

FORENSIC PATHOLOGY

WEB BASED

PRACTICAL GUIDE

Sudden Natural Deaths

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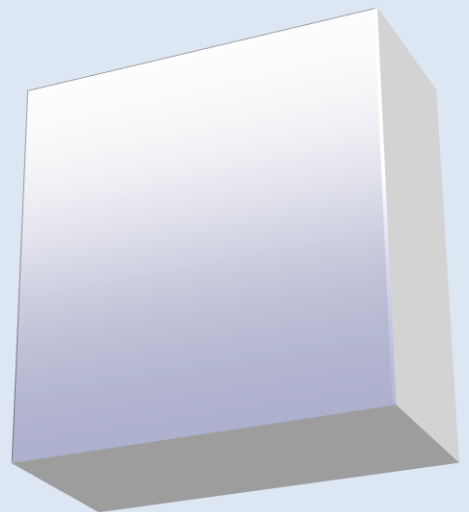
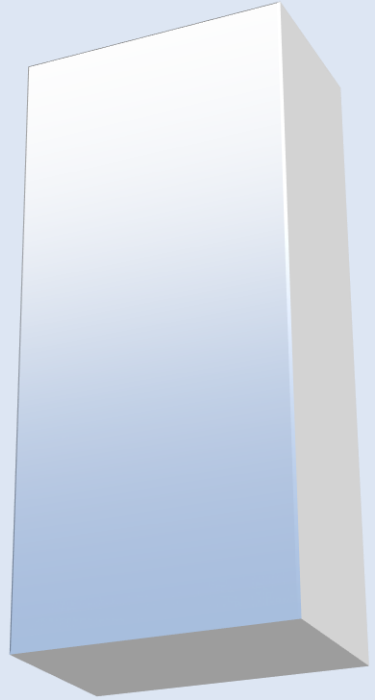
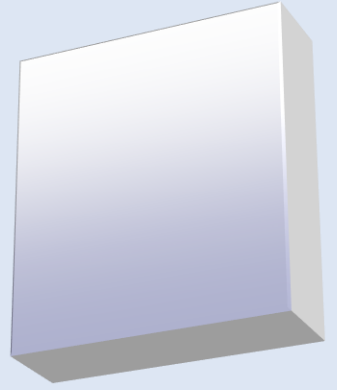
Electronic Formatting And Desining

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1. INTRODUCTION

This practical guide with model Objective Structures Practical Examination (OSPE) questions with an electronic copy of it in the web site of the Department is a long-felt need fulfilled to assist both postgraduate and undergraduate students to face their examinations. During the clinical rotation of forensic medicine, students may or may not get the practical exposure to these pathological conditions. Similarly, during the course of training the post graduate students may not be exposed to some of these pathological conditions.

This booklet contains questions and model answers together with the colour photographs. These are meant to fulfill the gaps in real life exposure where the student, either undergraduate or postgraduate will be able to fulfill the study requirement. These will give the students an insight into the type of questions and expected answers. The booklet in the electronic form is to help the student to undergo self-directed learning on their own either with a group or individually.

2. GENERAL OBJECTIVES

The aim of this guide in print and electronic version is to:

- provide the students with an idea about the type of questions and expected answers.
- use as a colour atlas in making the students aware on some of the unobserved pathological conditions

3. LEARNING OUTCOME

By using this booklet the students will able to:

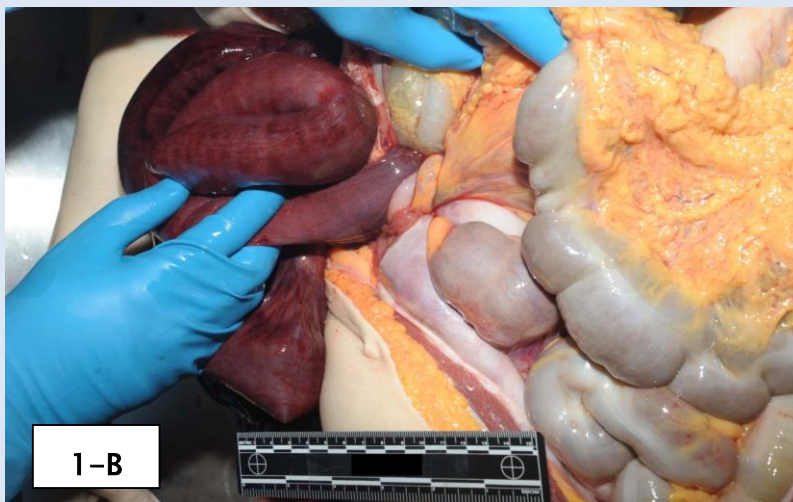
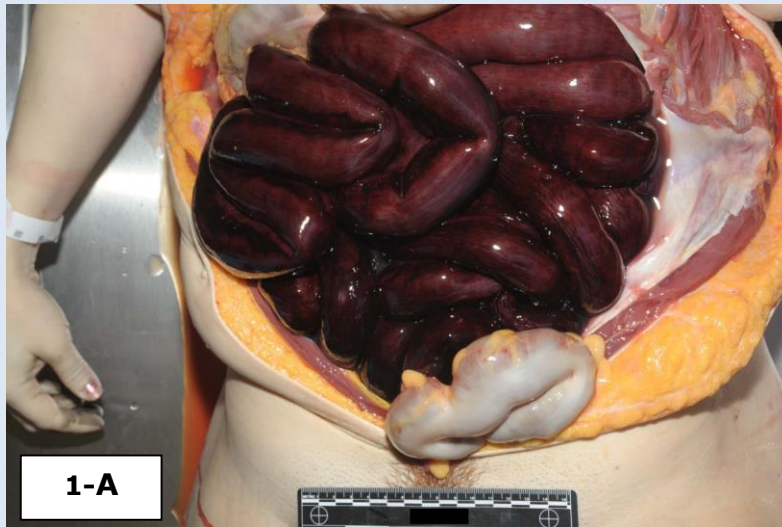
- Practice for their OSPE in forensic medicine related to sudden natural death
- Identify the pathological conditions related to sudden natural death.
- Improve their knowledge on conditions leading to sudden natural death in forensic context

