1. Guidelines for Autopsy Pathology

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Autopsy investigation of foetal and perinatal death

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1.1 Adult Autopsy

1.1.1 Introduction

In response to the requirements of the Health Sector Development Project funded by the World Bank, The College of Pathologists of Sri Lanka has formulated ***Best Practice Guidelines and Minimum Datasets in Autopsy Pathology***. All qualified pathologists in Sri Lanka should adhere to the standards and the minimum datasets set out in these best practice guidelines, to ensure that pathologists performing pathological autopsy will maintain high standards of professional performance.

These guidelines will help the pathologist performing the pathological post mortem in deaths which appear not to occur in suspicious circumstances.

The College of Pathologists of Sri Lanka is responsible for setting standards to deliver quality pathology service in a developing country like Sri Lanka where all the necessary investigations may not have been performed due to financial restraints. In such situations the pathologist must not be pressurized to make a diagnosis that cannot be arrived at by the pathological findings of the autopsy examination. In such situations, the pathologist should be able to request the coroner to arrive at the cause of death by discussing the relevant clinical features and results of investigations.

The college recognizes the hardships faced by the pathologists working in the peripheral part of the country, where basic investigation facilities may be scarce. In such situations, the pathologist who is performing the autopsy is required to adhere to the minimum datasets, which will demonstrate commitment to quality and accountability.

The pathologist should work hand in hand with their colleagues from the same discipline where expert opinion should be obtained in special situations, as well as with colleagues from other clinical departments where the diagnosis can be facilitated by clinical findings.

1.1.2 Pre requisites for performing an autopsy examination (Grade X)

Before performing a pathological autopsy it should be established whether the following requirements have been fulfilled.

- A probable cause of death should be given in all situations
- The coroner's report stating that the death occurred under natural circumstances.
- The Director of the Hospital where the death occurred should authorize carrying out of the autopsy.
- Informed consent should be obtained from the next of kin for performing a full post mortem or a limited post mortem, whichever the case may be, and for retention of organs or specimens if necessary. (Annexure 1)
- If, after scrutiny of all the information, the pathologist feels that the post mortem examination is not going to add any additional information, the pathologist should discuss with the attending physician whether a post mortem examination is necessary.
- When the information is insufficient to fulfill the above criteria, the pathologist must seek further information or request an inquest.
- The pathologist should alert those present at the post mortem to take proper precautions when dealing with hazardous organisms (Annexure 5)

A pathological post mortem should not be carried out in the following circumstances

- In all homicides.
- In all suicides.
- Death following Road Traffic Accidents.
- Death on Table (within 24 hours of surgery).
- Death occurring under suspicious circumstances.
- In the event of an inquest
- Death on admission in a previously healthy individual.
- Maternal deaths.
- Death following narcotic intoxication

1.1.3 The Post Mortem Examination.

The pathologist performing the post mortem examination should adhere to the following guidelines when performing the autopsy.

- Ensure that the body is that for which the postmortem was requested and authorized by positive identification by a relative or attending physician.

- Proper safety precautions to be taken in accordance with infection control protocols when dealing with hazardous samples or post mortem examination. (Annexure 5)

- Evisceration should be only carried out after the external examination is performed.
- The examination of the body should be carried out in a manner, which respects the dignity of the deceased.
- If facilities are available, photographs should be taken for later reference.
- Facilities should be available for storing and preservation of material, tissue and organs retained relevant to the cause of death
- Ensure that facilities are available for proper labelling of specimens, proper collection of specimens and prompt submission to the laboratory.
- Ensure that proper reconstruction of the body is carried out after the post mortem examination.

The pathologist performing the post mortem examination should adhere to the following when performing the autopsy.

- Identification by a relative or attending physician.
- Proper safety precautions should be taken.
- External examination and evisceration.
- Photographs to be taken for future reference.
- Proper storing and preservation of material, tissue and organs
- Proper collection, labelling of specimens, proper collection and prompt transport.
- Ensure that proper reconstruction of the body after the post mortem examination.

