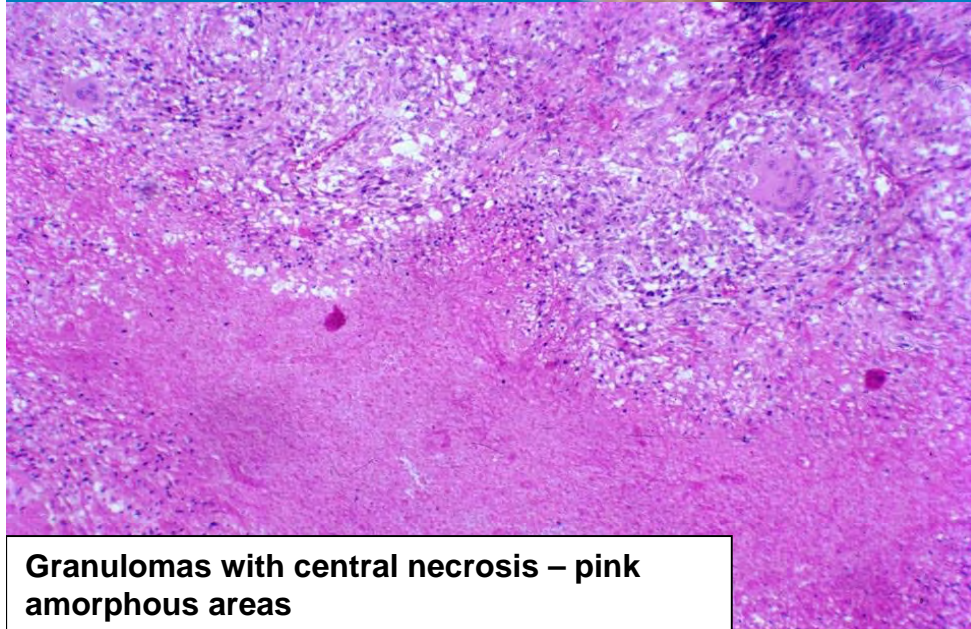
Tuberculosis

A 45-yr-old Malay man complained of a swelling on the left side of his neck for 1 month. He had coughed out fresh blood several times last week. He was a heavy smoker.

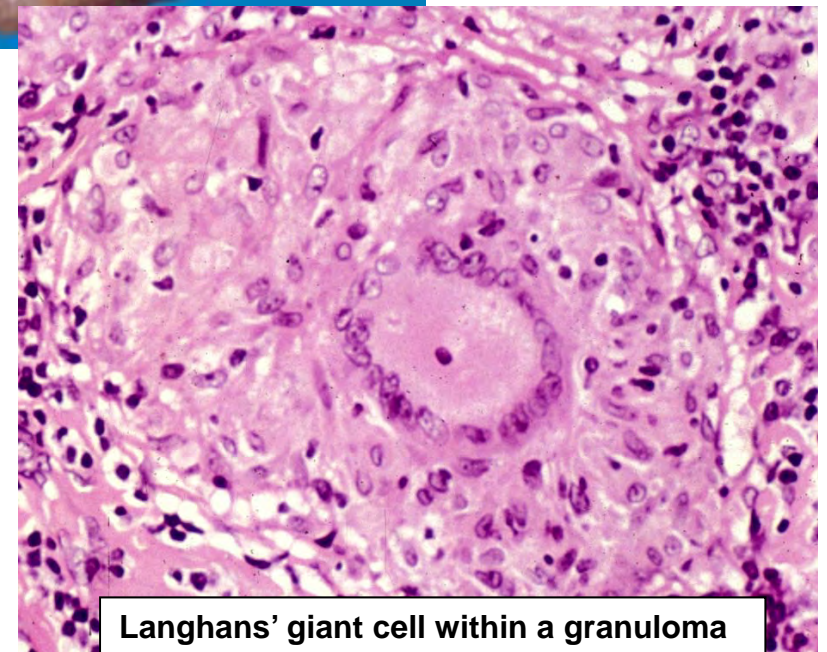
Physical examination showed a painless, 2 cm-diam., swelling at the left side of his neck. There were no chest signs. Chest X-ray revealed a left lung shadow.



Enlarged, matted lymph nodes with pale central areas



Granulomas with central necrosis – pink amorphous areas



Langhans' giant cell within a granuloma

SLIDE 15

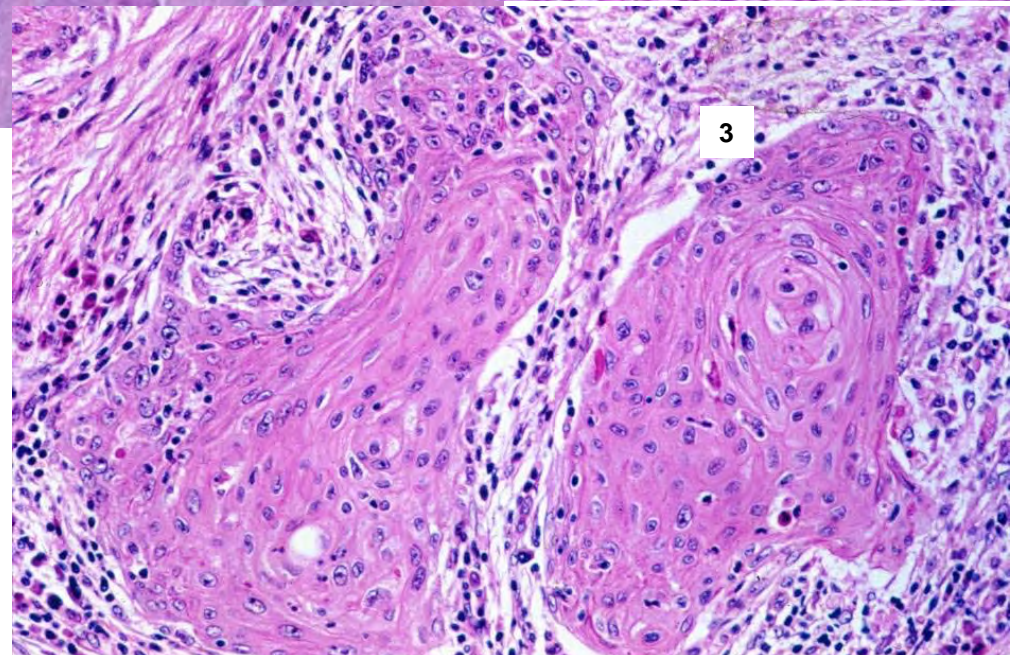
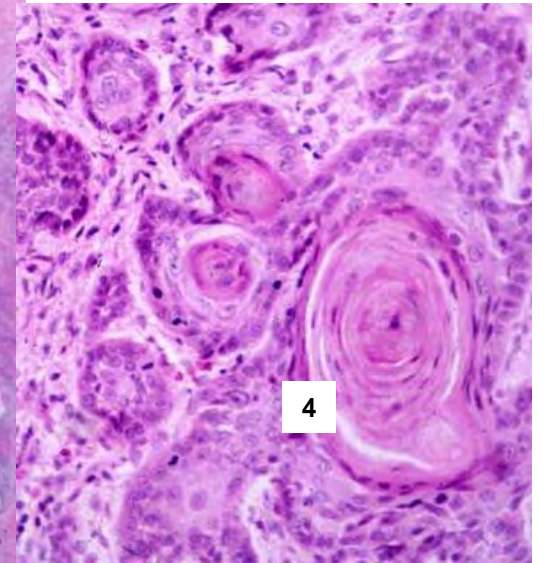
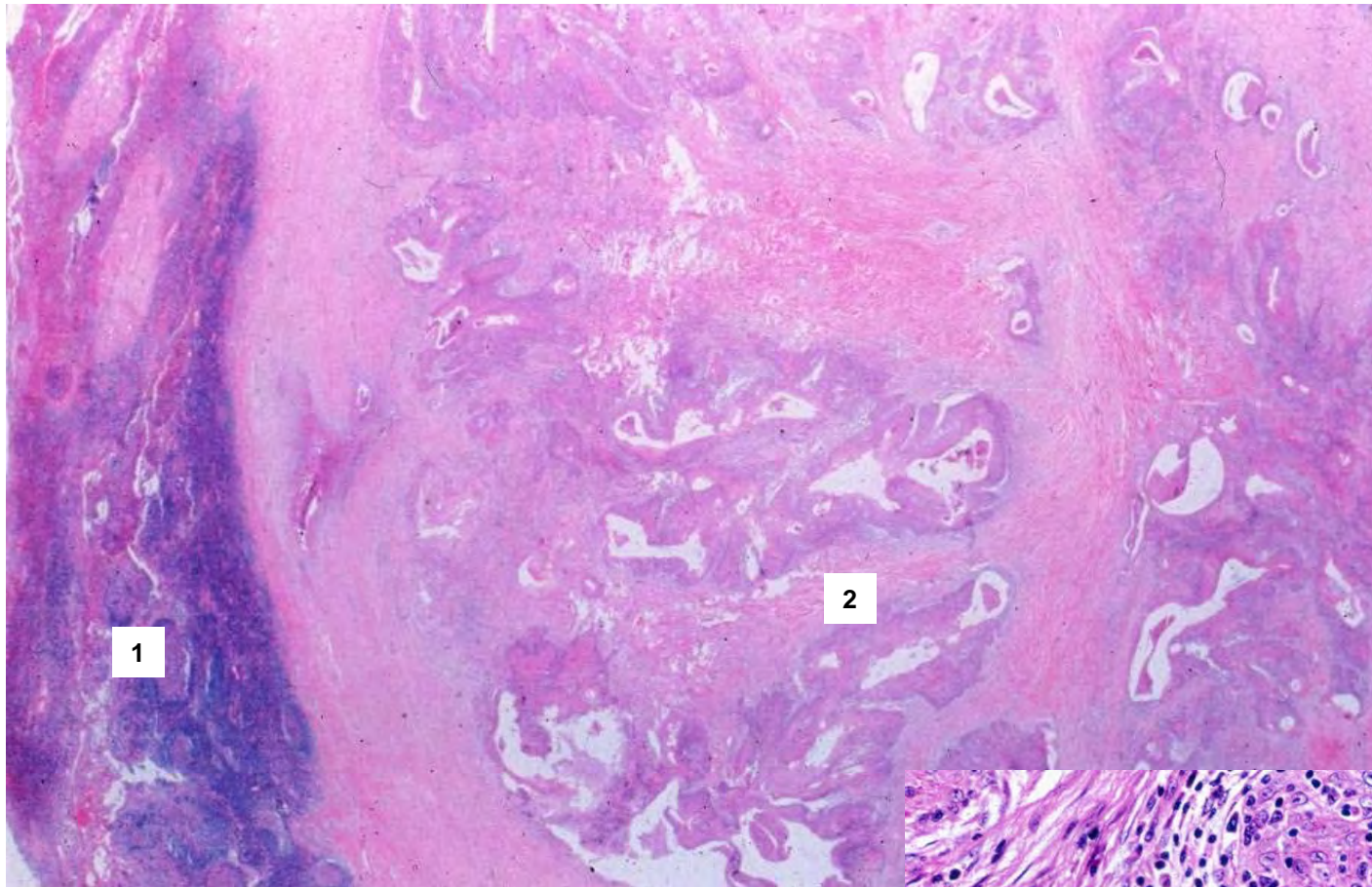
Lymph node – Metastatic squamous cell carcinoma

A 45-yr-old Malay man complained of a swelling on the left side of his neck for 1 month. He had coughed out fresh blood several times last week. He was a heavy smoker.

Physical examination showed a painless, 2 cm-diam., swelling at the left side of his neck. There were no chest signs. Chest X-ray revealed a left lung shadow.



Cut section of enlarged lymph node with pale necrotic areas



1. Residual non-neoplastic lymph node parenchyma.
2. Islands of malignant epithelial cells .
3. High power view of malignant squamous cells with abundant dense eosinophilic cytoplasm and well defined cell borders. A whorled appearance is discernible.
4. Keratin pearls.