4. ACKNOWLEDGEMENT

For the preparation of this booklet pictures from image folders presented by King County Medical Examiner: Dr. Richard Harruff, Seattle, WA 98104, United States (External examiner for MD Forensic Medicine 2013) and pictures presented by Prof. Michael Pollanen of Ontario Forensic Pathology Service, Toronto, Canada were

used with great appreciation. The valuable guidance and encouragement given by Prof. P.A.S. Edirisinghe and Dr. Handun Wijewardena in preparation of this guide is immensely appreciated.

(1) Photographs A and B were taken at autopsy on a 30 year old man admitted with abdominal pain died on admission.



1.1. What is the diagnosis?

1.2. Give three underlying mechanisms of causation of such pathology.

Photograph by courtesy of Dr. Richard Harruff

Answer

1.1. What is the diagnosis?

Bowel infarction

1.2. Give three underlying mechanisms of causation of such pathology.

- Volvulus
- Mesenteric artery thrombosis
- Bowel adhesion

assignment:

Describe the pathophysiology of Acute Mesenteric Ischemia (AMI)

(2) This photograph was taken at the autopsy of a 65 year old man found dead in his bedroom.



2.1 Describe what you observe.

2.2 Give three (3) possible underlying mechanisms of causation of this condition.

Photograph by courtesy of Dr. Richard Harruff

Answer

2.1. Describe what you observe.

There is an intraventricular haemorrhage with dilatation of the lateral ventricles in the brain sections. The white matter around the left ventricle shows haemorrhagic necrosis.

2.2. Give three (3) possible underlying mechanisms of causation of this condition.

- trauma
- hypertensive cerebral artery rupture
- aneurysm rupture
- vascular malformations
- tumors of the choroid plexus

Assignment:

Explain how you are going to differentiate traumatic intraventricular haemorrhage from a spontaneous one.

(3) This photograph was taken at an autopsy of a 50 year old man who died suddenly while being managed for a fracture of the femur following a road traffic accident.