1.1.4 Steps involved in conducting the post mortem examination (Grade X)

A. Step 1

Identification of the deceased

- Name of person identifying the deceased
- Relationship to the deceased

Details of the deceased

- Full name of the deceased
- Address
- Date of birth / Bed Head Ticket Number
- Date of Admission
- Ward number
- Date of death
- Date of autopsy

B. Step 2

Details of the medical practitioner conducting the post mortem examination

- Name of the pathologist/trainee pathologist conducting the post mortem examination
- Designation

C. Step 3

Details of the authorizing officer

- Name of the authorizing officer (e.g. Director of the Institution)
- Designation

D. Step 4

Probable cause□causes of death

a)
b)
c)

E. Step 5

Clinical History

- Circumstances of death: date, time and place of death (e.g. at home, at rest, after ingesting medication or food, during exercise)
- Whether the death occurred under suspicious circumstances
- Past medical history- General state of health, significant past medical disease (e.g. hypertension, diabetes, Ischaemic heart disease, malignancy, sickle cell disease, Chronic Obstructive Pulmonary Disease (COPD), Tuberculosis, Chronic renal failure, occupational lung disease, peptic ulcer disease, inflammatory bowel disease, psychotic or depressive diseases)
- History of medication- eg: Anti psychotic drugs, cardiac drugs.
- History of narcotic drug or alcohol abuse
- Family history- e.g. genetically transmitted disease, Ischaemic heart disease, emphysema, diabetes, hypertension
- History of recent surgical interventions- e.g. cardiac surgery, interventional cardiac procedures, Barium enema, Endoscopic procedures, bronchoscopic biopsies,
- Investigation findings- ECG findings. Serum electrolytes, blood urea/ serum creatinine, radiological findings (Chest X-ray, ultrasound examination, CT scan)

F. Step 6

External Examination (Grade X)

- Height and build
- Complexion
- Colour of the eyes, hair
- Marks of identification- e.g. Scars, tattoos, moles
- Any obvious disabilities (e.g. amputated limbs, contractures)
- General examination- pallor, jaundice, cyanosis, swelling of the legs, xanthelasma, rashes, petechial haemorrhages, bruises, injuries or wounds, tongue biting, any obvious syndromes (neurofibromatosis, Marfan's syndrome)

G. Step 7

Internal Examination (Grade X)

i. Examination of chest cavity

- Presence or absence of pulmonary embolism - Heart, great vessels and lung should be examined in- situ for the presence or absence of an embolus in the pulmonary trunk
- Presence or absence of Pneumothorax
- Presence or absence of air embolism

ii. **Examination of the heart** (Grade X)

- The pericardium should be checked for effusions, adhesions, and haemopericardium.
- Anatomy of the great vessels should be inspected and the great vessels transected for thrombi or emboli
- The atria should be opened into and the valves should be checked for thrombi, vegetations, valvular abnormalities, congenital abnormalities, abnormality of the valve rings,(e.g. bicuspid valves), valve rupture/ papillary muscle rupture in Ischaemic heart disease
- The aorta, pulmonary artery and coronary ostia should be inspected for any abnormalities.
- Examination of the major coronary arteries and their branches- the anatomy, distribution, narrowing and calcification should be documented (The coronary arteries cut at 3mm intervals transversely to look for narrowing, obstruction and calcification)
- The ventricle should be cut at 1 cm intervals from apex to mid ventricular level to look for symmetry, ischaemic lesions, thrombi, aneurysms, and hypertrophy.
- The thickness of the myocardium should be measured in the posterior wall of the left ventricle (approximately 1 cm below the mitral valve) and at the septum.
- The weight of the heart should be measured after emptying the blood and correlated with age, sex and body weight of the individual.
- The heart should be cut open in the direction of blood flow.

