

KING SAUD UNIVERSITY
College of Medicine
Department of Pathology

PRACTICALS FOR COURSE PATH 211 (NEW CURRICULUM)

Histopathology Practicals and slide numbers

Note:

The following is a guideline of the main microscopic features to the provided glass slides and is not meant to be a full description. Students are advised to examine the microscopic appearances and to draw labelled diagrams. Different sections may be used for examination.

Cell injury:

[1] *Fatty change of the liver: Section of liver shows:*

- Normal lobular architecture.
- The liver cells are distended by clear vacuoles of dissolved fat with displacement of nuclei to the periphery.
- Fatty cysts may be seen.
- No inflammation and no fibrosis.

[2] *Amyloidosis of the liver: Section of the liver shows:*

- Deposits of homogenous eosinophilic amyloid material in the walls of blood sinusoids and between the groups of liver cells.
- Liver cells are compressed, atrophied and may disappear in areas.
- Some fatty change is also seen.

[3] *Amyloidosis of the kidney:*

- Sections from this renal biopsy show a core of renal tissue containing seven glomeruli which are showing varying degrees of replacement by homogenous pink amyloid deposits. The glomeruli are also hypocellular with obliteration of some glomerular vessels. The interstitium is slightly fibrotic and contains chronic inflammatory cells. Some blood vessels in the interstitium also show deposition of amyloid material.

[4] *Dystrophic calcification: Section of skin shows:*

- Irregular blue granular deposits of calcium in the dermis surrounded by fibrous tissue and foreign body giant cell reaction.

Inflammation and Repair:

[5] *Fibrinous pericarditis: Section of heart shows:*

- The pericardium is distorted by thick irregular layer of pinkish fibrinous exudate with some red cells and inflammatory cells.
- The subpericardial layer is thickened by edema and shows dilated blood vessels, chronic inflammatory cells and areas of calcification.

[6] *Acute suppurative appendicitis: Cross section of appendix shows:*

- Accumulation of inflammatory exudate and pus cells in the lumen and the mucosa is ulcerated.
- All layers of the appendix wall show edema, dilated and congested blood vessels and infiltration by many neutrophils.
- Fibrino-purulent exudate is present on the serosal surface.

[7] *Foreign body reaction (pilonidal sinus): Section of skin shows:*

- A sinus tract lined by an inflammatory granulation tissue in the dermis.
- The lumen of sinus and wall contain large number of hair shafts with foreign body giant cells, lymphocytes, macrophages & neutrophils.

[8] *Granulation tissue: Section of fragments of edematous, loose connective tissue shows:*

- Many small newly formed capillaries lined by plump endothelial cells.
- Proliferation of fibroblasts is seen.
- Inflammatory cells including macrophages, lymphocytes, plasma cells and neutrophils in the oedematous stroma.
- Pink homogenous collagen fibres may be identified.

Circulatory disorders:

[9] *Chronic venous congestion of the liver: Section of liver shows:*

- The central portion of liver lobules show congestion and dilatation of central veins and blood sinusoids, with atrophy and necrosis of liver cells.
- Kupffer cells contain few brown haemosiderin pigment granules.

[10] *Chronic venous congestion of the lung: Section of lung shows:*

- The alveolar walls are thickened by dilated and engorged capillaries.
- The alveoli contain edema fluid, red blood cells and large alveolar macrophages (heart failure cells), which are filled with haemosiderin pigment derived from red cells breakdown.
- In the late stage some fibrous tissue may also be seen.

[11] *Organizing thrombus: Cross section of a blood vessel shows:*

- The lumen is occluded by thrombus which consists of alternate layers of platelets with fibrin thread and clotted blood (line of Zahn).
- Organization is seen at the periphery of thrombus which also shows formation of small capillaries & fibroblasts with chronic inflammatory cells.
- Recanalization is seen at one side.

[12] *Myocardial infarction: Section of myocardium shows:*

- Patchy coagulative necrosis of myocardial fibres. The dead muscle fibres are structureless and hyaline.
- The necrotic muscle fibres are pale with loss of nuclei and striations.
- Infiltration of neutrophils may be seen.
- Later granulation tissue formation and fibrosis.

[13] *Infarcted kidney: Section of kidney shows:*

- A cortical infarct showing coagulative necrosis of glomeruli, tubules and interstitial tissue with loss of cell nuclei.
- The haemorrhagic zone at the periphery of the infarct shows dilated and congested blood vessels and cellular infiltrate by neutrophils, red blood cells and lymphocytes.

