



面向21世纪精品课程教材

全国高等医药教育规划教材

病理学实验指导

GUIDE TO PRACTICE OF EXPERIMENT FOR PATHOLOGY

韦登明 周细武 方 荣 编著



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韦登明 周细武 方 荣 编著

责任编辑 张颖琪

责任校对 陈丽勋

封面设计 刘依群

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前 言

病理学实验课的主要目的就是使学生通过形态学的观察来理解和巩固理论知识,对一些临床常见疾病做出病理诊断。《病理学实验指导》(*Guide to Practice of Experiment for Pathology*)教材以宁波大学医学院现有的病理大体标本和切片等病理学实验材料为基础,根据为留学生制定的病理学实验教学大纲编写。全书在编写过程中,力争内容精练、层次分明、通俗易懂,充分突出病理形态学特点,通过大体标本及切片观察,培养学生分析问题、解决问题的实践能力。

本教材 Chapter 4 和 Chapter 9 由周细武编写, Chapter 6 由方荣编写,其余各章均由韦登明编写。

本教材的出版发行得到“2014 年宁波大学教材建设项目(编号: JCJSx201414)”及“宁波市重点学科——临床病理学”的资助,特此致谢!

这本教材是我们开展留学生病理学实验教学的一次尝试。虽然我们尽量努力,但由于编写时间仓促,书中缺点、错误在所难免,恳请师生在使用中提出宝贵意见,以期今后修改,不断完善提高。

宁波大学医学院 韦登明

2016 年 6 月

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Chapter 1

Cell Injury and Repair



Learning Requirements

1. Understand the cellular structure.
2. Master the atrophy, hyperplasia, and hypertrophy, dysplasia.
3. Master the types and pathological changes of degeneration, necrosis, and granulation tissue.



Gross Observation

Number 1

1. Organ: Kidney
2. Pathological changes:

The renal pelvis and calyces show marked dilation, consistent with hydronephrosis, the result of chronic urinary tract obstruction. If unilateral, it may be due to obstruction at the level of the ureteral orifice and above, as from a calculus or neoplasm, or less commonly a stricture from inflammation. Such obstruction becoming evident in childhood suggests a urinary tract anomaly. Bilateral hydronephrosis occurs from lesions within the urinary bladder or prostate, such as nodular prostatic hyperplasia or a transitional cell carcinoma of the bladder. Functional obstruction may result from autonomic neuropathy, as with diabetes mellitus. If obstruction remains chronic and progressive, there is continuing loss of renal function.

3. Diagnosis: _____ of kidney parenchyma (hydronephrosis)

Number 2

1. Organ: Cerebral

2. Pathological changes:

This is cerebral atrophy in a patient with Alzheimer's disease. The gyri are narrowed and the sulci widened toward to frontal pole.

3. Diagnosis: _____ of cerebral

Number 3

1. Organ: Testis

2. Pathological changes:

The testis at the right has undergone atrophy and is much smaller than the normal testis at the left.

3. Diagnosis: _____ of testis

Number 4

1. Organ: Prostate

2. Pathological changes:

This is an example of prostatic hyperplasia. The normal prostate is about 3 to 4 cm in diameter. The number of prostatic glands, as well as the stroma, has increased. The pattern of increase here is not uniform, but nodular. This increase is in response to hormonal manipulation, but this case is not a normal physiologic process.

3. Diagnosis: _____ of prostate

Number 5

1. Organ: Kidney

2. Pathological changes:

When many cells undergo necrosis at once, definable patterns of necrosis are produced, depending upon the nature of the injury, the type of tissue, and the length of

time. This is an example of coagulative necrosis. This is the typical pattern with ischemia and infarction (loss of blood supply and resultant tissue anoxia). Here, there is a wedge-shaped pale area of coagulative necrosis (infarction) in the renal cortex of the kidney.

3. Diagnosis: _____ of the kidney

Number 6

1. Organ: Lung

2. Pathological changes:

The two lung abscesses seen here are examples of liquefactive necrosis in which there is a liquid center in an area of tissue injury. One abscess appears in the upper lobe and one in the lower lobe. Liquefactive necrosis is typical of organs in which the tissues have a lot of lipid (such as brain) or when there is an abscess with lots of acute inflammatory cells whose release of proteolytic enzymes destroys the surrounding tissues.

3. Diagnosis: _____ of lung

Number 7

1. Organ: Cerebral

2. Pathological changes:

Grossly, the cerebral infarction at the upper left here demonstrates liquefactive necrosis. Eventually, the removal of the dead tissue leaves behind a cavity.