- Representative blocks from lesions in the myocardium of the posterior wall of the left ventricle and septum in cases of ischeamic heart disease, and cardiomyopathy.
- Other relevant tissue based on observations.
- Blocks for teaching purposes if necessary.

ii. ii Organ retention

- In cases where expert opinion is needed
- For teaching purposes.

iii. **Examination of the lungs** (Grade X)

- Proper precautionary measures to be adhered to when dealing with hazard type 3 organisms (Annexure 5)
- Presence of pleural effusions and the nature of the effusion (e.g. blood stained, colourless, pus) should be noted**.**
- Each lung should be separated across the main bronchi at the level of bifurcation of the trachea.
- The lungs should then be put into a bucket of water to examine whether the lungs sinks or floats on water.
- Bronchi should be longitudinally cut open up to the pleura to look for collected secretions, foreign bodies, bronchiectasis, bronchitis, mucus plugs, casts, and tumours
- Lungs should be examined externally for haemorrhagic spots (in asphyxia) pleural thickening, (past infection) adhesions, (infection) puckering, (underlying tumour)
- Pleura should be examined for adhesions,(past infection) nodules, plaques (asbestosis) and tumour (e.g. mesothelioma).
- Lungs should be cut in the coronal plane from hilum to the pleura, washed and weighed.
- The consistency of the cut surface, areas of consolidation, abscesses, apical cavities, fibrosis, emphysema, caseous necrosis, and tumours should be noted.
- Presence of enlarged hilar nodes, their consistency and the presence of caseation should be noted.

iii. i Recommended blocks for histological assessment (Grade X)

- To determine the extent and type of neoplastic disease.
- Immunohistochemistry to be performed if necessary e.g. Mesothelioma. (Grade Y)

iii. ii Organ retention

- For tumour related occupational lung disease.
- Research and medical education purposes.

iv. **Examination of the abdominal cavity** (Grade X)

- Presence of ascites, collections of pus, blood or faecal matter, rupture of a viscus, evidence of recent surgical intervention.
- Presence of mesenteric nodules, or tumour deposits.

iv. i Recommended blocks for histological assessment (Grade X)

- Sample of ascitic fluid for cytology
- Blocks from mesenteric nodules or deposits.

v. Examination of Gastrointestinal system (Grade X)

v i. Mouth, tongue and oesophagus

- The mouth, tongue and oesophagus should be examined for ulcers, injuries and tumours.

- The stomach is separated at the cardiac and the pyloric ends.
- The stomach is placed in a container and opened along the greater curvature.
- The contents of the stomach should be collected, the colour, smell and presence of blood should be noted, and the contents sent for further investigation if necessary.
- The internal surface of the stomach should be examined for ulcers, and tumours.

v. ii. i. Recommended blocks for histological assessment (Grade X)

- Representative samples from ulcers, tumours, any other lesions.

v. iii. Examination of the intestines

- The entire intestine (small and large) should be cut open and the cut surface examined for injury, ulceration, strictures, toxic dilation, volvulus, gangrene and tumours.
- The mesentery should be examined for haemorrhage, injury and tumour deposits.

v. iii. i. Recommended blocks for histological assessment (Grade X)

- Representative samples from ulcers, tumours or any other lesions.

v. iii. ii. Organ retention

- For teaching purposes

vi. Examination of the Hepato biliary System and Pancreas (Grade X)

vi. i. Liver

- The liver should be separated, weighed and sliced at 1cm intervals.
- Note the colour of the liver.
- Examine the liver for injury, fatty change, cirrhosis, and primary or metastatic tumour.

vi. ii. Gall bladder

- The gall bladder is dissected with the biliary tract up to the opening at the duodenum.
- The patency of the biliary tract, presence of stones or tumour in the gall bladder or biliary tract is noted.

vi. iii. Pancreas

- The pancreas should be opened in the longitudinal axis.
- Examine the pancreas for haemorrhage, necrosis and tumours.

vi. iv. Recommended blocks for histological assessment (Grade X)

- Representative samples from suspected areas

vi. v. Organ retention

- For teaching purposes

vii. **Examination of the Spleen** (Grade X)

- The spleen should be separated at the hilum and weighed
- It should be sliced at 0.5cm intervals.
- The spleen should be examined for rupture. Infarction, diffuse nodularity, and focal lesions

vii. i. Recommended blocks for histological assessment (Grade X)

- Representative samples from suspected areas including the hilar region.

viii. **Examination of endocrine glands** (Grade Y)

Detailed examination of these glands should be carried out where an endocrine pathology is suspected. (Grade X)

viii. i. Pituitary gland

- Should be carefully dissected out and weighed
- Anterior and posterior lobes should be identified, and examined for focal lesions.