Granulomas:

[14] *Tuberculous lymphadenitis: Section of a lymph node with connective tissue capsule and lymphoid tissue shows:*

- Many round and oval tubercles/ granulomas with or without central caseation that appears structureless, homogenous and pink in colour.
- The granulomas consists of epithelioid cells, few Langhan's giant cells (large cell with multiple peripheral nuclei) and peripheral rim of lymphocytes.

[15] *Miliary tuberculosis of the lung: Section of lung shows:*

- The alveolar septae contain many tubercles with or without structureless granular pinkish caseation.
- Tubercles consist of epithelioid cells, few Langhan's giant cells and peripheral rim of lymphocytes.

[16] *Lepromatous leprosy of the skin: Section of the skin shows:*

- Extensive cellular infiltrate in the dermis consisting of large macrophages (Lepra cells).
- The infiltrate causes the destruction of the cutaneous appendages and extends into subcutaneous fat.
- A narrow clear zone separates the flattened epidermis from the infiltrate.

[17] *Bilharziasis of the rectum: Section of fragments of rectal mucosa shows:*

- Many Bilharzial ova with yellow brown shells in mucosa and submucosa surrounded by fibrosis and chronic inflammatory cells consisting of lymphocytes, plasma cells and many eosinophils.
- Few granulomas are seen around the ova.

[18] *Para-vaginal Schistosomiasis:*

- The sections show a mass of fibrovascular connective tissue containing several histiocytic and giant cell granulomas at the centre of which Schistosoma haematobium eggs are identified. Many eosinophils are also seen surrounding the described granulomas.

Hyperplasia:

[19] *Cystic hyperplasia of the endometrium: Section shows fragments of endometrial tissue and blood clot:*

- The endometrial glands are increased in number and show marked variation in size and shape and some are cystically dilated.
- The glands are lined by more than one layer of tall columnar epithelium with many mitoses.
- The stroma in between the glands is increased and cellular.

[20] *Cystic hyperplasia of the breast: Section of breast shows:*

- Adenosis: Increased in number and size of glands.
- Epitheliosis: Epithelial hyperplasia of ducts with occasional papillae formation.
- Cystic dilatation of some ducts.
- Few cystic ducts are lined by large cells with eosinophilic cytoplasm (apocrine metaplasia).
- Dense hyalinized fibrous tissue around ducts with scattered lymphocytes.

Benign tumours:

[21] *Nevus: Section of skin shows:*

- Nests and clusters of small round or spindle shaped nevus cells with few melanophages in the upper dermis.
- The cells contain varying amount of brown melanin pigment.
- No junctional activity.

[22] *Leiomyoma: Section of tumour shows:*

- A well demarcated tumour mass in the muscle coat of uterus without a definite capsule.
- Tumour consists of interlacing bundles of smooth muscle and fibrous tissue.
- The muscle cells are spindle shaped with elongated nuclei and eosinophilic cytoplasm.

[23] *Chondroma: Section of tumour shows:*

- Lobules of mature cartilage separated by thin trabeculae of fibrous tissue with blood vessels.
- Lobules consists of mature cartilage cells irregularly distributed through pale blue homogenous matrix and are contained within the lacunar spaces singly, in pairs or in tetrads.
- Few bony trabeculae are included in the tumour.

[24] *Haemangioma: Section of the skin shows:*

- A tumour mass in the dermis which consists of large number of vascular spaces of varying shapes and sizes separated by connective tissue stroma.
- Vascular spaces are lined by the flattened endothelial cells and some contain blood.
- Delicate connective tissue stroma separates the capillary vascular spaces.

[25] *Fibroadenoma of the breast: Section shows breast tumour:*

A tumour shows proliferation of both glandular tissues and fibrous tissue.

- (a) Proliferating fibrous tissue is invaginating the ducts causing elongation, compression and distortion of the ducts which have slit-like lumen (intracanalicular).
- (b) At places fibrous tissue is arranged around the ducts (pericanalicular) and does not invaginate.

Malignant tumours:

[26] *Basal cell carcinoma of skin: Section of skin shows:*

- Normal epidermis with appendages on both ends of the section.
- Epidermis shows an ulcer covered by inflammatory exudate.
- Dermis is infiltrated by masses of neoplastic basal cell of variable sizes separated by connective tissue stroma.
- The neoplastic cells are small, dark staining and show little pleomorphism and palisading at periphery of masses.
- Some masses show cystic degeneration and melanin pigment
- Few mitosis are seen.