SLIDE 16

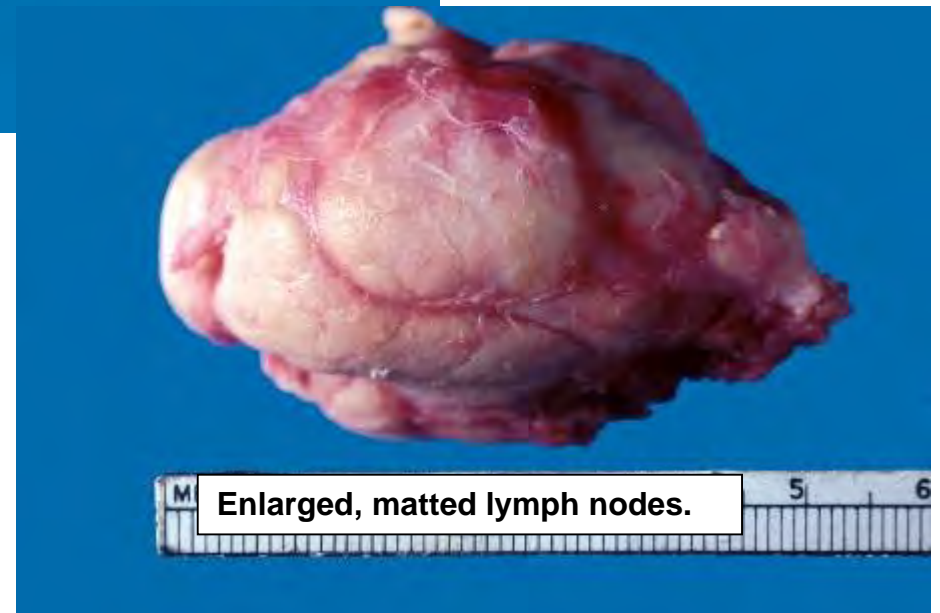
Lymph node – Non-Hodgkin lymphoma, diffuse

A 50 yr old Chinese man complained of a rapidly enlarging painless neck mass. He had no other symptoms.

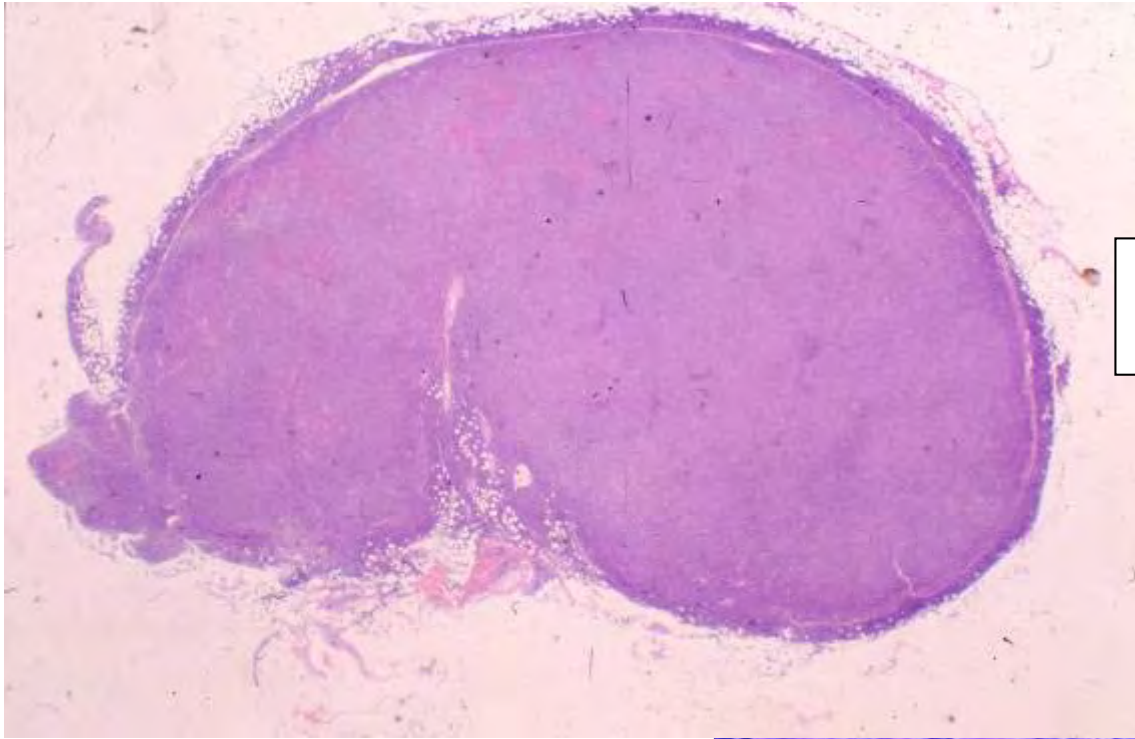
Physical examination revealed no pallor, jaundice or skin hemorrhages. There was a 2-cm-diam., large non-tender, firm swelling on the right side of the neck.



Enlarged lymph node with pale fleshy cut surface.

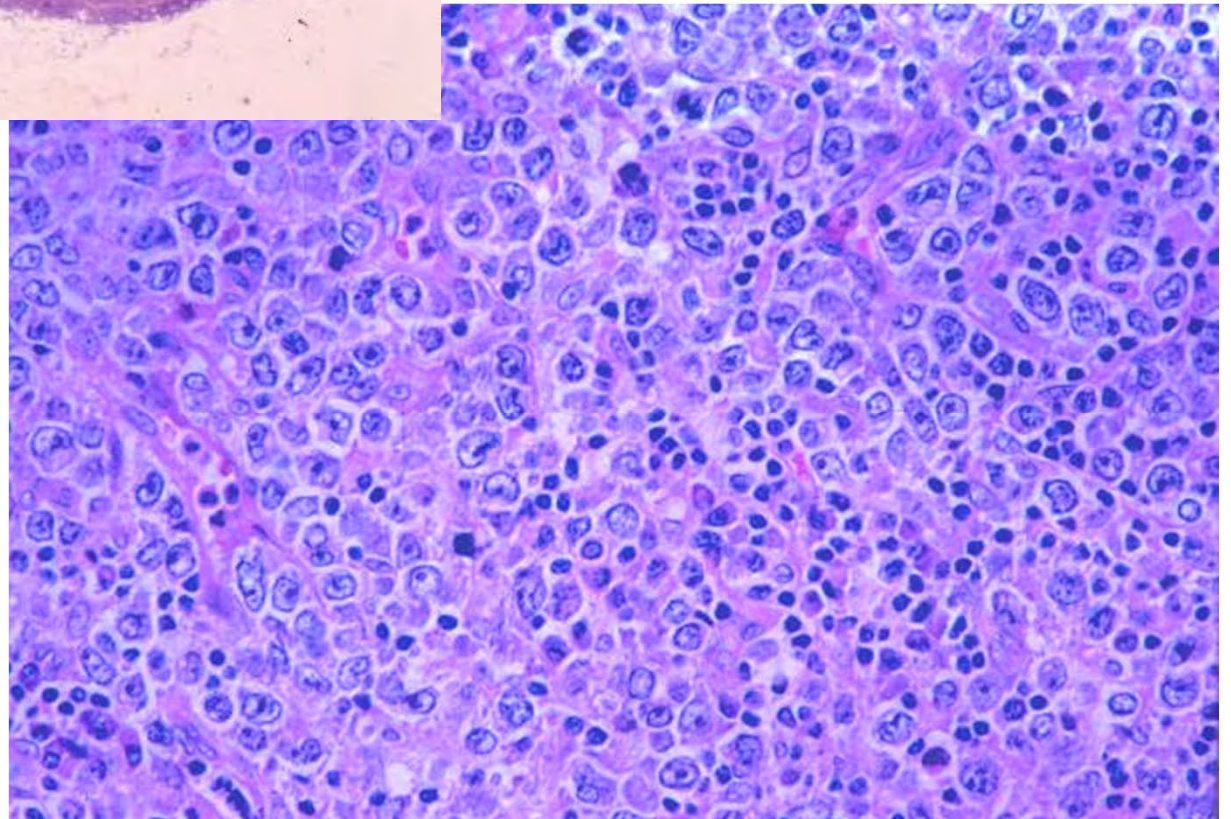


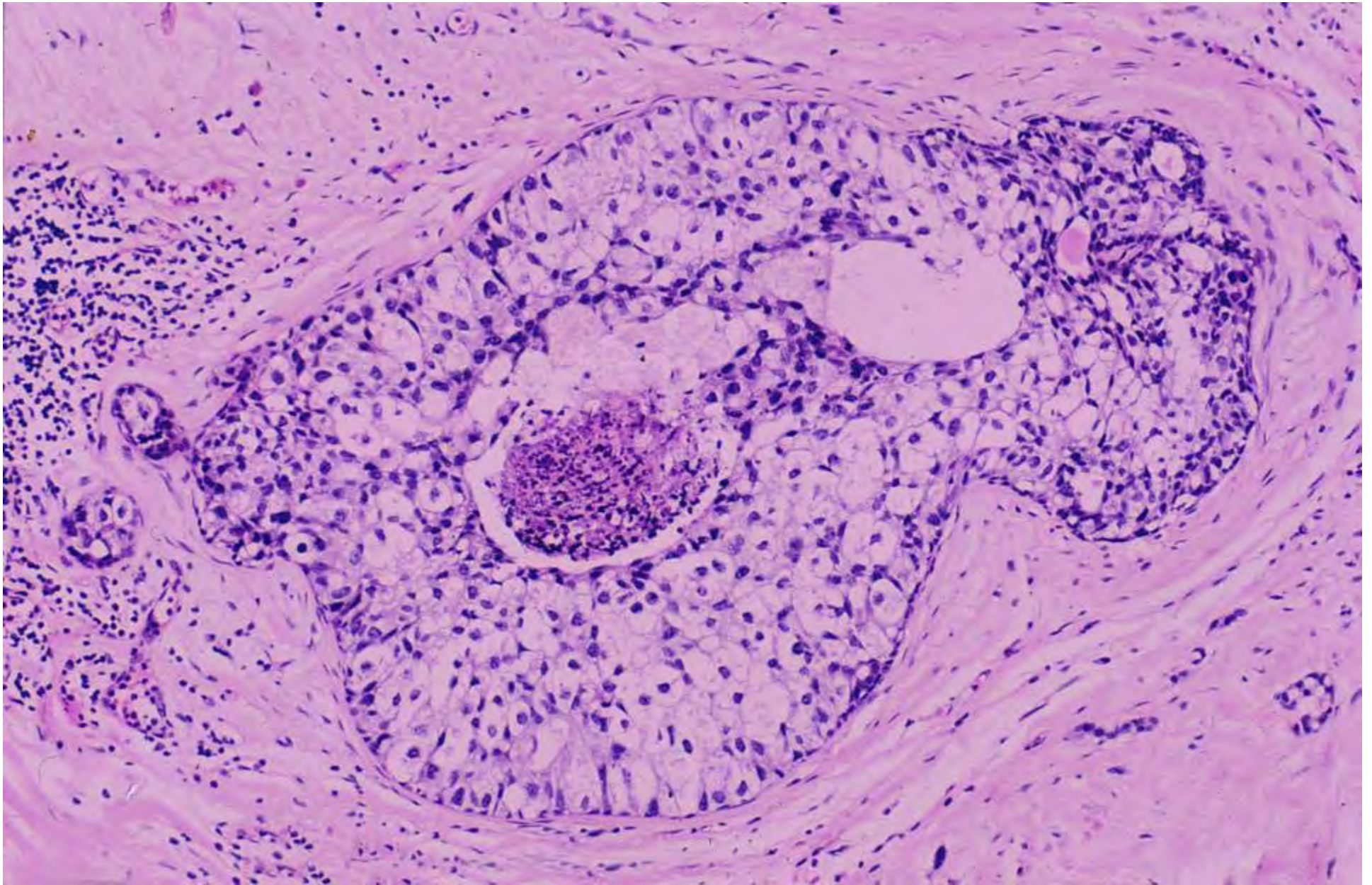
Enlarged, matted lymph nodes.



Diffuse effacement of nodal architecture – replacement by sheets of malignant cells.

Sheets of large lymphocytes with coarse chromatin and prominent nucleoli. Some smaller benign lymphocytes are seen admixed with the malignant cells.