3.1 State the cause of death according to the WHO format.

Photograph by courtesy of Dr. Richard Harruff

Answer

3.1 State the cause of death according to the WHO format.

A. Pulmonary thrombo embolism

Due to

B. Deep vein thrombosis

Due to

C. Fracture femur

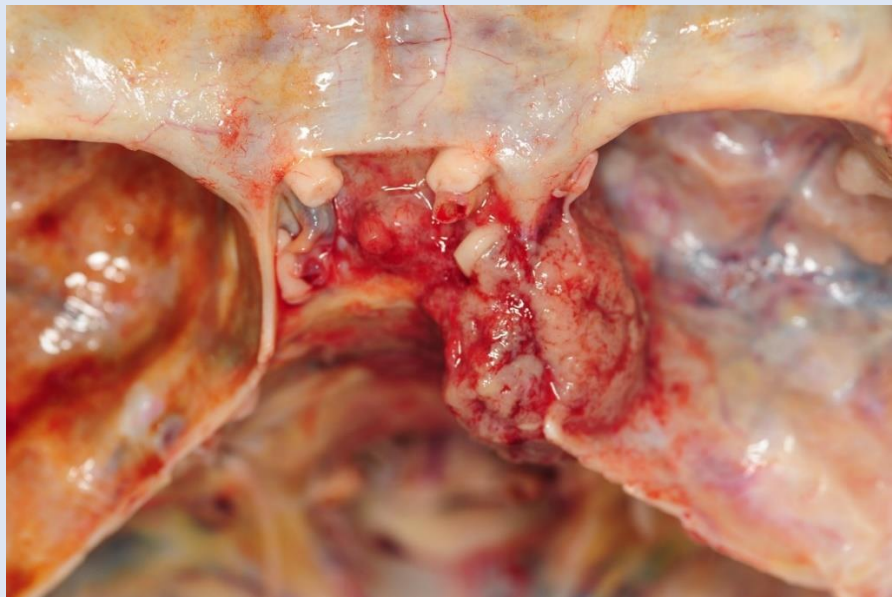
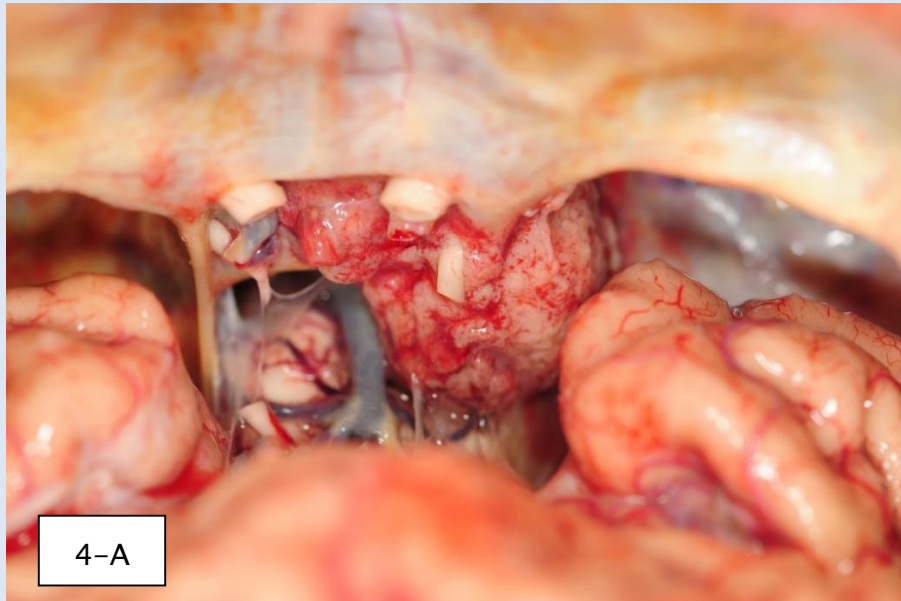
Due to

D. Blunt force trauma

Assignment:

1. Find the conditions predisposing to deep vein thrombosis
2. Describe the pathophysiological basis of deep vein thrombosis following immobility

(4) A and B photographs of the brain were taken at autopsy of a 50 year old female who complained of severe headache for 3 months prior to death. According to the family members she complained of visual disturbances on and off.



4.1. Describe the pathology you see in these photographs.

4.2. What is your diagnosis?

Photographs by courtesy of Dr. Richard Harruff

Answer

4.1. Describe the pathology you see in these photographs.

There is a well circumscribed discrete mass that can be distinguished from the brain tissue on the greater wing of the left sphenoid. The mass is haemorrhagic and looks friable and can be easily separated from the brain. The right ocular motor nerve is encircled within the mass.

4.2. What is your diagnosis?

Meningioma

Assignment: 1

1. **Workout the mechanisms of death from meningioma**
2. **find out other different types of brain tumors**

(5) Photographs A and B were taken at an autopsy of a 45 year old woman with a history of hypertension and diabetes complaining of severe headache prior to death.



5.1. State your cause of death according to the WHO format.

Photographs by courtesy of Dr. Richard Harruff

Answer

5.1. State your cause of death according to the WHO format.

- 1) A. Subarachnoid haemorrhage
 Due to
 B. Ruptured Berry aneurysm
- 2) Hypertension

Assignment:

1. Find other causes for Subarachnoid haemorrhage
2. Describe the features of hypertensive cerebral disease.

(6) The following specimen was obtained from an autopsy which was performed on an unidentified body.



6.1 Describe what you observe.

6.2 What is the causation?

Photograph by courtesy of Dr. Richard Harruff

Answer

6.1 Describe what you observe.

There are multiple smooth-walled variably sized cysts within the cerebrum. Swiss cheese appearance.

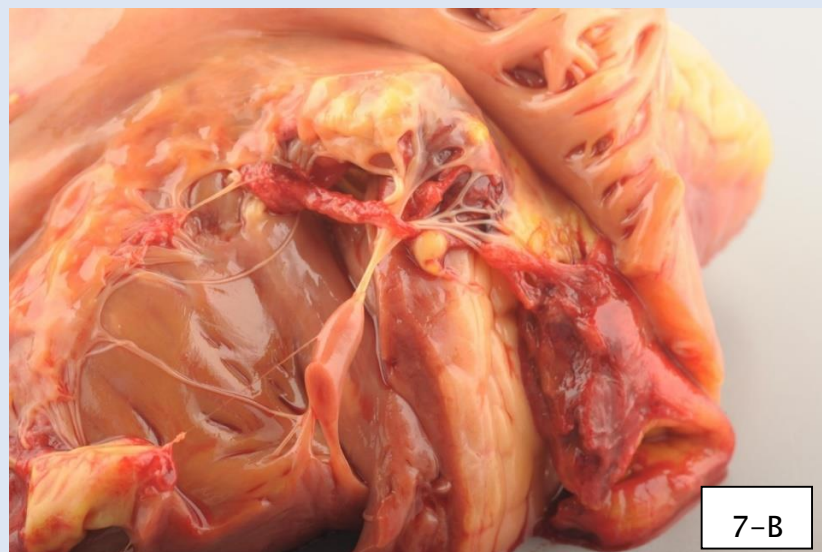
6.2 What is the causation?