3. Diagnosis: _____ of cerebral

Number 8

1. Organ: Lung

2. Pathological changes:

This is the gross appearance of caseous necrosis in a hilar lymph node infected with tuberculosis. The node has a cheesy tan to white appearance. Caseous necrosis is

really coagulative necrosis that is most characteristic of granulomatous inflammation.

3. Diagnosis: _____ of lung

Number 9

1. Organ: Foot

2. Pathological changes:

This is gangrene, or necrosis of many tissues in a body part. In this case, the toes are involved in a frostbite injury. This is an example of “dry” gangrene in which there is mainly coagulative necrosis from the anoxic injury.

3. Diagnosis: _____ of foot

Number 10

1. Organ: Foot

2. Pathological changes:

This is gangrene of the lower extremity. In this case, the term “wet” gangrene is more applicable because of the liquefactive component from superimposed infection in addition to the coagulative necrosis from loss of blood supply. This patient has diabetes mellitus.

3. Diagnosis: _____ of foot



Microscopy Observation

Number 1

1. Organ: Heart

2. Pathological changes:

When there is marked cellular injury, there is cell death. This microscopic appearance of myocardium is a mess because so many cells have died that the tissue is not recognizable. Many nuclei have become pyknotic (shrunken and dark) and have

then undergone karyorrhexis (fragmentation) and karyolysis (dissolution). The cytoplasm and cell borders are not recognizable.

3. Diagnosis: _____ of heart

Number 2 (I-M-2)

1. Organ: Liver

2. Pathological changes:

Intracellular accumulations of a variety of materials can occur in response to cellular injury. Here is fatty metamorphosis (fatty change) of the liver in which deranged lipoprotein transport from injury (most often alcoholism) leads to accumulation of lipid in the cytoplasm of hepatocytes.

3. Diagnosis: _____ of liver

Number 3 (I-M-8)

1. Organ: Lung

2. Pathological changes:

Microscopically, caseous necrosis is characterized by acellular pink areas of necrosis, as seen here at the upper right, surrounded by a granulomatous inflammatory process.

3. Diagnosis: _____ necrosis

Number 4 (I-M-6)

1. Organ: Skin

2. Pathological changes:

There are capillaries, inflammatory cells, and fibroblasts in skin tissue.

3. Diagnosis: _____ tissue

Chapter 2

Hemodynamic Disorder



Learning Requirements

1. Master the pathological characteristics of liver congestion, familiar with the congestion results.
2. Master the morphological characteristics of thrombus.
3. Master the morphological characteristics of infarction.



Gross Observation

Number 1

1. Organ: Lung
2. Pathological changes:

The main pulmonary trunk and pulmonary arteries to right and left lungs are seen here opened to reveal a large “saddle” pulmonary thromboembolus. Such an embolus will kill your patient.

3. Diagnosis: The _____ of main pulmonary trunk

Number 2

1. Organ: Heart
2. Pathological changes:

This cross section reveals a large myocardial infarction involving the anterior left ventricular wall and septum.

3. Diagnosis: The left ventricular anterior wall ventricular and septum myocardial

Number 3

1. Organ: Heart

2. Pathological changes:

Here is hemorrhagic pulmonary infarction in a patient with a pulmonary thromboembolism pulmonary artery.

Occlusion of main pulmonary arteries can kill the patient suddenly. Occlusion of small pulmonary arteries has no major immediate effect. Occlusion of a medium-sized branch of pulmonary artery can lead to a pulmonary infarction in a person with compromised cardiac or respiratory status. A pulmonary infarct is hemorrhagic because of the dual blood supply from the non-occluded bronchial arteries which continue to supply blood, but do not prevent the infarction.

3. Diagnosis: Hemorrhagic pulmonary _____

Number 4

1. Organ: Heart

2. Pathological changes:

This is coronary thrombosis, one of the complications of atherosclerosis. The dark red thrombus is seen in the anterior descending coronary artery.

3. Diagnosis: _____ in coronary atherosclerosis

Number 5

1. Organ: Foot

2. Pathological changes:

A localized collection of blood outside the vascular system within tissues is known as a hematoma. Here is a small hematoma under the toenail following trauma, which

has a bluish appearance from the deoxygenated blood within it.

3. Diagnosis: _____ hematoma

Number 6

1. Organ: Intestinal

2. Pathological changes:

Necrosis of intestinal wall, the red color.

3. Diagnosis: Intestinal _____



Microscopy Observation

Number 1 (2-M-1)

1. Organ: _____

2. Pathological changes:

The presence of liver lobules: central vein and hepatic sinus are dilated and congested.

3. Diagnosis: _____ of liver

Number 2 (2-M-2)

1. Organ: _____

2. Pathological changes:

These are “lines of Zahn” which are the alternating pale pink bands of platelets with fibrin and red bands of RBC’s forming a true thrombus.