DCIS (Ductal carcinoma-in-situ)

Central Nervous System

CENTRAL NERVOUS SYSTEM

Case 1 : Glioblastoma multiforme

Case 2: Meningioma

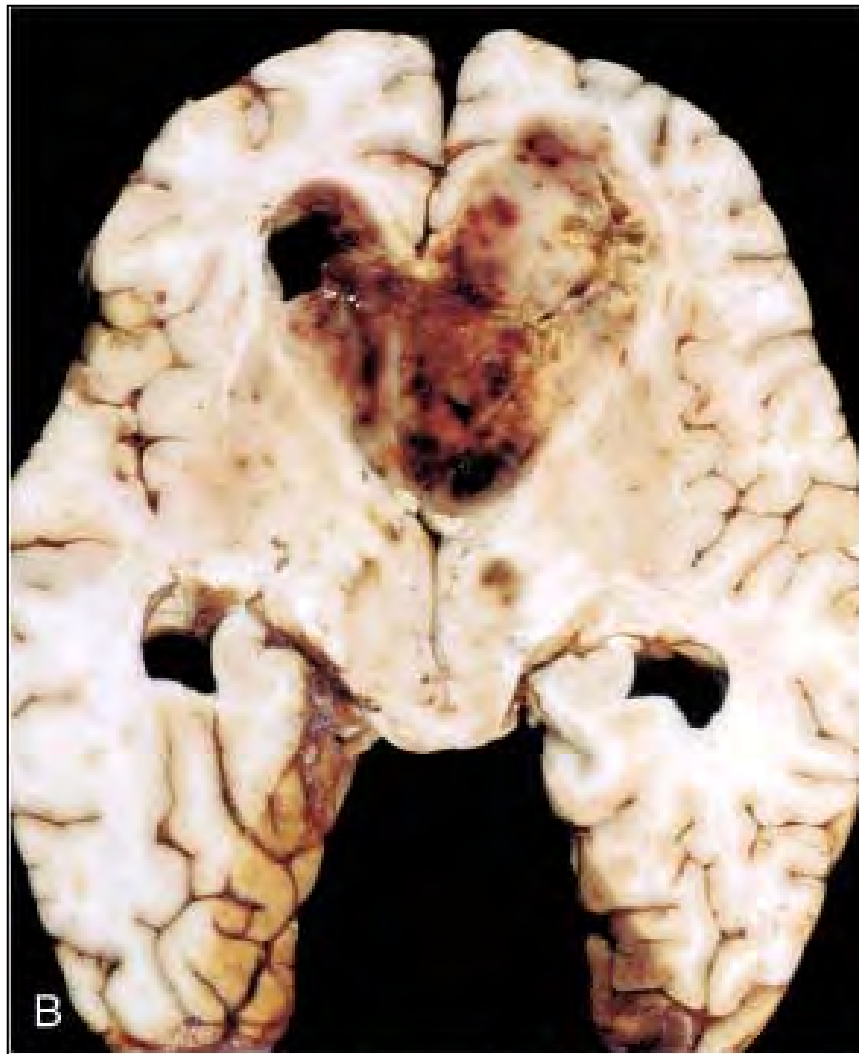
Case 3: Medulloblastoma

Case 4: Metastatic adenocarcinoma

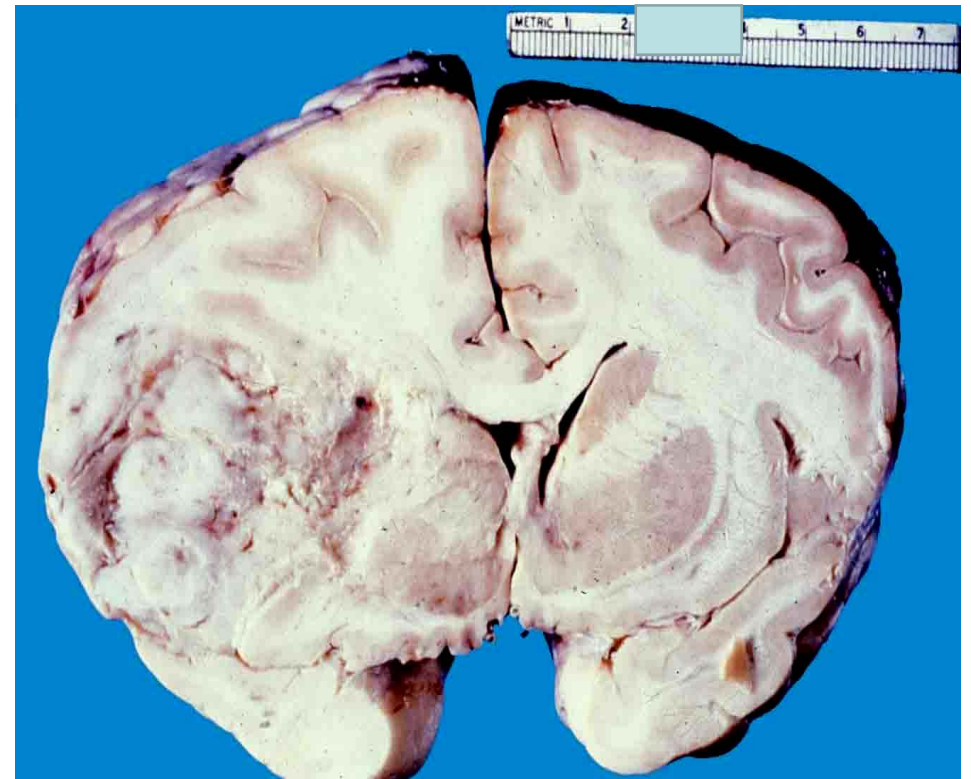
Case 5 : Cerebral infarct

Case 1 : Glioblastoma multiforme

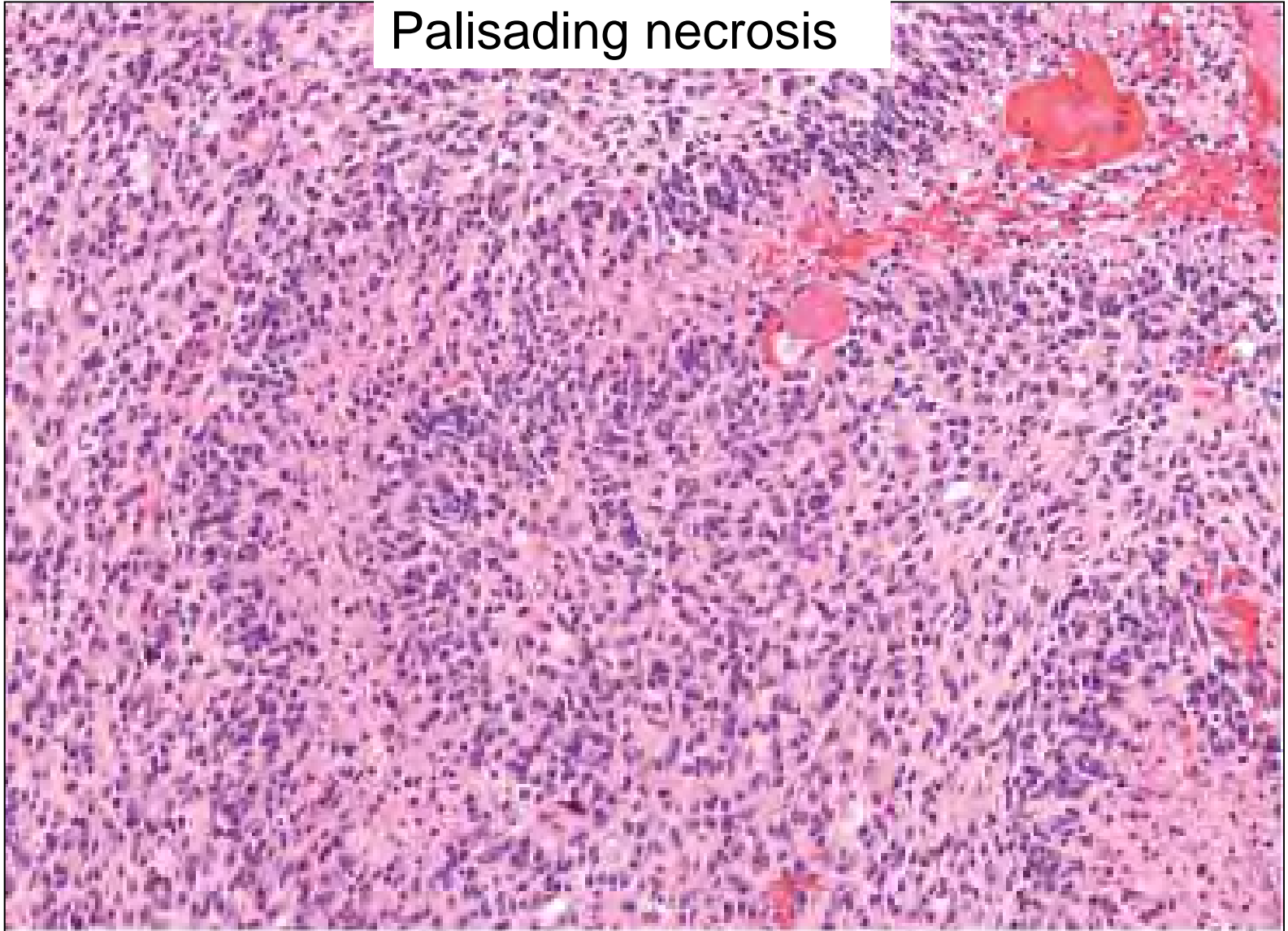
A 57 year old man complains of worsening headache and nausea.

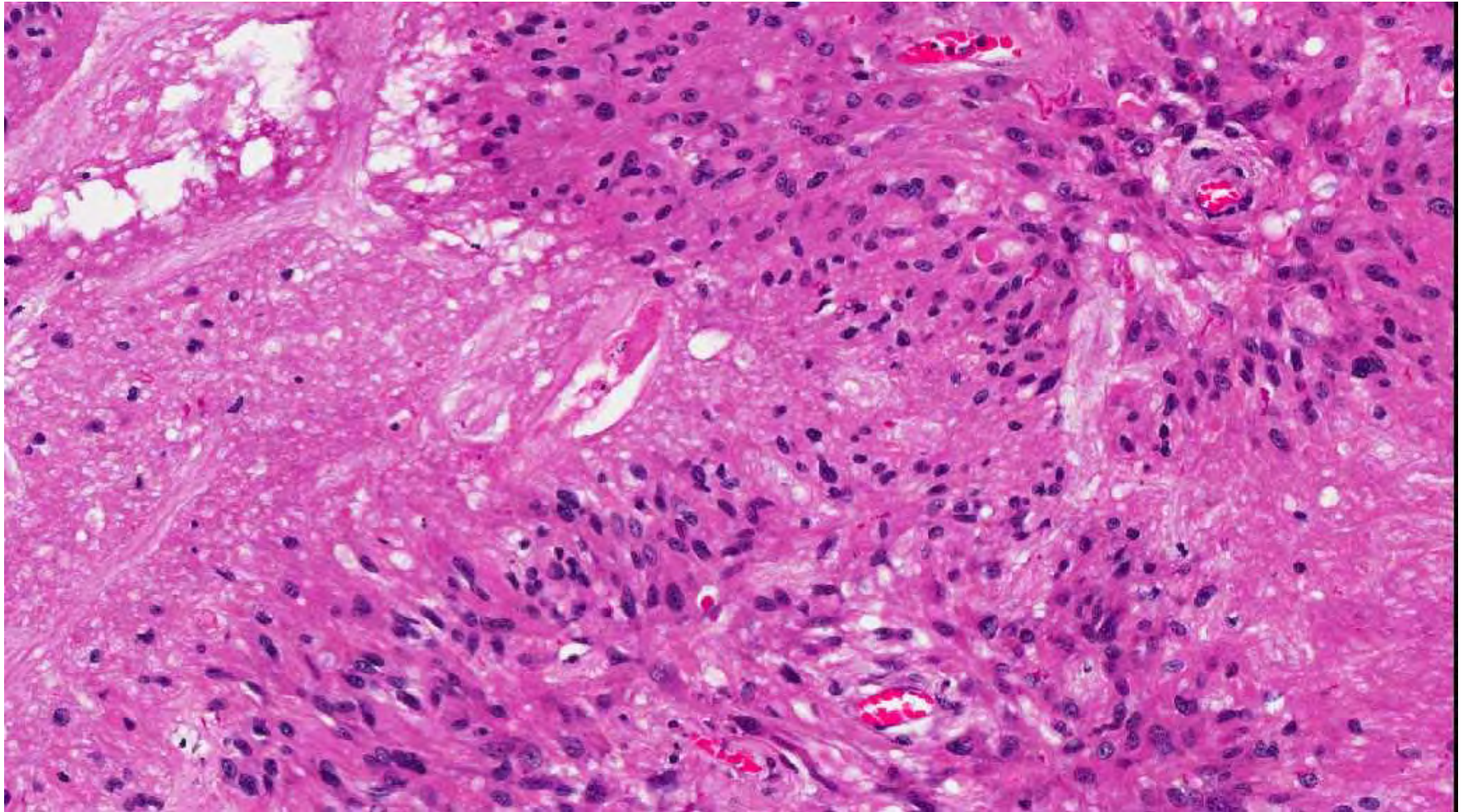


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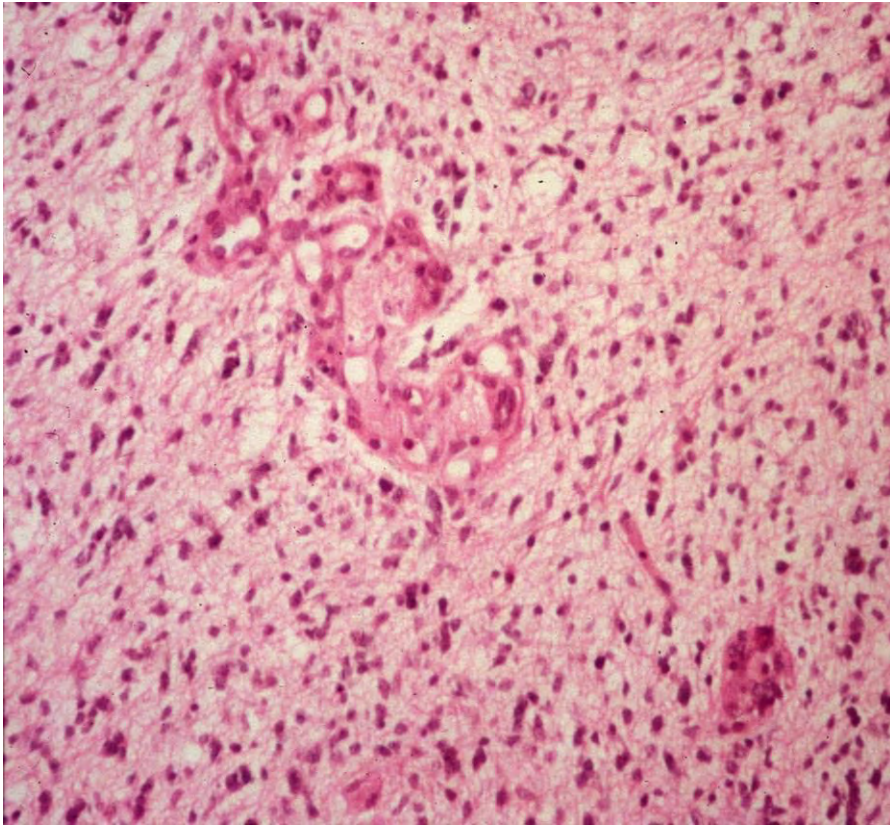