This is an artifact due to freezing.

Assignment:

Find out other forms of freezing artifacts

(7) A and B photographs are taken from the heart of a man found dead after a violent fight.



7.1 Describe the findings.

7.2 What is the possible pathology?

Photographs by courtesy of Dr. Richard Harruff

Answer

7.1 Describe the findings.

There is a vegetative lesion on the tricuspid valve.

7.2 What is the possible pathology?

Infective endocarditis in an IV drug abuser (due to injecting drugs with contaminated needles where bacteria are introduced in to the veins which are then draining in to the right side of the heart)

Assignment:

Find out the aetiology of infective endocarditis

(8) This photograph was obtained at the autopsy of a man who was having a febrile illness and left upper quadrant abdominal pain



8.1 Describe the pathology seen in this photograph.

8.2 What are the possible underlying aetiological factors?

Photograph by courtesy of Dr. Richard Harruf

Answer

8.1 Describe the pathology seen in this photograph.

Cut section of the spleen showing a haemorrhagic well demarcated infarct on the left side with multifocal, well-demarcated, haemorrhagic wedge-shaped subcapsular infarcts. There is an early infarct on the right side.

8.2 What are the possible underlying aetiological factors?

- Infective endocarditis vegetative emboli
- Thrombo emboli due to myocardial dysrhythmias or aneurysms
- Malignant haematologic disorders

Assignment:

Workout how to differentiate above etiological factors at autopsy and by ancillary testing

(9) The photograph was taken at an autopsy of a man who was found dead in his room.



9.1 Describe the pathology seen in this photograph.

9.2 What is the diagnosis?

Photograph by courtesy of Dr. Richard Harruff

Answer

9.1 Describe the pathology seen in this photograph.

Coronal section of the brain. There is asymmetry of the brain with atrophy of white matter on left side with multiple petechial haemorrhages involving the white matter of the superior and middle frontal gyri

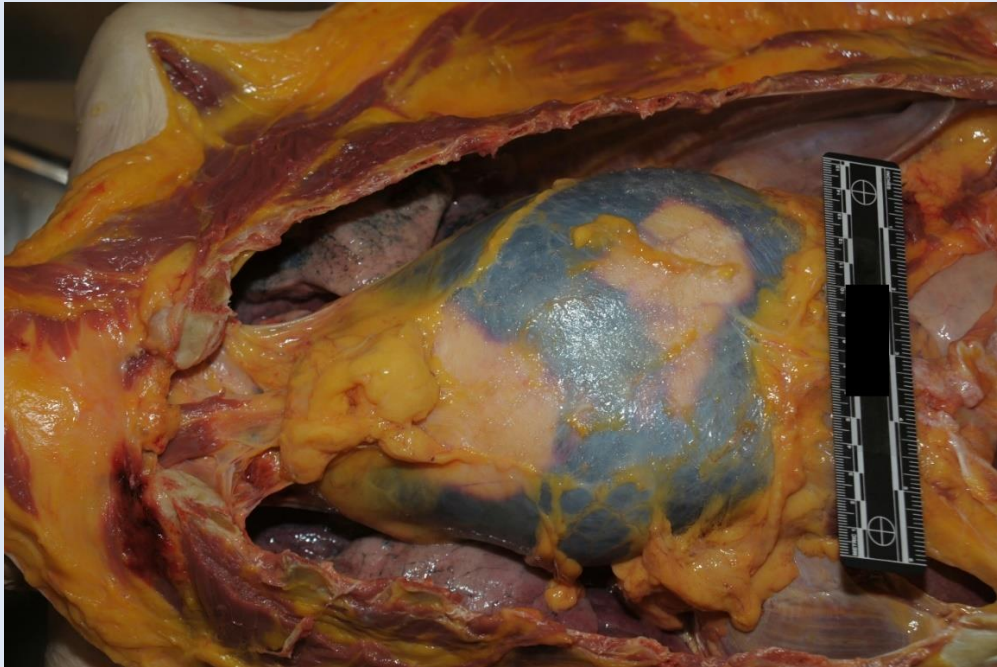
9.2 What is the diagnosis?