viii. ii. Thyroid

- The thyroid should be weighed.
- It should be examined for the presence of multinodular goiter, thyroiditis and tumours.

viii. iii. Parathyroid gland

- Number of glands identified
- Weight of each gland
- Presence or absence of focal lesions

viii. iv. Adrenal

- The adrenal glands are weighed separately.
- Examine for haemorrhage, enlargement, and unilateral or bilateral focal lesions.

viii. v. Recommended blocks for histological assessment
Representative samples from suspected areas

viii. vi. Organ retention

- If special investigations need to be carried out.
- For teaching purposes.

ix. **Examination of the kidneys, ureters and bladder** (Grade X)

- The kidneys, ureters and bladder can be dissected en- bloc or separately.
- The kidneys are separated from the adrenals and each kidney weighed separately.
- The renal artery is examined for stenosis.
- The capsule of the kidney should be stripped and the surface examined for nodularity, scarring, cysts, petechial haemorrhages, or abscess formation.
- The kidneys should be cut open longitudinally and examined for calculi, state of the pelvis, cortico-medullary demarcation, caseation, abscess formation, or tumour.
- The ureters are opened longitudinally and examined for patency, calculi, focal lesions or tumour.
- The bladder contents should be syringed out and the bladder cut open to look for calculi, hypertrophy of the bladder wall, haemorrhage or tumour.

ix. i. Recommended blocks for histological assessment (Grade X)

- Representative samples from suspected areas with adjacent normal tissue.

x. **Examination of the pelvic cavity** (Grade X)

- Examination of the pelvic cavity and pouch of Douglas for blood, pus, rupture of a viscus, petechiae, adhesions, abscesses.
- Representative samples to be taken

xi. **Examination of the pelvic organs** (Grade X)

- An ovoid incision is made lateral to the labia majora, which extends inferiorly and curves round the anus and continues upward up to the pubic symphysis.
- The pelvic organs including the bladder, urethra and rectum, with vagina, cervix, uterus, fallopian tubes and ovaries in the female, and the prostate and the testis in the male are dissected out.

xi. i. Uterus, fallopian tubes and ovaries.

- The uterus should be weighed and examined for evidence of pregnancy, abortion, products of conception, foreign bodies, instrumentation, rupture, haemorrhage, placental parts, and tumours.
- The fallopian tubes should be cut open and examined for ectopic pregnancy, or tumour.
- The ovaries should be weighed and examined for corpus luteum, cysts or tumour.

xi. i. i. Recommended blocks for histological assessment

- Representative blocks should be taken from any abnormal area, products of conception or tumour.

xi. ii. Prostate and testes (Grade Y)

- The prostate should be dissected out through the abdomen after making an incision at the pelvic outlet, weighed and examined for tumours.
- The testis is removed by making a small nick in the inguinal canal and pushing the testis out of the inguinal canal.

xi. iii. Rectum and anus (Grade X)

- The rectum and anus should be longitudinally cut open and examined for ulceration or tumour.

xii. Examination of the brain (Grade X)

- The scalp incision is made joining the mastoid processes across the vertex and the scalp reflected making note of any hemorrhage or other abnormalities. The skull is opened with a saw by a horizontal incision above eyebrow ridges, extending backwards above the ears up to the occiput.
- The tentorium, blood vessels and nerves at the base of the skull are cut and the brain separated from the spinal cord at the deepest level while supporting the brain with palms and fingers.
- The tentorium is examined for haemorrhages.
- The Circle of Willis should be carefully dissected out and opened longitudinally to examine for thrombosis, atherosclerosis and aneurysms.
- The brain should be weighed and examined externally for areas of haemorrhage, injury, flattening of gyri and narrowing of sulci in cases of increased intracranial pressure.
- If any cerebral pathology is suspected the brain is examined after suspension in a 10-litre bucket and fixation in 10% formalin for two to three weeks. After fixation the brain stem and the cerebellum are separated and the brain is sliced at 1 cm intervals.
- The levels of the slices should include the anterior margin of the temporal lobe, anterior margin of the optic chiasma, mammilary bodies, midbrain at the posterior end of the substantia nigra, and occipital lobe.