Palisading necrosis



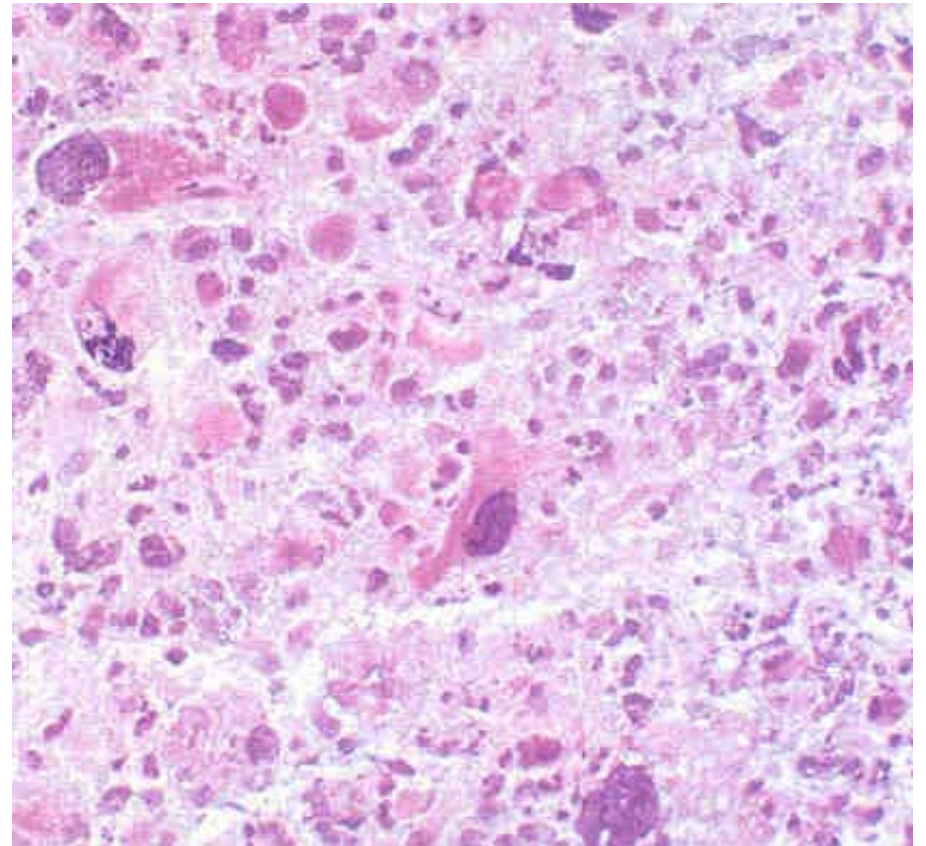


Palisading necrosis



- Microvascular proliferation

- Marked cellular pleomorphism
- Mitoses

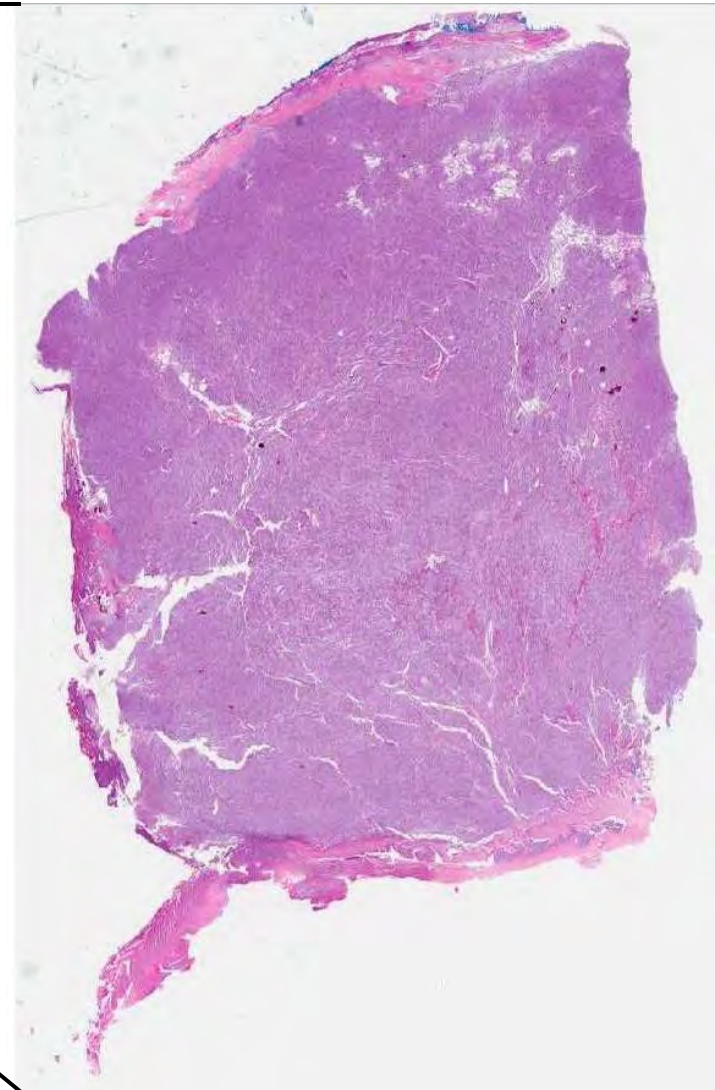
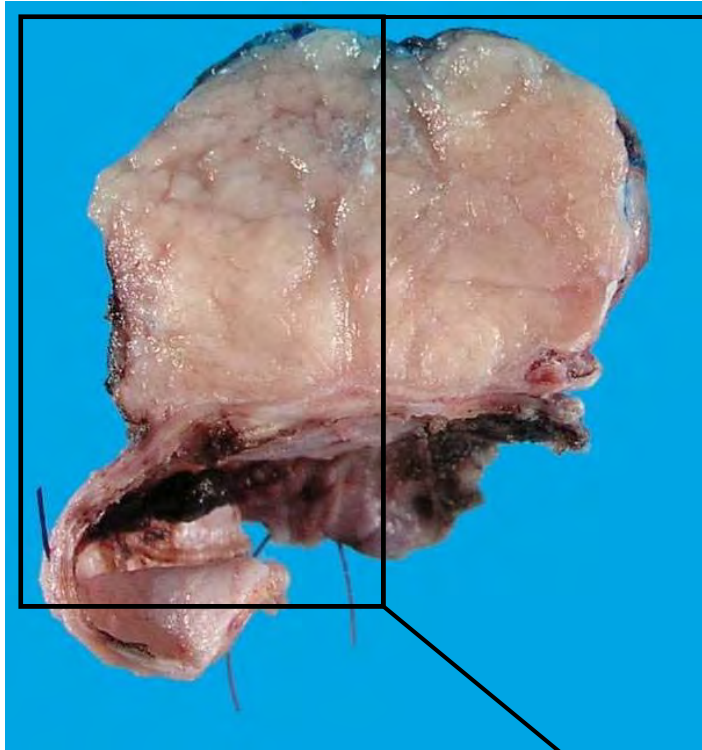


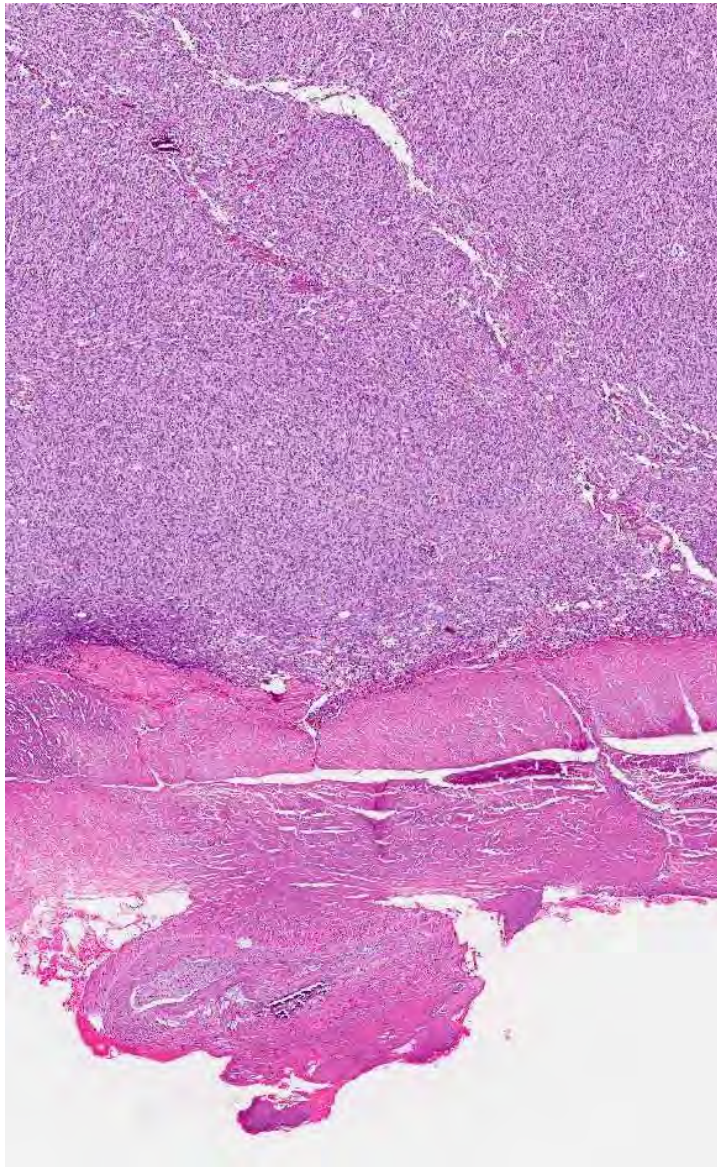
Case 2 : Meningioma

A 60 year old lady complained of headache and seizures, over a long period.