Cerebral infarction (watershed area)

Assignment:

Find the etiologies for cerebral infarction and how to differentiate them at autopsy

(10) This photograph was taken at an autopsy of a man who collapsed at work and diagnosed dead at the admission to the hospital.



10.1 What is the diagnosis?

10.2 What are the likely causes for this pathology?

Photograph by courtesy of Dr.Richard Harruff

Answer

10.1 What is the diagnosis?

Heamopericardium

10.2 What are the likely causes for this pathology?

- Ruptured myocardial infarction
- Dissection/ aneurismal rupture of coronary artery
- Ruptured dissecting aneurysm of the ascending aorta.

Assignment:

Describe the microscopic findings of each of above etiology

(11) This photograph was taken at an autopsy of a 34-year-old alcoholic who died while being investigated for pyrexia of unknown origin.



11.1 Describe what you observe in this photograph.

11.2 What is the diagnosis?

11.3 State 3 possible complications leading to death.

Photograph by courtesy of Prof. Michael Pollanen

Answer

11.1 Describe what you observe in this photograph.

Brain surrounded by pus (the yellow–greyish coat around the brain, under the dura).
Blood vessels are congested.

11.2 What is the diagnosis?

Pyogenic meningitis

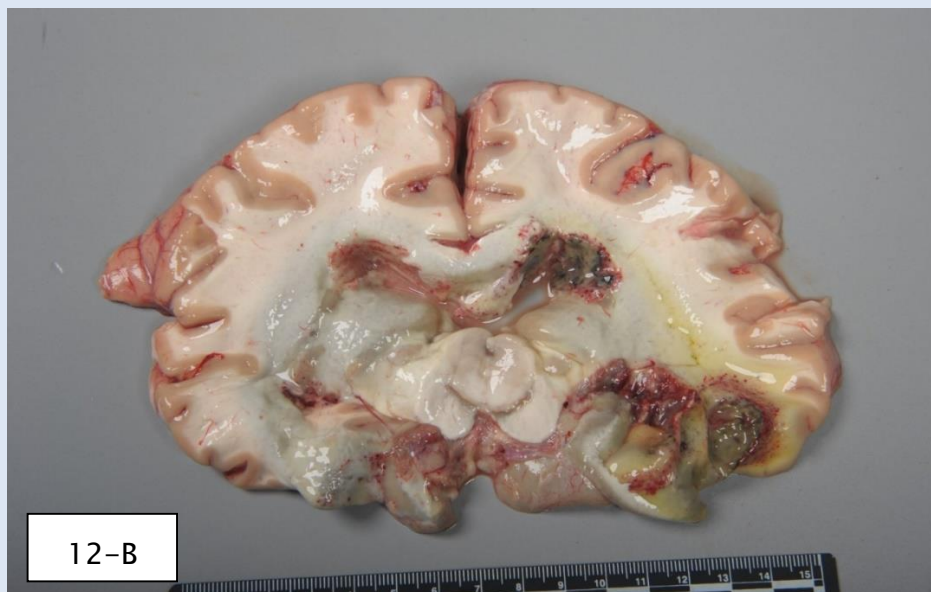
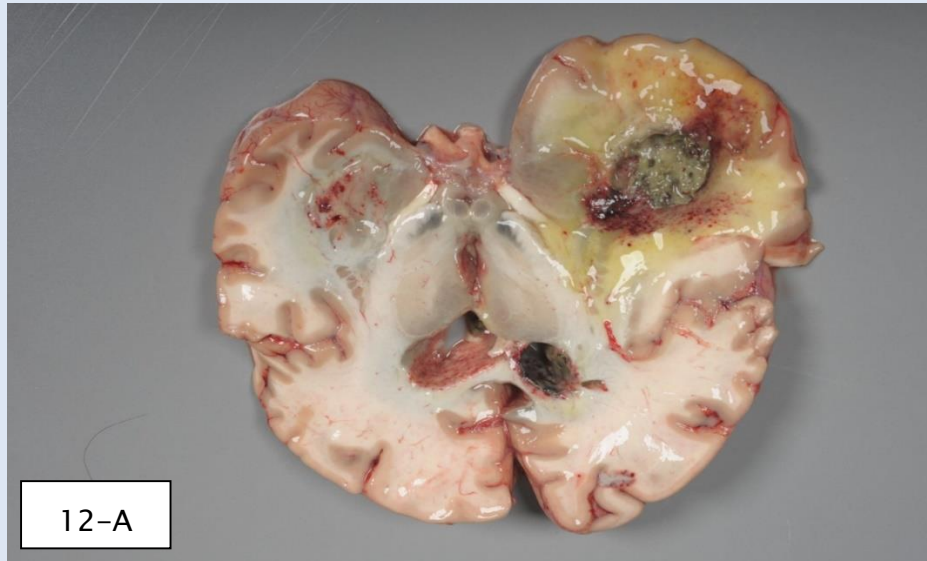
11.3 State 3 possible complications leading to death.