3. Diagnosis: _____

Number 3 (2-M-3)

1. Organ: Intestinal
2. Pathological changes:
Intestinal necrosis and hemorrhage.
3. Diagnosis: _____

Number 4

1. Organ: Kidney
2. Pathological changes:
Small fibrin thrombi from widespread activation of the coagulation system with disseminated intravascular coagulopathy (DIC) can be seen in capillary loops in this glomerulus, highlighted by a fibrin stain.
3. Diagnosis: _____ (microthrombus)

Number 5 (2-M-4)

1. Organ or tissue: Lung
2. Pathological changes:
At high magnification, the alveoli in this lung are filled with a smooth to slightly floccular pink material characteristic for pulmonary edema. Note also that the capillaries in the alveolar walls are congested with many red blood cells. Congestion and edema of the lungs is common in patients with heart failure and in areas of inflammation of the lung.
Pulmonary congestion with dilated capillaries and leakage of blood into alveolar spaces leads to an increase in hemosiderin-laden macrophages, as seen here. Brown granules of hemosiderin from breakdown of RBC's appear in the macrophage cytoplasm. These macrophages are sometimes called "heart failure cells" because of their association with pulmonary congestion with congestive heart failure.
3. Diagnosis: _____

Chapter 3

Inflammation

Learning Requirements

1. Master the basic lesion of inflammation.
2. Master the morphological characteristics of exudative inflammation.
3. Identify inflammatory cells in the slice.
4. Understand the local and systemic inflammatory response.

Gross Observation

Number 1

1. Organ: Heart
2. Pathological changes:

The pericardial cavity has been opened to reveal fibrinous adhesions between epicardium and pericardium in the top panel. There is also a small amount of reddish discoloration from hemorrhage. The shaggy fibrin is seen over the anterior surface of the heart in the lower panel. This is pericarditis. The etiology in this case is infectious (viral). A serous pericarditis, in which there is some inflammation but little or no exudation, is most often due to autoimmune diseases or viral infection. A fibrinous pericarditis can be localized over an area of myocardial infarction and more extensive when uremia is present. Fibrinous exudate may be present with infections and autoimmune diseases. Metastatic tumor and tuberculosis are most likely to produce extensive hemorrhage, often superimposed upon a fibrinous exudate. A purulent pericarditis is most often the result of spread of bacterial infection from lung or mediastinum. Healing of pericarditis most often results in focal adhesions, but occasionally (and particularly with tuberculous pericarditis) it leads to extensive

scarring that encases the heart (“constrictive pericarditis”).

3. Diagnosis: _____ pericarditis

Number 2

1. Organ: Pleural

2. Pathological changes:

Here is an example of fluid collection into a body cavity, or an effusion. This is a right pleural effusion (in a baby). Note the clear pale yellow appearance of the fluid. This is a serous effusion. Extravascular fluid collections can be classified as follows. Exudate: extravascular fluid collection that is rich in protein and/or cells. Fluid appears grossly cloudy. Transudate: extravascular fluid collection that is basically an ultrafiltrate of plasma with little protein and few or no cells. Fluid appears grossly clear. Effusions into body cavities can be further described as follows. Serous: a transudate with mainly edema fluid and few cells. Serosanguinous: an effusion with red blood cells. Fibrinous (serofibrinous): fibrin strands are derived from a protein-rich exudate. Purulent: numerous PMN’s are present. Also called “empyema” in the pleural space.

3. Diagnosis: _____ effusion in children

Number 3

1. Organ: Lung

2. Pathological changes:

The white arrows mark areas of abscess formation in the upper lobe of this lung. The liquefactive necrosis of an abscess is apparent, because the purulent contents are draining out to leave a cavity. On a chest radiograph, the liquefied central contents of an abscess can appear as an “air-fluid level”.

3. Diagnosis: Pulmonary _____

Number 4

1. Organ: Lung

2. Pathological changes:

This example of edema with inflammation is not trivial at all: there is marked laryngeal edema such that the airway is narrowed. This is life-threatening. Thus, fluid collections can be serious depending upon their location.

3. Diagnosis: Laryngeal _____

Number 5

1. Organ: Brain

2. Pathological changes:

A purulent exudate is seen beneath the meninges in the brain of this patient with acute meningitis from *Streptococcus pneumoniae* infection. The exudate obscures the sulci.

3. Diagnosis: Purulent _____

Number 6

1. Organ: Heart

2. Pathological changes:

Here is a purulent exudate in which the exuded fluid also contains a large number of acute inflammatory cells. Thus, the yellowish fluid in this opened pericardial cavity is a purulent exudate.

3. Diagnosis: Purulent _____