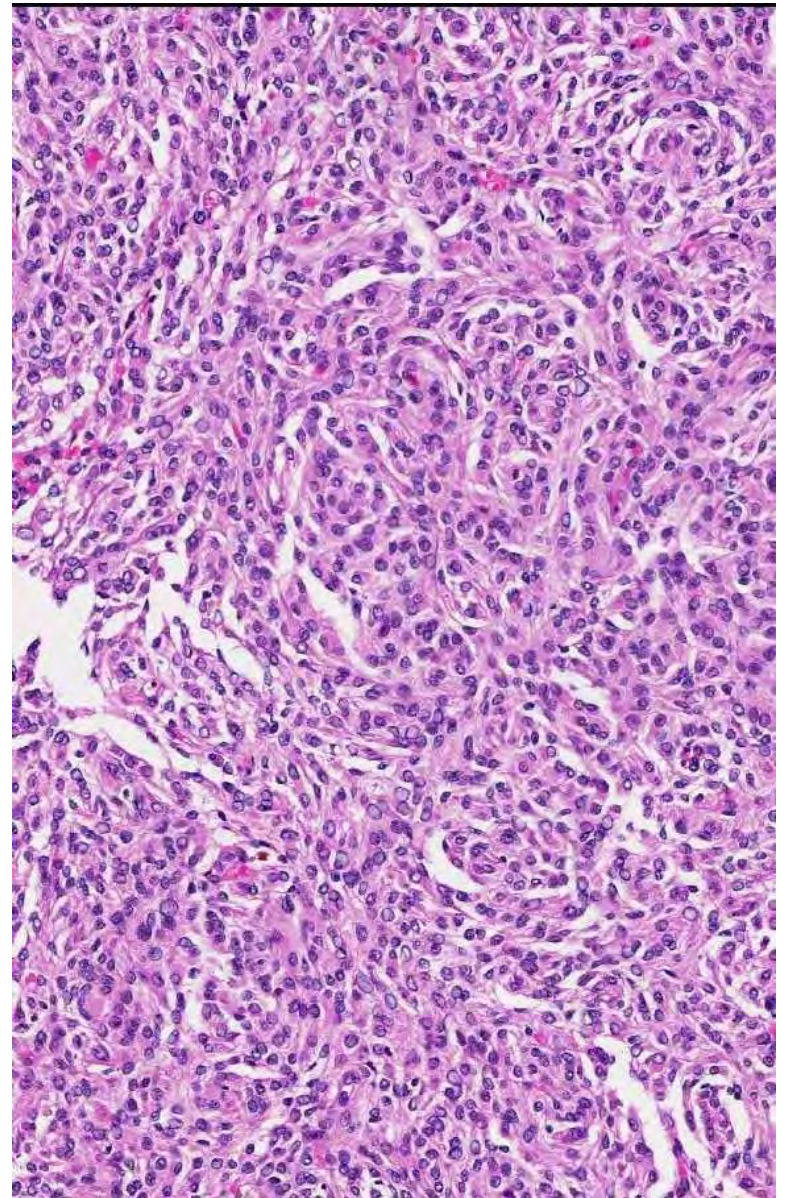
Microscopy



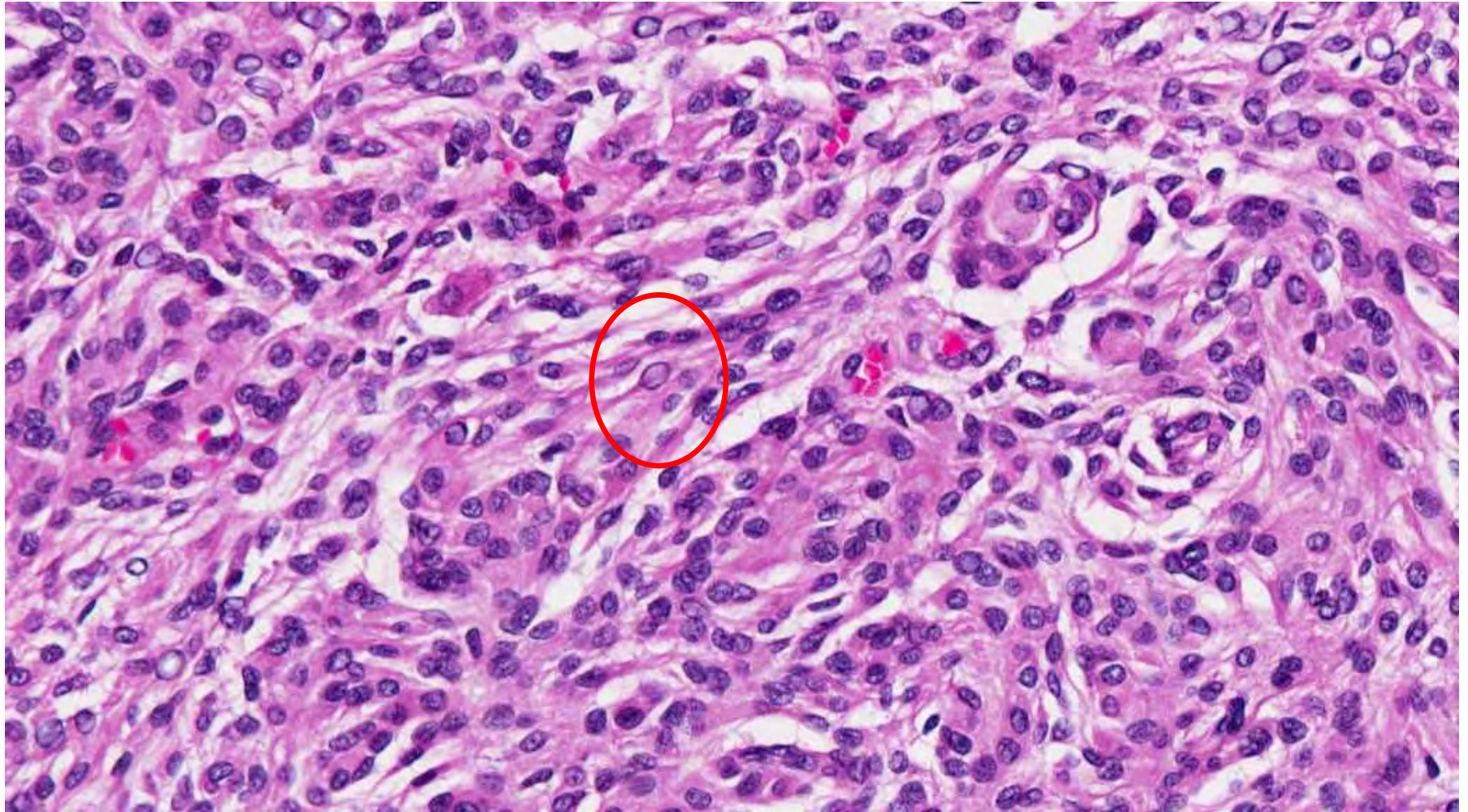


Tumour

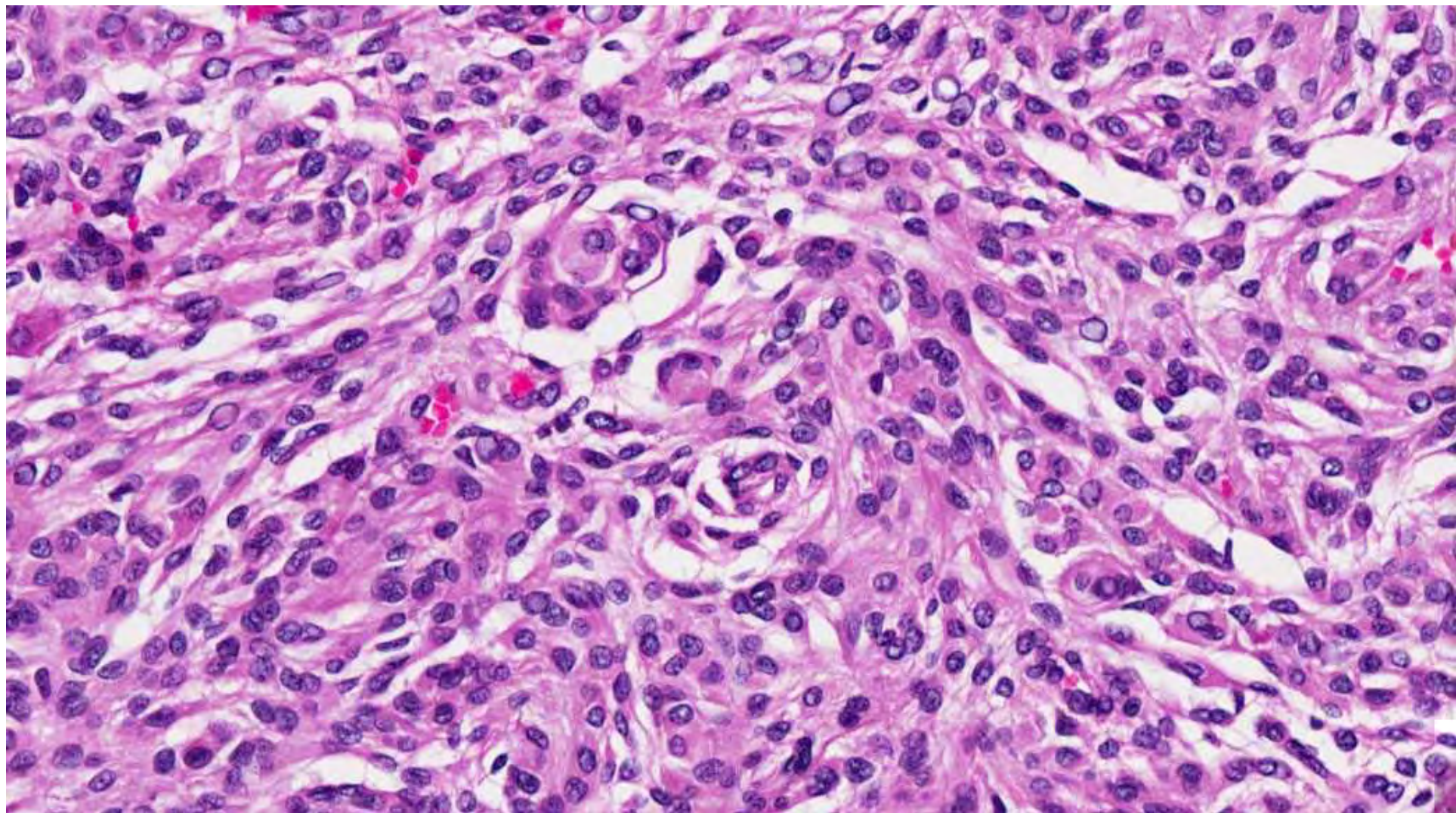
Dura

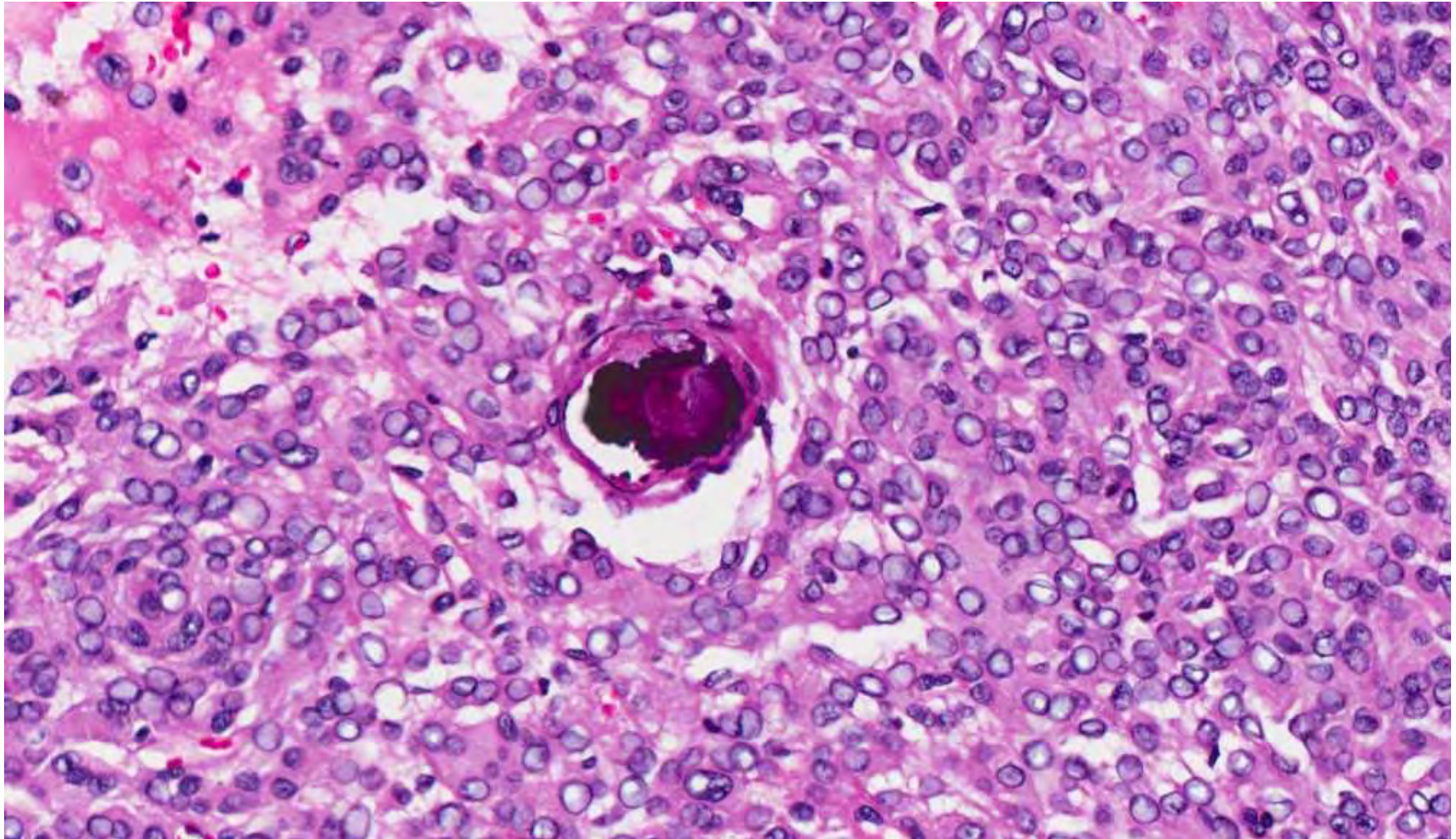


Meningoethelial whorls



- Regular, ovoid nuclei with fine chromatin