[27] *Squamous cell carcinoma of the skin: Section of the skin shows: An ulcer covered by inflammatory exudate.*

- The dermis is infiltrated by masses of well differentiated neoplastic squamous cells which are separated by fibrous tissue stroma with chronic inflammatory cells.
- Tumour cells show pleomorphism, hyperchromatism and many mitotic figures.
- Pinkish laminated keratin pearls (epithelial cell nests) are present in the center of some cell masses.

[28] *Adenocarcinoma of the large intestine: Section of large intestine shows: A tumour mass at one end, and a normal mucosa on the other side.*

- Tumour consists of crowded irregular malignant acini separated by thin fibrovascular stroma.
- The acini are lined by one or several layers of neoplastic cells with papillary projection showing pleomorphism, hyperchromatism and few mitoses.
- Muscle coat is invaded by neoplastic glands.

[29] *Mucoid carcinoma of the large intestine: Section of large intestine shows normal mucosa:*

- All the layers under mucosa are infiltrated by masses of tumour cells separated by connective tissue stroma.
- Tumour cells are present either singly or as imperfect acini floating in large quantities of mucin secreted by malignant cells.
- The cells are pleomorphic with large basophilic nuclei, pushed to the side due to the presence of intracellular mucin giving a signet-ring appearance.

[30] *Fibrosarcoma: Section of the tumour shows:*

- The tumour consists of interlacing bundles of pleomorphic spindle shaped cells with areas of haemorrhage and necrosis.
- The cells show marked variation in size and shape, nuclear hyperchromatism with tumour giant cells formation and many mitoses.

CARDIOVASCULAR BLOCK

31. Acute rheumatic myocarditis: Section of cardiac muscle shows:

- Aschoff bodies in the intermuscular fibrous septa. They are oval in shape and seen in relation to blood vessels.
- Each consists of a focus of fibrinoid necrosis, few lymphocytes, macrophages and few small giant cells with one or several nuclei (Aschoff giant cell).

32. Rheumatic valvulitis: Section of fragments of endocardial valve shows:
- Irregular endocardial surface , no endocardial lining and focal fibrin deposits.
 - The valve is thickened by dense hyalinized fibrous tissue with vascularization and chronic inflammatory cell infiltrate.
33. Coronary atherosclerosis: Cross section of a coronary artery shows:
- Partial occlusion of the lumen by an atheromatous plaque.
 - The plaque consists of dissolved, cholesterol clefts, hyaline fibrous tissue and some blood capillaries.
 - The internal elastic lamina is thin and fragmented.
 - Pressure atrophy of the media opposite atheromatous plaque.
34. Thromboangitis obliterans (Buerger's disease): Section of the skin and subcutaneous tissue shows marked hyperkeratosis with inflammatory exudate in epidermis:
- Large number of small blood vessels in the dermis show occlusive organized thrombi with recanalization and fibrosis around blood vessels.
 - Some blood vessels show recent organizing thrombi while others show infiltration of the wall and surrounding tissue by chronic inflammatory cells.

RESPIRATORY BLOCK

35. Lobar pneumonia: Section of the lung shows diffuse consolidation.
- All the alveoli are filled with fibrinous exudate containing fibrin threads, polymorphs, macrophages and red cells.
 - Alveolar walls are congested.
 - Pleura is covered by fibrinous exudate
36. Bronchopneumonia: Section of the lung shows foci of inflammatory consolidation surrounding bronchioles.
- Bronchioles are filled with an inflammatory exudate and show ulceration of mucosa, focal inflammation and necrosis of walls.
 - Alveoli surrounding the bronchiole are filled with fibrin threads polymorphs and few macrophages.
 - Surrounding lung parenchyma shows congestion and edema.
37. Emphysema: Section of lung shows:
- Increase in the size of air spaces.
 - Decrease in number of air spaces and their walls are thinned.
 - Some of the alveolar septae are ruptured and the ruptured septa project with in air spaces on the form of spurs.
 - Alveolar blood vessels show reactive thickening of their walls.

38. Squamous cell carcinoma of the lung: Section of the lung shows one small bronchus and tumour masses.

- Tumour consist of trabeculae and sheets of moderately differentiated squamous cells with little connective tissue stroma.
- Neoplastic squamous cells show pleomorphism, hyperchroma-tism, individual cell keratinization, mitoses and areas of necrosis.
- Peribronchial and perivascular lymphatics are occluded by tumour cells.