- Seizures
- Cerebral oedema and herniation
- Brain abscess and herniation
- Sepsis

Assignment:

Find the etiological agents for pyogenic meningitis

(12) Photographs A and B are sections from the brain obtained at the autopsy of a man who had died following focal seizures. He had taken treatment for fever and headache three days ago.



12.1. Describe the pathology you observe in these photographs.

12.2. What is the diagnosis?

Photographs by courtesy of Dr. Richard Harruff

Answer

12.1 Describe the pathology you observe in these photographs.

There is an abscess in the right hippocampus showing well-formed capsule and necrotic, purulent center. Surrounding area is haemorrhagic. The right lateral ventricle is dilated with purulent collection occupying the entire ventricle.

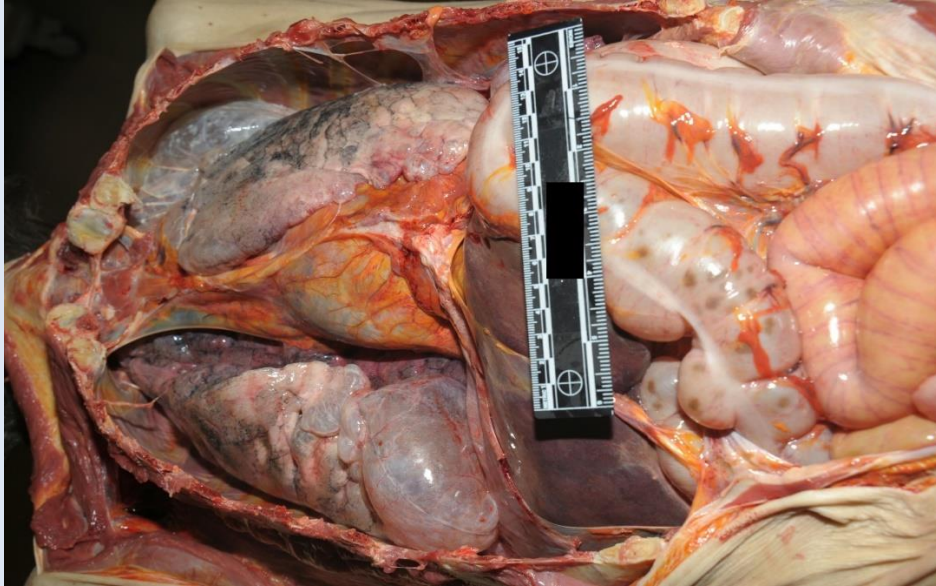
12.1. What is the diagnosis?

Cerebral abscess with ventriculitis

Assignment:

List the causes of brain abscess and out the pathophysiology

(13) This photograph was taken at the autopsy of a 65 year old man who died suddenly.



13.1 Describe the pathology you observe in this photograph.

13.2 What is the likely mechanism of death?

13.3 Give two (2) underlying causes.

Photograph by courtesy of Dr. Richard Harruff

Answer

13.1 Describe two pathological findings that you observe in this photograph.

Bullous pulmonary emphysema lung with large bullae involving the right lower lobe and left upper lobe.

13.2 What is the likely mechanism of death?

Pneumothorax due to ruptured bullae.

13.3 Give two (2) underlying causes.

- Smoking
- Air pollution
- Occupational exposure
- Genetics

Assignment:

Describe pathophysiology of pulmonary emphysema

(14) This photograph of the heart was taken at the autopsy of a 50 year old man who was found dead in his room



14.1 Describe the abnormalities you observe in this photograph.

14.2 What is the diagnosis

14.3 State three (3) underlying etiologies.

Photograph by courtesy of Dr. Richard Harruff

Answer

14.1 Describe the abnormalities you observe in this photograph.

The heart is very large and has a globoid shape because all of the chambers are dilated

There are multiple petechial haemorrhage

14.2 What is the diagnosis

Dilated cardiomyopathy

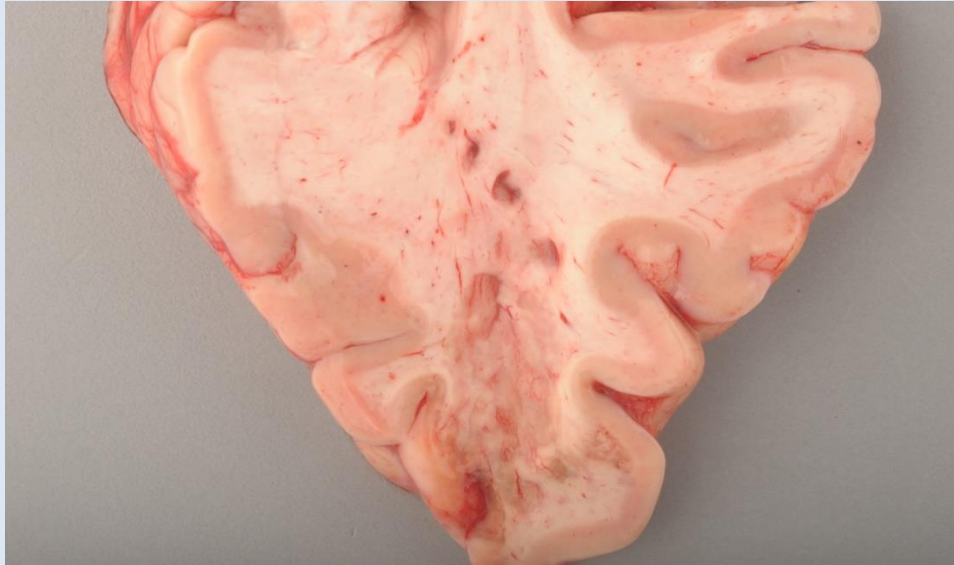
14.3 State three (3) underlying etiologies.