- Nuclear inclusions

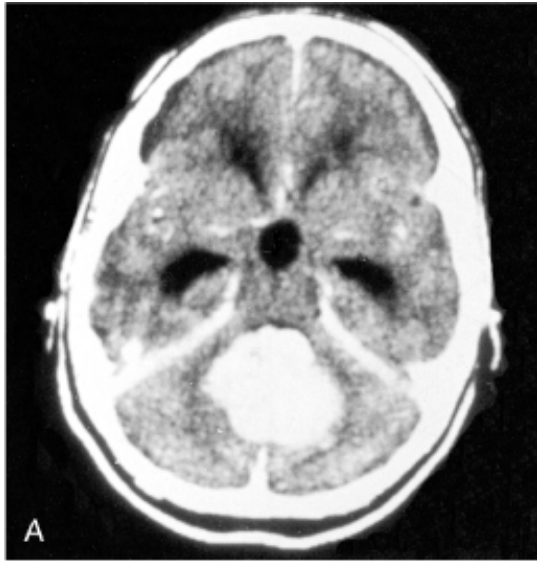




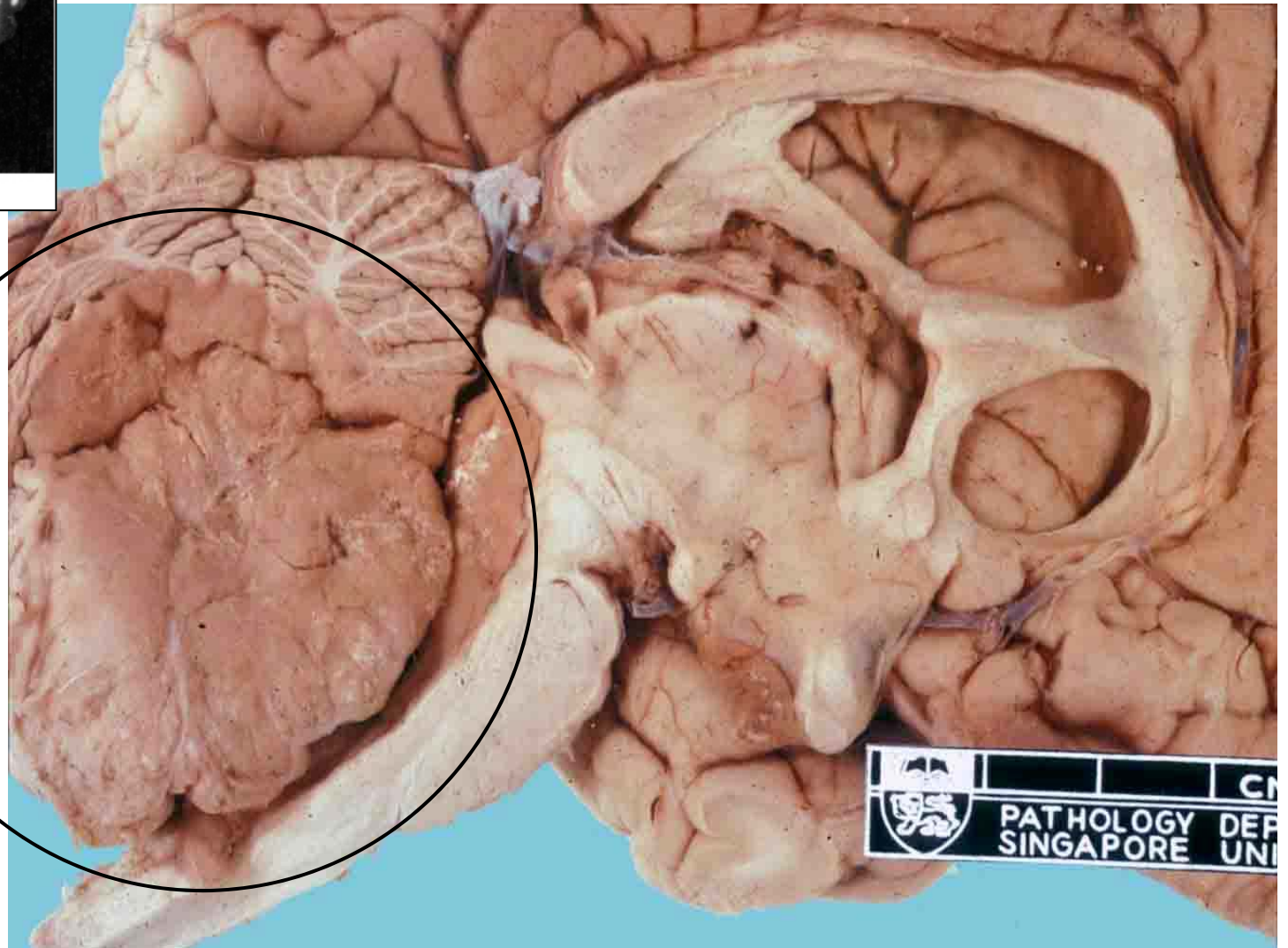
- Psammoma bodies

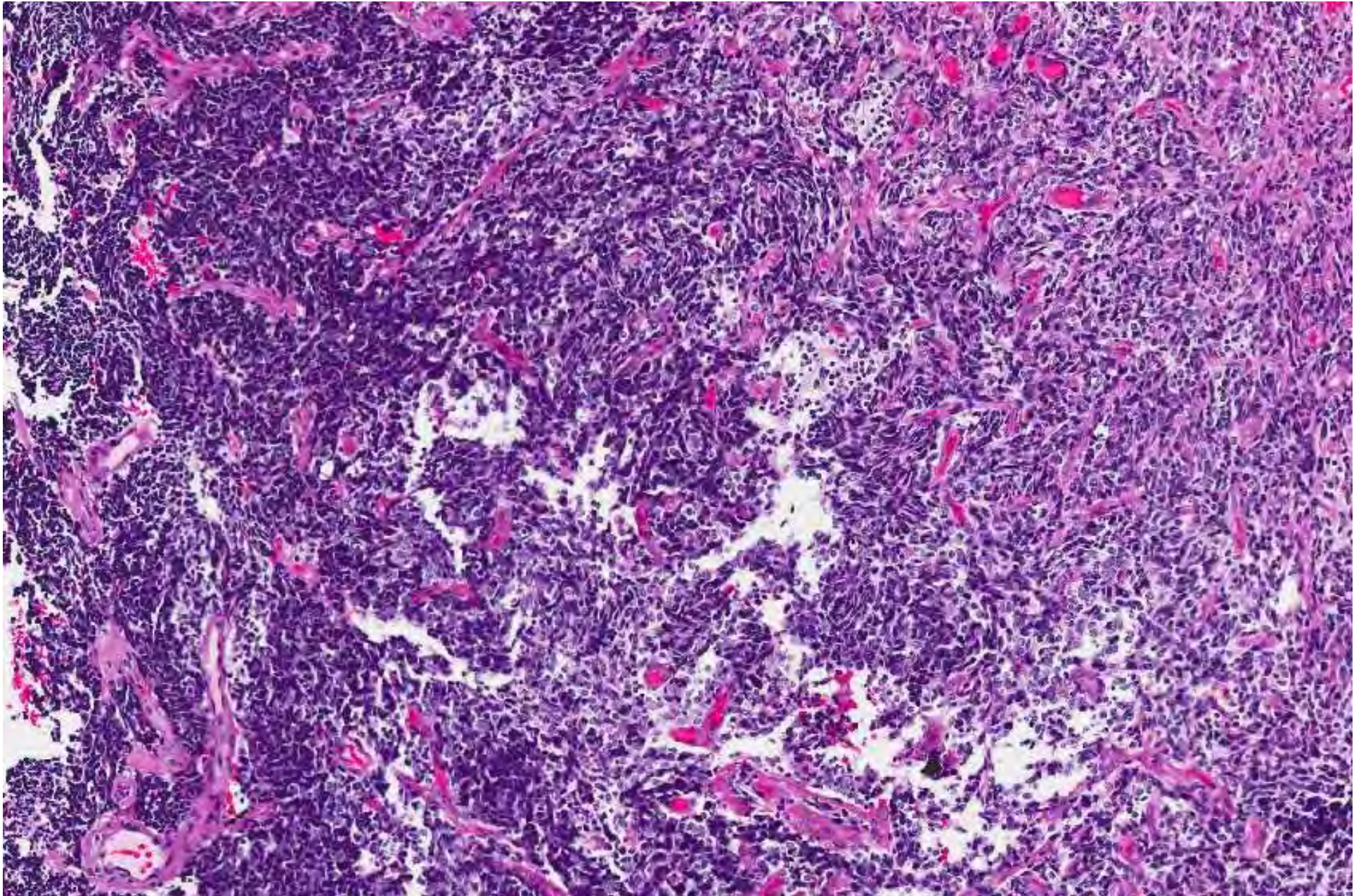
Case 3 : Medulloblastoma

A 7 year old boy has been experiencing unsteady gait and truncal ataxia.