RENAL BLOCK

47. Post streptococcal glomerulonephritis: Section of kidney shows:

- The glomeruli are enlarged, lobulated and hypercellular with obliteration of capsular space.
- Cellularity is due to proliferation of endothelial and mesangial cells with some neutrophils.
- Many capillaries appear obliterated.
- Tubules show degenerative changes.

48. Chronic pyelonephritis: Section of kidney reveals that:

- The glomeruli show varying degrees of sclerosis and periglomerular fibrosis.
- The tubules show varying degrees of atrophy. Some tubules are dilated and filled with eosinophilic hyaline casts resembling colloid (thyroidization).
- Interstitial tissues shows chronic inflammatory cells infiltrate and fibrosis.

49. Clear cell carcinoma of the kidney: Section of the kidney shows:

- Compressed kidney tissue at the margin of the tumour masses.
- Tumour cells are large polygonal with clear cytoplasm (dissolved glycogen and lipid) and piknotic nuclei.
- Cells are arranged as alveolar groups or tubules with papillary formations separated by thin fibrovascular septae.
- Cells show pleomorphism and mitosis.
- Areas of haemorrhage and necrosis are present.

TUTORIALS

Tutorials on relevant topics will be given.

HISTOPATHOLOGY PRACTICAL AND SLIDE NUMBERS

Cell injury

1. Fatty change of the liver.
2. Amyloidosis of the liver.
3. Amyloidosis of the kidney.
Electron micrograph of amyloid fibrils.
4. Dystrophic calcification.

Inflammation, repair and regeneration

5. Fibrinous pericarditis.
6. Acute suppurative appendicitis.
7. Foreign body reaction (pilonidal sinus).
8. Granulation tissue.

Haemodynamic (circulatory) disorders

9. Chronic venous congestion of the liver.
10. Chronic venous congestion of the lung.
11. Organizing thrombus.
12. Recent myocardial infarction.
13. Infarction of the kidney.

Granulomatous diseases

14. Tuberculous lymphadenitis.
15. Miliary tuberculosis of the lung.
16. Leprosy of the skin.
Lepra bacilli (ZN stain).
17. Bilharziasis of the rectum.
18. Bilharziasis of the liver.

Disorders of growth

19. Cystic hyperplasia of the endometrium.
20. Fibrocystic changes and epithelial hyperplasia of the breast.

Neoplasia - benign tumors

21. Intradermal nevus.
22. Leiomyoma.
23. Chondroma.
24. Hemangioma.
25. Fibroadenoma of the breast.

Neoplasia - malignant tumors

26. Basal cell carcinoma of the skin.
27. Squamous cell carcinoma of the skin.
28. Adenocarcinoma of the large intestine.
29. Mucoid carcinoma of the large intestine.
30. Fibrosarcoma.

Cardiovascular block

31. Acute rheumatic myocarditis.
32. Rheumatic valvulitis.
33. Coronary atherosclerosis.
34. Thromboangitis obliterans (Buerger's disease).

Respiratory block

35. Lobar pneumonia.
36. Bronchopneumonia.
37. Emphysema.
38. Squamous cell carcinoma of the lung.

Renal block

47. Post streptococcal glomerulonephritis.
48. Chronic pyelonephritis.
49. Clear cell carcinoma of the kidney.

NOTE: Other slides representing similar conditions may be added for examination purposes.

PATHOLOGY MUSEUM**Cell injury**

H	Amyloidosis of the liver.
SP	Amyloidosis of the spleen.

Inflammation, repair and regeneration

CVS	Fibrinous pericarditis.
RS	Bronchiectasis.
RS	Empyema between lobes of the lung.
GB	Chronic cholecystitis with stone.
GB	Acute cholecystitis with stone.
US	Pyonephritis.
US	Pyemic abscesses of the kidney.
CNS	Brain abscess.
GUT	Acute suppurative appendicitis.
Skin	pilonidal sinus.

Haemodynamic - circulatory disorders

H	Chronic venous congestion of the liver.
H	Infarction of the liver.
CVS	Myocardial infarction with mural thrombus.
GUT	Infarction of the small intestine.
US	Infarction of the kidney.
SP	Congestive splenomegaly.
SP	Infarction of the spleen.
RS	Pulmonary embolus with infarction.

Granulomatous diseases

RS	Tuberculosis of the lung.
LN	Tuberculous lymphadenitis.
US	Tuberculosis of the kidney.