- The slices should be examined for asymmetry, areas of haemorrhage, infarction, hydrocephalus, abscesses.
- The cerebellum is cut in the coronal plane and the nuclei examined for haemorrhages and infarction.
- The brain stem is sliced at 4mm intervals and examined for haemorrhages, infarctions and tumour.

xii. i. Recommended blocks for histological assessment (Grade X)

- Representative blocks from any pathology such as infarct, haemorrhage, sinus thrombosis, abscess, and suspected tuberculous focus, plaques of tuberous sclerosis, aneurysms, arterio-venous malformation, and tumour.
- Opinion of a senior pathologist should be sought when reporting if necessary.

xii. ii. Organ retention

- The brain should be retained for examination after adequate fixation in cases where a cerebral pathology is suspected.
- For research, and teaching purposes.

xiii. Examination of the spinal cord (Grade Y)

Detailed examination of these glands should be carried out where spinal cord pathology is suspected. (Grade X)

- This is carried out in special circumstances where pathology of the spinal cord is suspected.
- The body is placed face down on the autopsy table.
- A midline skin incision is made from the occiput to the buttocks.
- The posterior vertebral muscles are separated up to the vertebral column.
- The posterior laminae with their interconnecting ligaments are cut with a saw and the posterior wall of the spinal cord is removed.
- The spinal cord should be carefully dissected out and fixed for a few days.
- It should be cut at 4mm slices or less and examined for the suspected pathology.

xiv. Dissection of the calf veins (Grade Y)

Detailed examination of these glands should be carried out where vascular pathology (thrombosis thromboembolism) is suspected. (Grade X)

- This is done in the presence of pulmonary embolism to look for deep vein thrombosis
- A midline posterior incision is made on the back of leg above the popliteal fossa to the ankle.
- The skin and the calf muscles are cleared from the Achilles tendon below to the upper attachment to the bone.
- Transverse sections are made on the soleus and gastrocnemius muscles cutting through the vessels.
- The vessels should be examined for ante-mortem clots which will be seen bulging out from the deep veins of the leg commonly seen in the interosseous veins between tibia and fibula.

xiv. i. Further Analysis**:** **(Grade Y)**

When relevant, samples should be sent for,

- Microbiological examination and culture
- Cytology
- Bone marrow examination
- Collection and analysis of vitreous humor for estimation of sodium, chloride, potassium, and glucose. Normally the sodium, potassium and glucose levels fall after death and the potassium level rises.

- A Sodium level of > 155-mmol/ l, chloride level of > 135mmol/l and urea level > 40 mmol/l is a reliable indication of ante mortem dehydration[1]
- When sodium and chloride levels are normal and blood urea level is >150 a diagnosis of uraemia can be made.
- A vitreous glucose > 11.1 mmol/l is an indicator of diabetes mellitus and a value < 1.4 mmol/l is an indicator of hypoglycaemia.

- Immunohistochemistry in tumours
- Electron microscopy e.g.: mesothelioma, (Grade Z)

xiv. ii. General recommendations regarding blocks for histological assessment:

Organs that need mandatory sampling (Grade X)

- Heart, lung, kidneys, liver, spleen, gut, brain, pancreas, and adrenal.

Organs that may be sampled: (Grade Y)

- Thyroid, bone marrow, breast, testis, prostate, parathyroid, pituitary.

- When taking samples, the blocks can be put into the cassettes at the time of the post mortem and fixed in formalin. When sampling paired organs, blocks from each organ should be sent in separate bottles

H. Step 8

Reporting of the post mortem (Annexure 6) (Grade X)

- The pathologist should inform the clinicians requesting the post mortem of the major findings of the post mortem indicating further investigations that are required for full interpretation.
- Proper preservation should be done for blocks, samples and retained organs.
- The necessary investigations should be carried out without delay.
- Obtain the opinion of another pathologist in difficult cases
- The report should be issued as soon as possible which includes examination findings, conclusion and comments by the pathologist.

Recommendations to the reporting pathologist. (Grade X)

- A provisional report should be issued soon after the post mortem. The full report should be issued as soon as possible.