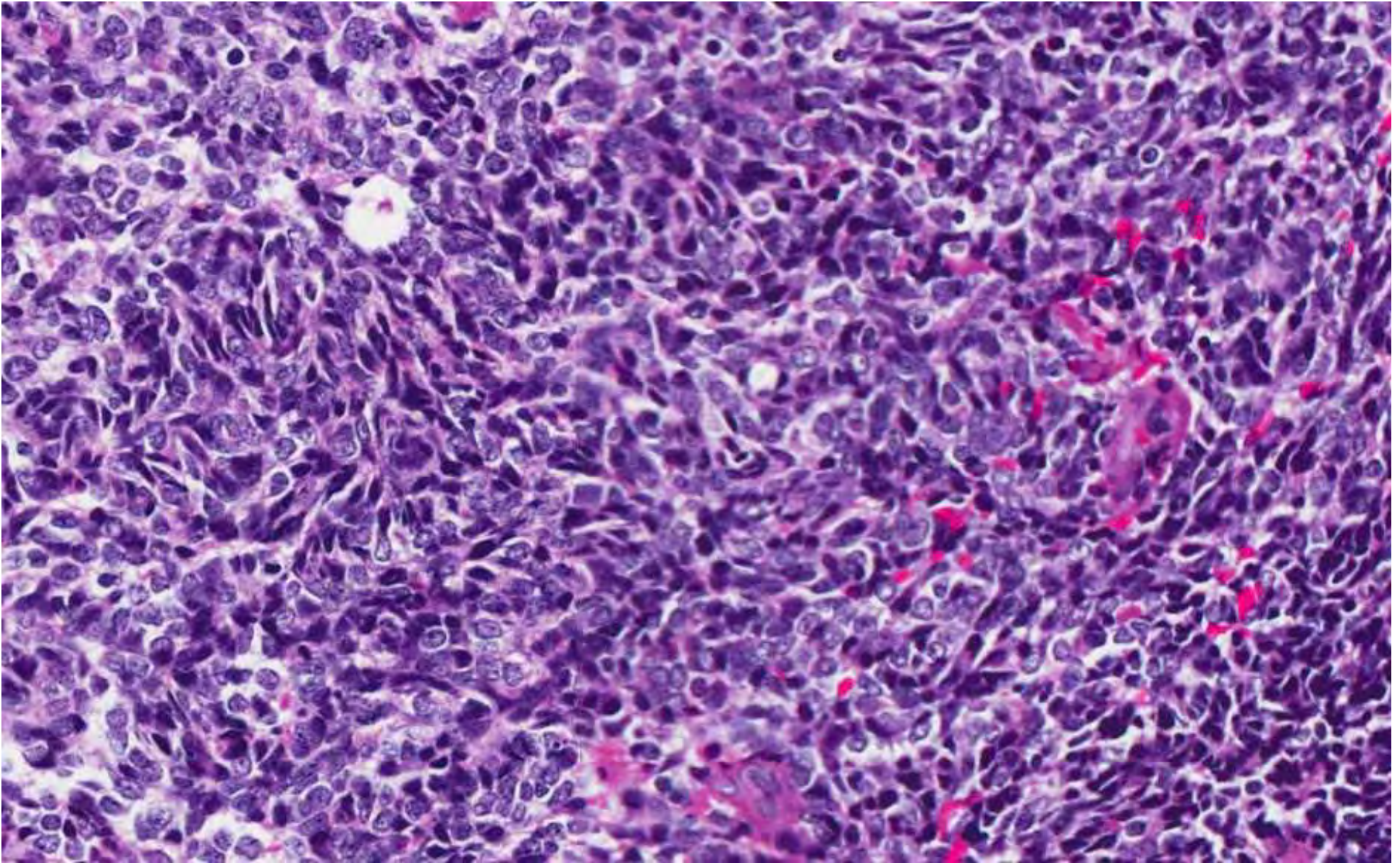


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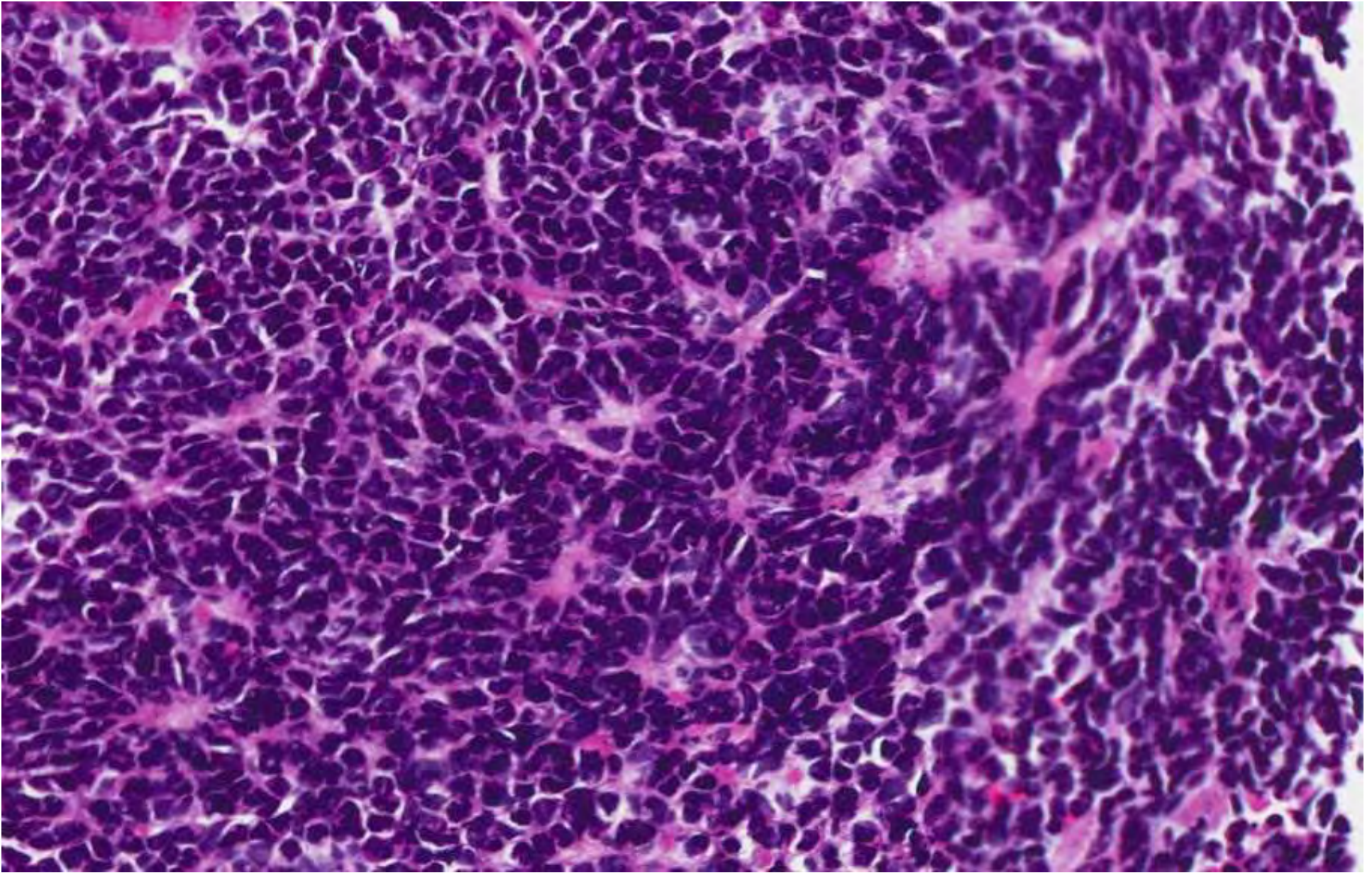




- Highly cellular , necrosis
- “Small blue round cell tumour”



- Carrot shaped nuclei
- High N/C ratios, hyperchromasia

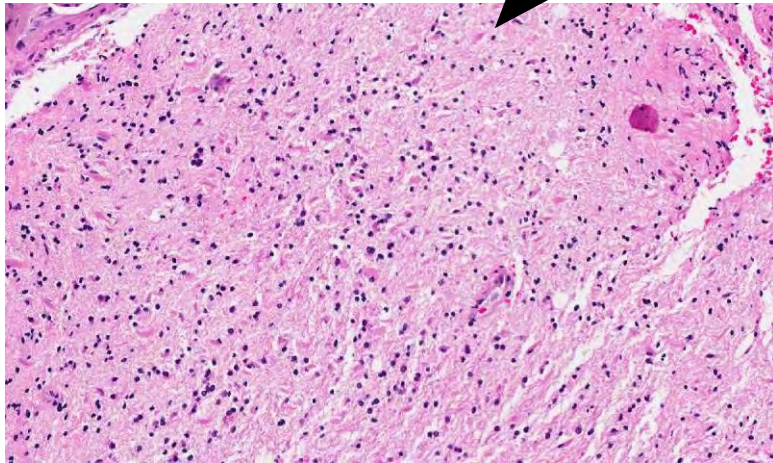
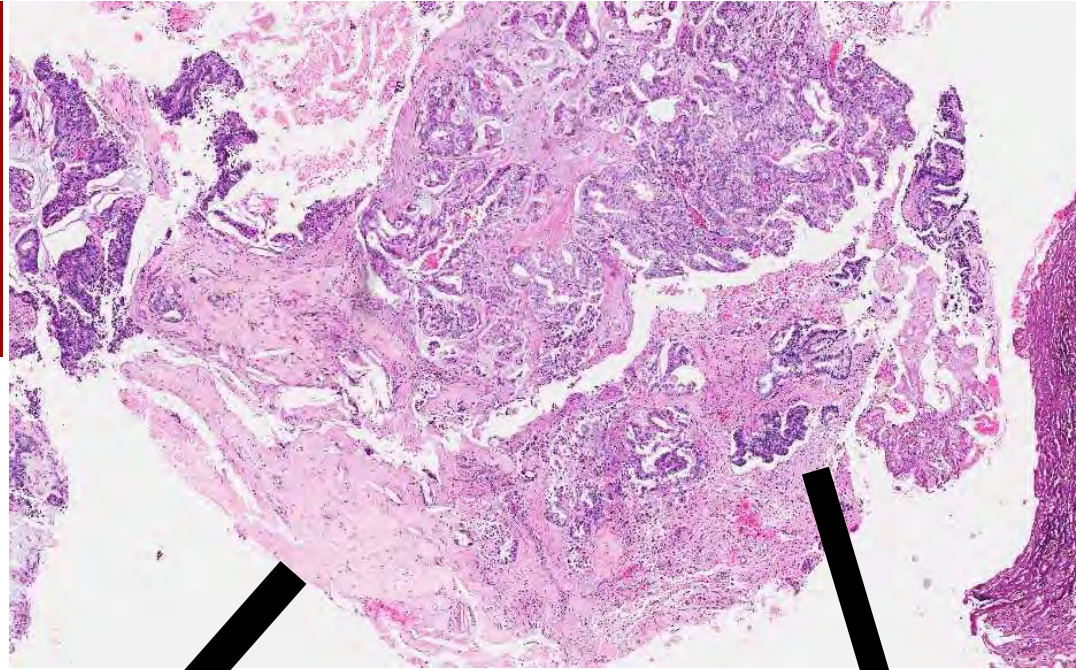
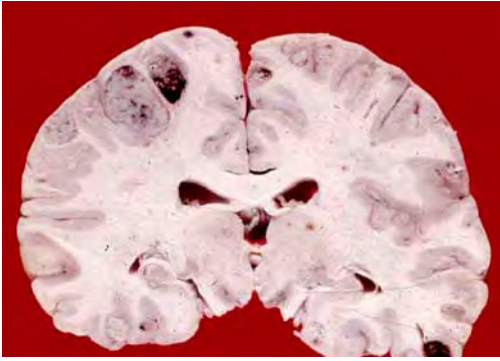


- Rosettes

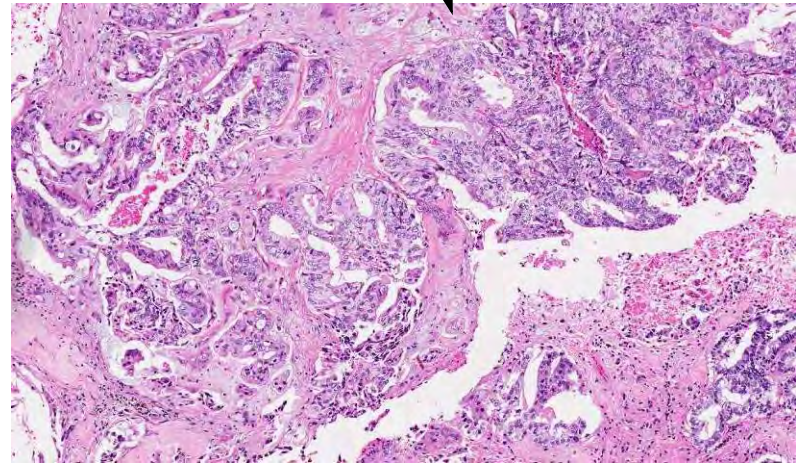
Case 4 : Metastatic adenocarcinoma

*A 66 year old lady complained of
headache and seizures, and
progressive loss of weight. She has a
past history of breast carcinoma.*