Growth disorders and neoplasia

US	Renal carcinoma.
US	Prostatic hyperplasia.
GUT	Carcinoma of the esophagus.
GUT	Carcinoma of the stomach.
GUT	Lipoma of the small intestine.
GUT	Papillary tumor of rectum and colon.
FGS	Teratoma, dermoid cyst.
FGS	Multiple leiomyomata.
BR	Carcinoma of the breast.
BR	Fibroadenoma of the breast.

Cardiovascular block

CVS	Fibrinous pericarditis.
CVS	Vegetations of rheumatic mitral and aortic valves.
CVS	Myocardial infarction.
CVS	Left ventricular hypertrophy.
CVS	Aneurysm of abdominal aorta.
CVS	Atheroma of aorta.

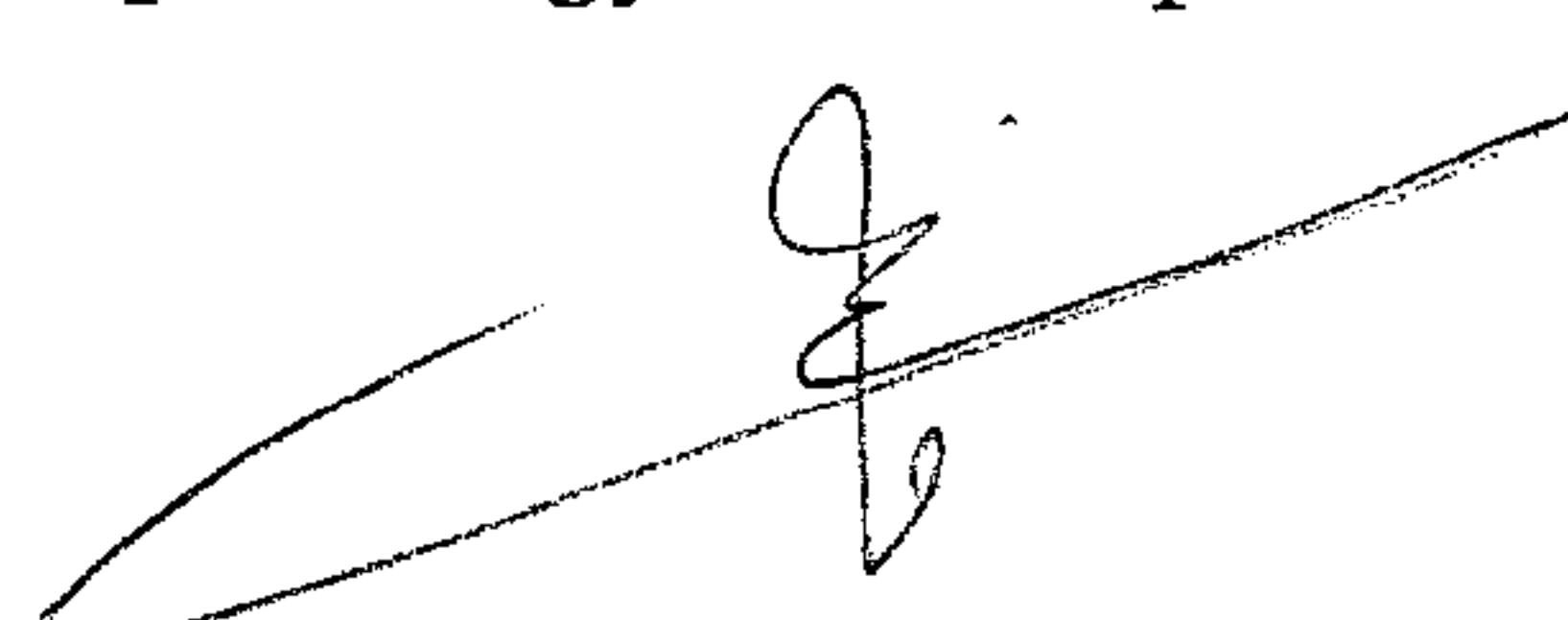
Respiratory block

RS	Bronchiectasis.
RS	Bronchopneumonia.
RS	Lobar pneumonia.
RS	Bronchogenic carcinoma.
RS	Metastatic carcinoma of the lung.
RS	Empyema.

Renal block

US	Hydronephrosis.
US	Pyonephrosis.
US	Polycystic kidney.
US	Renal carcinoma.
US	Wilm's tumor.
US	Carcinoma of urinary bladder.

NOTE: Students are asked to study the gross pathology of all specimens related to lecture topics.


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