- Familial
- Inflammatory
- Alcoholism
 - anthracycline drugs
 - ingestion of metals
 - autoimmune and systemic disorders

Assignment:

Find other forms of cardiomyopathy and how to differentiate each of them at autopsy.

(15) The photograph was taken at the autopsy of a man who had a sudden death following a road trauma.



15.1 Describe the pathology you observe

15.2 What is the diagnosis?

15.3 State 3 risk factors for this condition

Photograph by courtesy of Dr.Richard Harruff

Answer

15.1 Describe the pathology you observe

There are multiple small, cavitory infarcts (lake-like space <15mm), tissue loss in cerebral white matter

15.2 What is the diagnosis?

Lacunar infarctions of cerebral white matter

15.3 State 3 risk factors for this condition

- Aging
- Hypertension
- diabetes mellitus
- hyperlipidemia
- smoking

Assignment:

Describe the causation of lacunar infarcts

(16) This photograph is from a section of the spleen from an alcoholic who presented with haematemesis



16.1 Describe the observation

16.2 What is the diagnosis?

Photograph by courtesy of Dr. Richard Harruff

Answer

16.1 Describe the observation

Cut section of the spleen showing multiple dark haemorrhagic foci of varying sizes

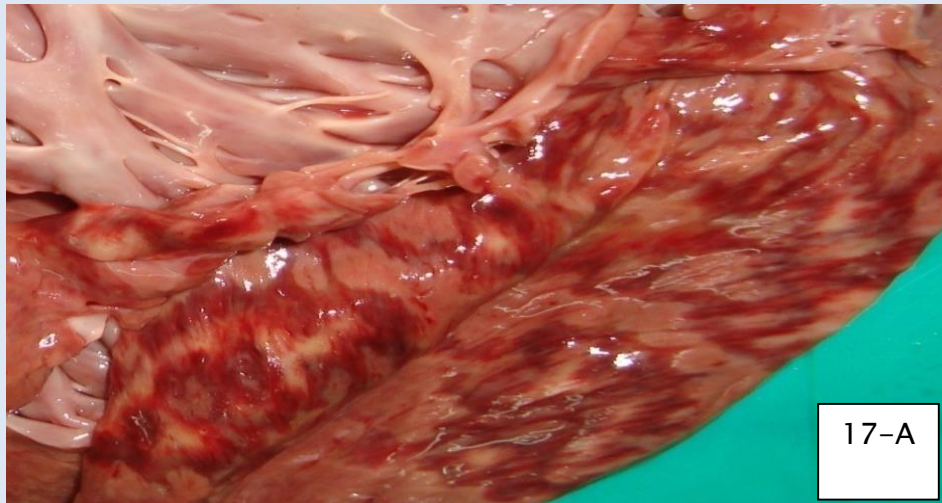
16.2 What is the diagnosis?

Gamma Gandy bodies

Assignment:

Find the causes for formation of siderotic nodules of the spleen

(17) A & B photographs of the heart were obtained at autopsy of a man following a sudden death at home.



17.1 Describe the findings

17.2 State the cause of death according to the WHO format

Answer

17.1 Describe the findings

There is occlusive coronary atherosclerosis. The myocardium shows a transmural infarction. There are necrotic muscles that appears yellow-tan. Surrounding this is a zone of red hyperemia. (tigroid appearance). Remaining viable myocardium is reddish- brown.