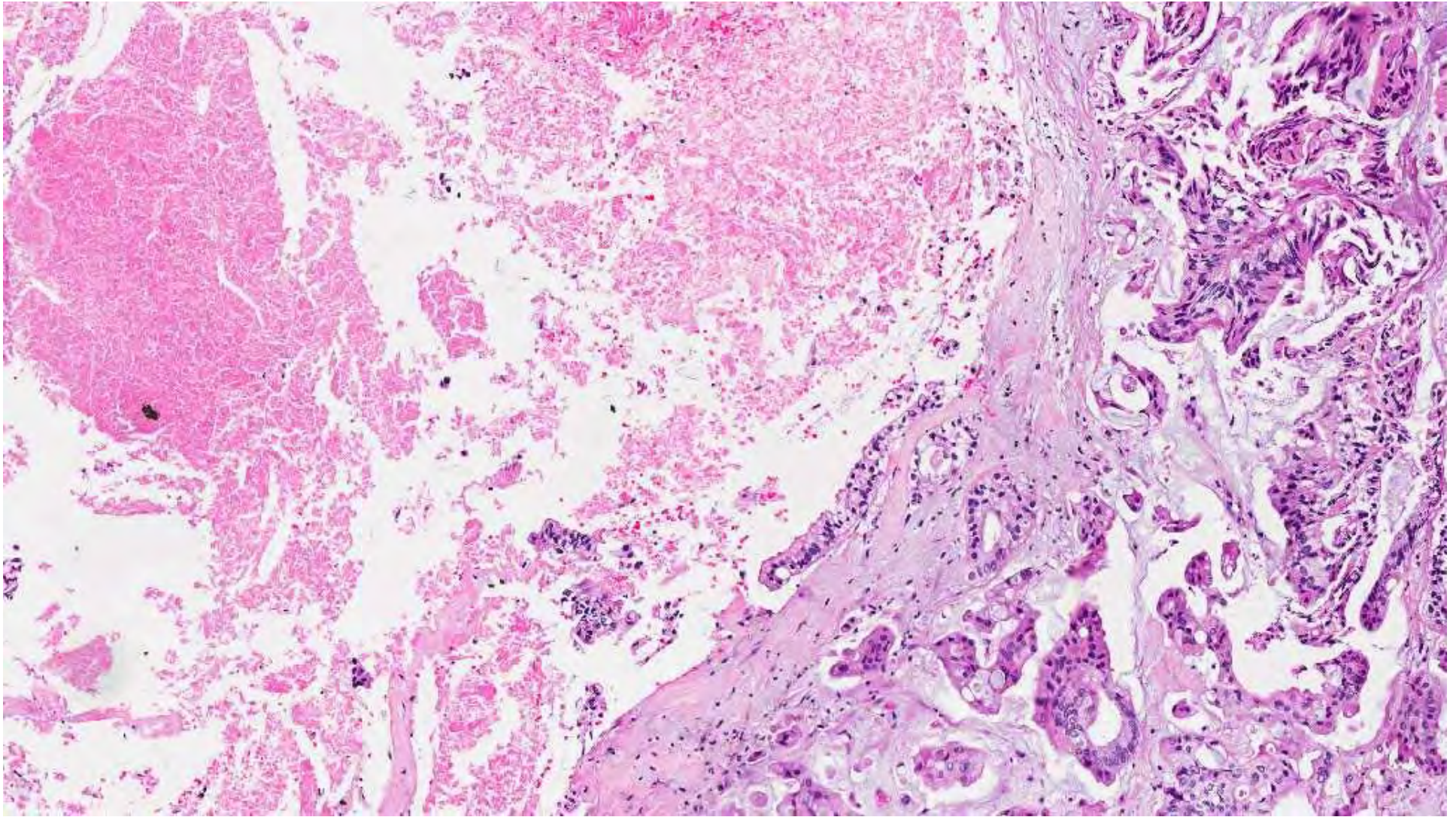




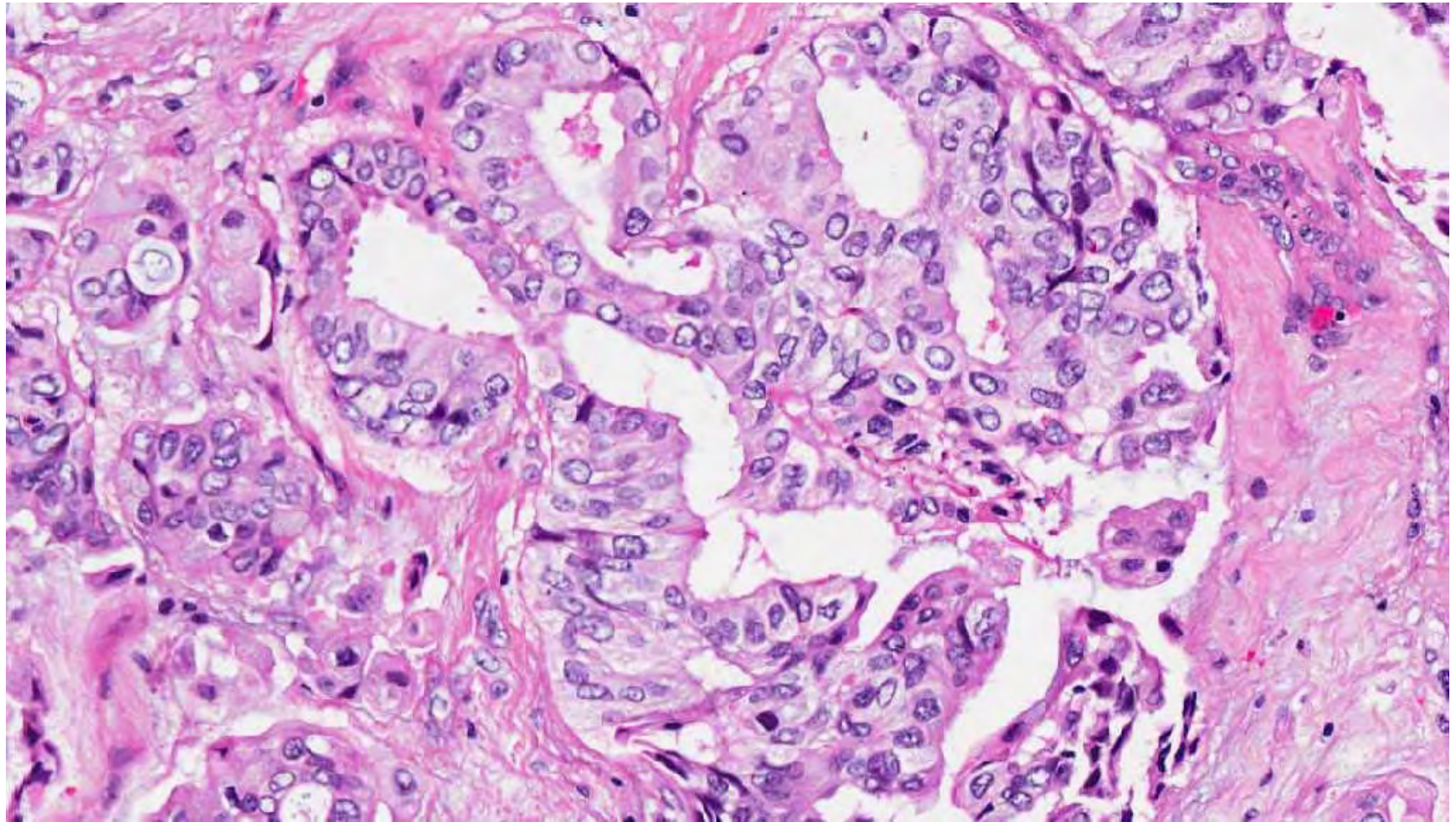
- Reactive gliosis

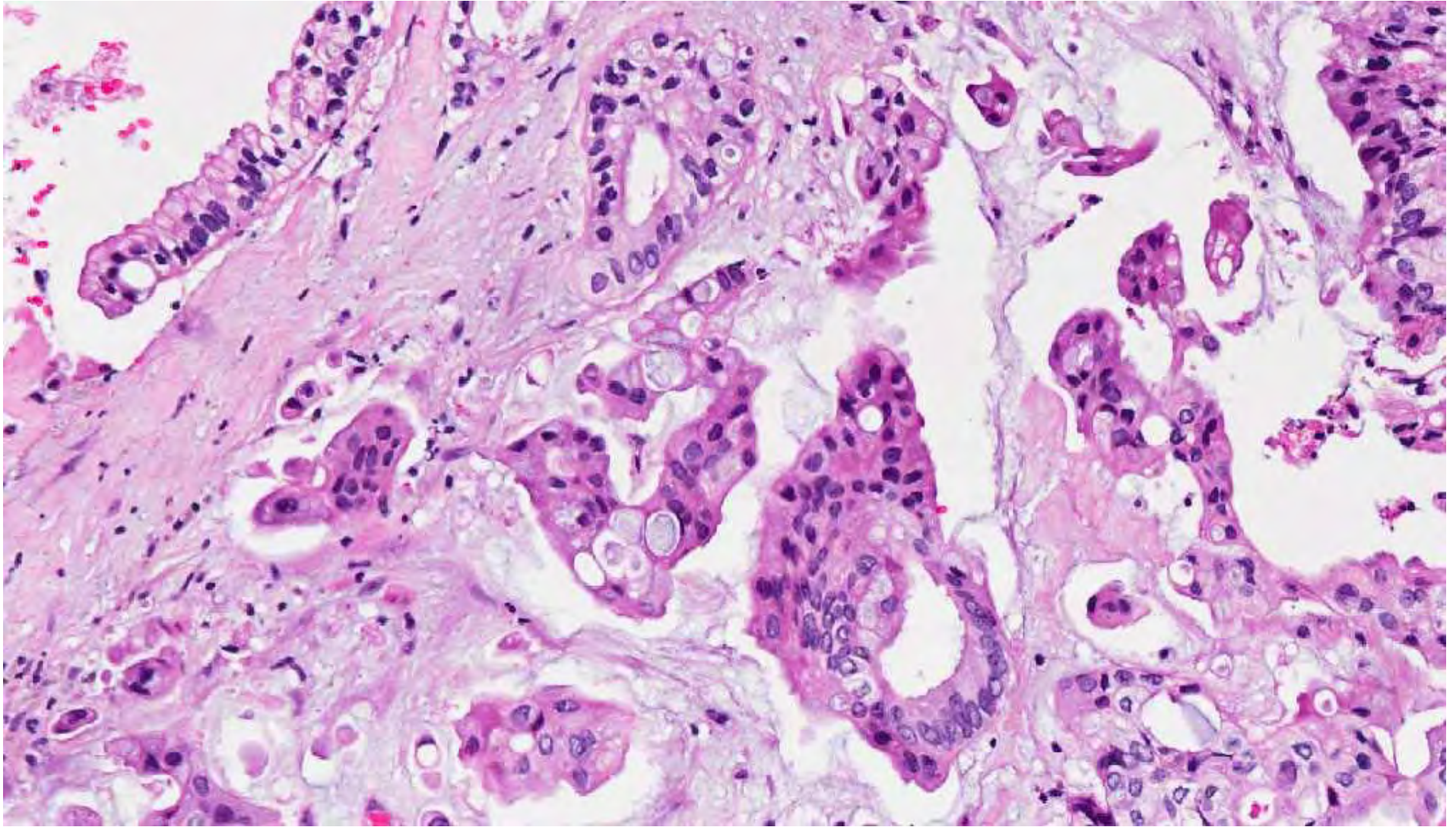


- Tumour



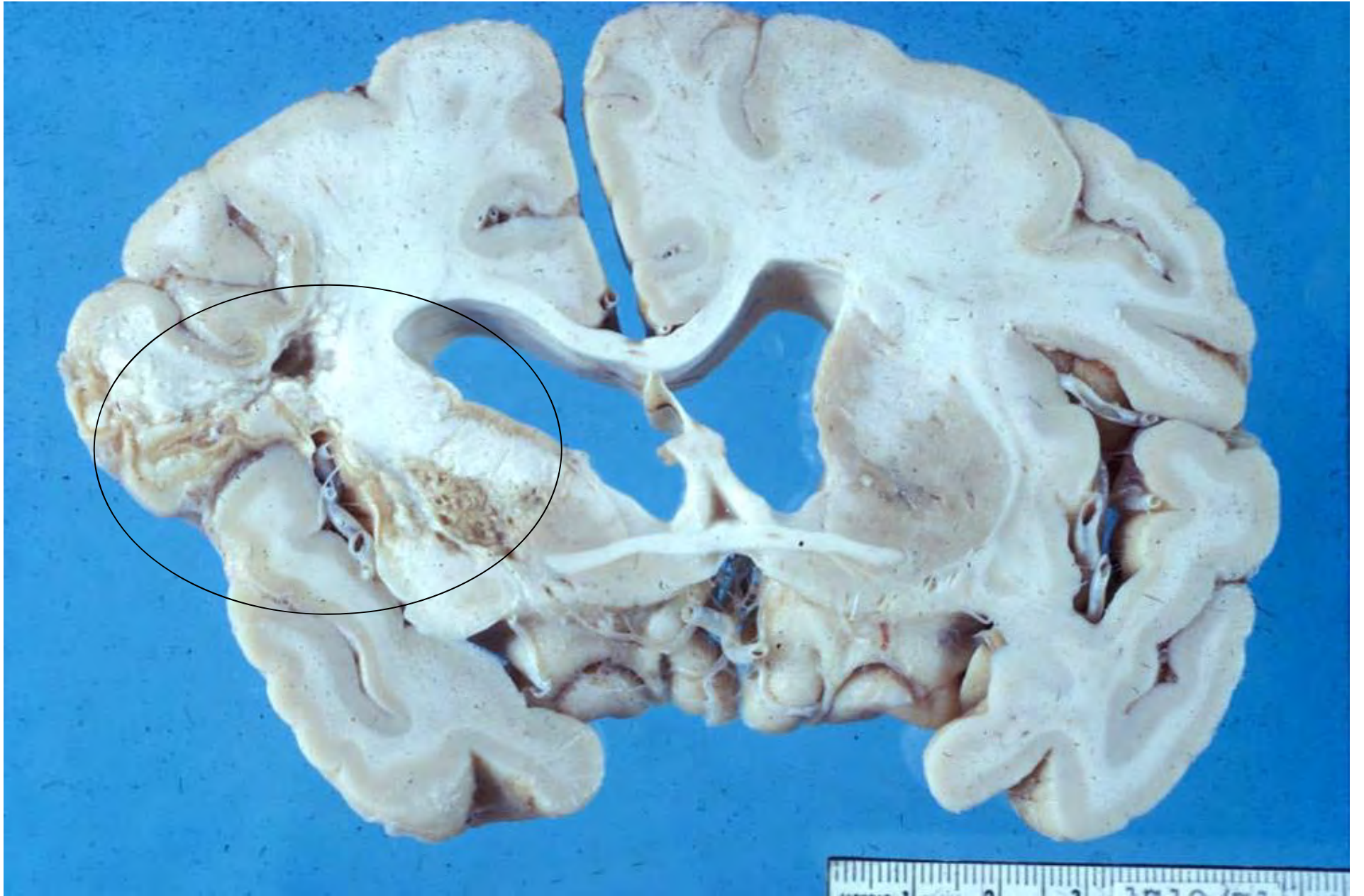
- Tumour
 - Gland formations
 - Necrosis





- Intracytoplasmic mucin
- Columnar cells

Case 5 : Cerebral Infarct (Liquefactive necrosis)



Brain: Liquefactive necrosis

