Organ Tissue Blocks

Chapter Outline

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College of American
Pathologists

INTRODUCTION

The role of histopathology should be restricted to relevant lesions and suspected organs in view of cause of death.

Tissue sampling during autopsy: After taking history of the case surgeon has to make a plan about incisions and possible tissue blocks to screen further. All bottles and formalin solution should be kept ready for use. It is always rewarding to discuss the case with clinical pathologist. In sudden deaths, sampling of affected organ is done as per protocol and requirement. In special situations, skin can be preserved in electrocution/firearm injuries/injection or puncture marks in IV drug abusers, lungs can be preserved in drowning, and kidneys can be preserved in snake bites/ mismatched blood transfusion deaths. Precaution when tissue is taken out remove excess bleeding, avoid excessive washing, it should not be dry and there should be sufficient preservative.

After the organs have been dissected, and the photographs of intact specimens completed, the doctor should verify that tissue blocks for histology study from the following organs/tissues in adult cases have been taken. In routine forensic cases, detailed microscopic study is not recommended but in sudden death cases, fetal deaths require proper and complete screening. Where gross findings are clear then microscopic study is just of corroborative value.

The **routine blocks** submitted for preparation of histology slides in sudden death case should include the following blocks or as deemed necessary. Additional sections of any organ can be taken as necessary depending on lesions, to evaluate gross findings.

TISSUE BLOCKS

Heart: The following three sections are recommended if no lesions are identified:

- i. Cross section of anterior descending branch of left coronary artery to include the underlying myocardium including the septum.
- ii. Vertical section through posterior mitral leaflet to include part of posterior wall of left atrium and left ventricle.
- iii. Section to include right ventricle.

Lungs: Two sections from each lobe of lung for a total of 10, in 5 cassettes (1 cassette/lobe). One section from each lobe should include a lobar bronchus and one should be from peripheral lung with pleura.

Various organs—one section only: One section should be submitted from each of the following organs: Thyroid, spleen or lymph node, pancreas, each lobe of the liver, each kidney (to include cortex and medulla), each adrenal, each testis or ovary, prostate or uterus (to include endometrium and myometrium), urinary bladder, aorta, skin, muscle (diaphragm or psoas), and bone or bone marrow.

Gastrointestinal tract: 2–4 sections should include esophagus, stomach, and small and large intestines.

Brain and spinal cord: Sections will be taken at the neuropathology conference to include:

- Cerebral cortex
- Basal ganglia
- Thalamus/hippocampus
- Midbrain
- Pons
- Medulla
- Cerebellum
- Spinal cord

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Note:

- 1. The actual number of blocks submitted for histopathology on a given case should be just adequate but not excessive as it requires lot of time and resources. Pathology department is loaded with clinical material.
- 2. In general, the routine can be selected to include diffuse lesions and most focal lesions. In some cases, especially if the nature of the lesion is uncertain grossly, several blocks should be taken of a given organ.
- 3. Avoid taking sections from totally dead necrotic tissue (usually yellow-tan). Obtain sections from the periphery of necrotic lesions showing the junction of viable and necrotic tissues.
- 4. Increasing the number of blocks beyond a few rarely provides significant additional information. In case, you want further study, preserve the left out tissue.
- 5. In addition it is desirable to preserve basic organs and tissues by fixation in a save bottle in the event of the finding of some unexpected observation of the case.

ROUTINE BLOCKS IN ADULTS

Recommendation on number of blocks to take for each adult case (Table 6.1).

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The following is a list of **tissue specimens** that are suggested **to be preserved** in all adult and pediatric cases by the **College of American Pathologists.** The list duplicates many of the specimens already mentioned for routine sectioning.

Adrenals	One block from each
Aorta	Strip from ascending portion
Brain	Blocks of cortex (hippocampus, water shed), basal ganglia, cerebellum, and brainstem
Breast	One from each in females; males optional
Colon	One cross-section from near rectosig- moid area
Duodenum	One block from gastroduodenal junction
Esophagus	One block with all layers; may be taken from gastroesophageal junction
Fallopian tube	One cross-section from each
Gallbladder	One block with all layers
Heart	Blocks from right and left sides to include atrium, ventricle, and AV valve in continuity

Table 6.1: Organ blocks				
Organs	Sections	Cassettes		
Lungs: 2 sections/lobe	10	5		
Heart: LV, RV, septum, major coronary	6	6		
arteries (LAD, left circumflex, RCA)				
showing the most severe stenosis				
Esophagus, stomach, small and large bowe	ls 2–4	1–2		
Thyroid	1	1		
Spleen/lymph node	2	1		
Pancreas: Head, body and tail	3	1		
Liver: 1 piece from each lobe	2	1		
Kidneys: 1 from each	2	2		
Adrenals: 1 piece from each	2	1		
Ovaries/testis: 1 piece from each	2	1		
Prostate/uterus	1	1		
Bladder	1	1		
Bone	1	1		
Muscle	1	1		
Skin lesion: 1 control, 1 rest on findings	2	1		
Brain	10	5		
Cortex	1			
Basal ganglia	1			
Thalamus	1			
Hippocampus	1			
Midbarin	1			
Pons	1			
Medulla	1			
Cerebellum	1			
Spinal cord	1			
Pituitary	1			

Ileum	One cross-section about 20 cm proximal to the cecum
Jejunum	One cross-section just distal to the ligament of Treitz
Joint	Block of sternoclavicular joint; if exudate or deposits of material are present, scrape surface and prepare an air-dried smear
Kidneys	Blocks from each to include capsule, cortex, medulla, apex of papilla, and pelvis
Liver	Two blocks, at least one including capsule
Lung	Blocks from each lobe containing pleura and bronchi
Lymph nodes	Axillary, hilar, inguinal, and abdominal nodes
Muscle	Longitudinal and transverse sections of diaphragm and psoas
Ovary	One block from each to include cortex and hilum
Pancreas	Blocks from the head and tail
Parathyroid	All tissue found

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Organ Tissue Blocks

Pituitary	One block
Prostate	One transverse block to include ure- thra, posterior lobes and capsule (level of verumontanum)
Rib	Marrow expressed into a separate bottle of fixative for sections; block with costochondral junction
Skin	One representative
Spinal cord	One cross-section including meninges
Spleen	One block with capsule
Stomach	One block with all layers, fundus
Testis	One block from each to include capsule and epididymis
Thymus	Organ, or a block taken from the anterior mediastinal fat pad

Thyroid	One block from each lobe
Urinary bladder	One block to include all layers
Uterine cervix	One block to include vagina, cervix, and endocervical canal
Uterus	One block including endometrium and myometrium
Vertebra	Sagittal block including a disc

In forensic practice, one has to be selective about tissue samples, only appropriate lesions should be screened otherwise it increases unproductive workload. Only selective cases require histopathology examination, rest can be settled even without it.

Disposal of waste tissues should be done as Medical Bio-hazard Waste Disposal Rules.