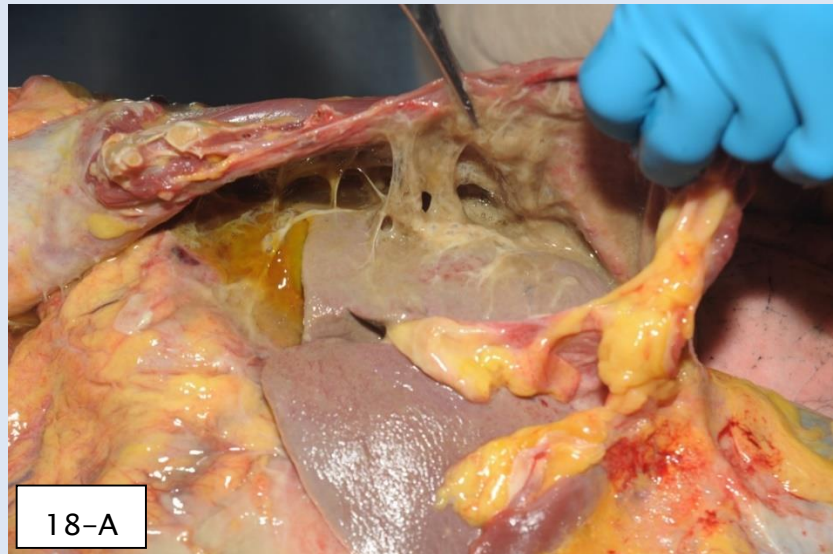
17.1 State the cause of death according to the WHO format

- 1 A. Recent myocardial infarction
- 1 B. Occlusive coronary atherosclerosis

Assignment:

Describe the microscopic findings observed in a heart following a myocardial infarction in a chronological order.

18. Photographs A and B were taken at an autopsy of a 58 year old alcoholic presented with features of an acute abdomen



18.1 Describe your observations

18.2 State the cause of death according to the WHO format

Photograph by courtesy of Dr. Richard Harruf

Answer

18.1 Describe your observations

There is thick fibro purulent exudate in the peritoneum. Especially over the liver and on the parietal peritoneum covering it. There is a perforated gastric ulcer on the pylorus.

18.2 State your cause of death according to the WHO format

1 A. Peritonitis

Due to

B. perforated pyloric ulcer

2. Chronic ethanol abuse

Assignment:

State other causes for peritonitis

19. Photographs A,B,C and D are sections from the heart at autopsy of a 24 year old man who collapsed suddenly while jogging





19.1 Describe the pathology you observe in these photographs.

19.2 What is your diagnosis?

Photographs by courtesy of Dr. Richard Harruff

Answer

19.1 Describe the pathology you observe in these photographs.

Cross section of the heart showing increased fat in the outer walls of the right ventricle and left ventricular anterolateral walls. Towards the apex, right ventricle shows that the anterior wall is nearly completely replaced with fat, and fibrofatty irregular posterior wall involvement is seen. No actual thinning of the wall itself exists, although the muscular portion is in some areas completely missing.

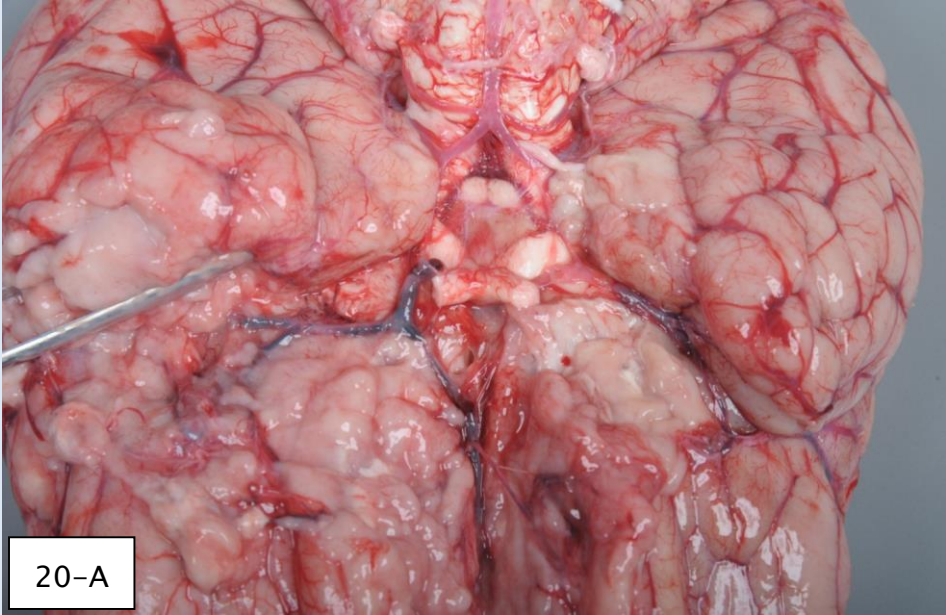
19.2 What is your diagnosis?

Arrhythmogenic right ventricular dysrhythmia (ARVD)

Assignment:

Describe the microscopy of the heart in ARVD

20. Photographs A, B and C were obtained at an autopsy from a teenage boy who had a sudden death.





20.1 Describe the observations.

20.2 State 2 risk factors for this condition

Photographs by courtesy of Dr. Richard Harruff

Answer

20.2 Describe the observations.

Thrombosis of the left middle and anterior cerebral artery is seen here.
There is evidence of necrosis of the left frontal and temporal lobes.

20.2 State 2 risk factors for this condition

- Familial hypercoagulable state
- Vasculitis

Assignment:

Describe the pathophysiology of vasculitis