Limited Autopsy

In limited autopsy the examination is restricted only to particular organs or regions of the body to which the next of kin agree.

- A limited post mortem may not provide all the information about possible abnormalities in other parts of the body.
- The organ or region should be removed en-bloc and examined.

Recommendations by the College to the Ministry of Health:

- Specialized training in perinatal pathology and neuropathology should be offered to Pathologists.

References

1. Bernard Knight, Forensic Pathology, Second Edition; Oxford University Press; 1996.

2. Pryce D.M., Ross C.P., Ross's Post Mortem Appearances, Sixth Edition Oxford University Press, 1961

3. Performance standards for Coroner's pathologists in post –mortem examinations of deaths which appear not to be suspicious, Royal College of Pathologists; November 2003.

4. Samarasekera P.A., Autopsy: guidelines for medical practitioners, G.M.O.A. Medical Journal Volume 2, No1:1998

5. Queensland Health: autopsy 01; Version 2: 07/2004

6. Guidelines on autopsy practice R C Path September 2002

1.2 Annexure 1

Name of the Deceased	Age
Sex-Male/ Female	Hospital
Ward	BHT Number
Admission Number	Date of Admission
Date of death	Clinical Consultant
Name of the doctor performing the pathological post mortem	Designation

Consent Form for Pathological Post Mortem Examination

1. I am the immediate next of kin of the deceased.

2. My relationship to the deceased is…….

3. To my knowledge no next of kin object to the proposed procedure

4. In order to confirm/ determine the cause of death, and the nature and extent of the diseases present, I consent to a
a) Full Pathological post mortem
. or
b) Limited pathological post mortem involving the following organs.

5. I understand that
- Small pieces of tissue from each organ studied will need to be processed and examined under a microscope
- Some organs may be retained for further examination or for teaching purposes

6. At the end of the examination, the diagnostic samples will be disposed of respectfully by the hospital or handed over to a medical museum for teaching purposes.

7. I consent to the hospital removing, using and keeping samples for research or teaching purposes.

8. I consent to the hospital and doctors using the medical records for research or medical education if the deceased's identity is not revealed.

9. The medical officers involved in the management of the deceased, have explained the nature of the pathological post mortem and the reason for it

I have read and understood the hospital pathological post mortem consent form

- Name of the immediate next of kin……
  ……..
- Relationship to the deceased
……
- Address……..
  ……..

- Signature……
- Date……...

Reference:
Queensland Health: autopsy 01; Version 2: 07/2004

1.3 Annexure 1a

Consent For a Pathological Post-Mortem-
Information for the families

Thank you for considering and /or giving consent to this pathological post mortem at a difficult time for you and your family. The aim of this document is to provide answers to frequently asked questions in helping the family of the deceased to make a decision to consent to a pathological autopsy and /or tissue removal.

What is a Pathological Post -Mortem?
It is careful internal and external examination of the body and organs including microscopic examination, by a pathologist.

Why is it performed?
The aim of this post mortem is to

- Help in determining the cause of death
- Extent of the disease
- To look for any other diseases that may have coexisted.
- Help with the treatment of other patients with the same disease.

What are the types of pathological post mortems?

1. **Full Post-Mortem**
   This will ensure full external and internal examination of the body with possible retention of some organs for further investigations**.**

2. **Limited Post- Mortem**
   The examination is limited to the region or organ for which the consent has been given. However, this might not provide all the necessary information about the nature of the disease.

What happens in a pathological post mortem?

- The pathologist will make a careful external and internal examination of the body, organs and send tissue, body fluid or blood samples for further analysis if necessary.
- The examined organs that are not necessary for further sampling will be returned to the organ. The retained organs will be respectfully disposed of.

Will organs be retained?

- If some organs need to be examined later, these organs may be retained.
- You can also give consent for retention of organs in the deceased for purposes of medical education and research.

How will we know the outcome of the autopsy?
The pathologist will issue a detailed report of the findings in helping to determine the cause/ causes of death

Will this post mortem delay the funeral?
There will be a delay only if you want the organs that were removed for examination and further investigations to be returned to the body prior to the funeral

1.4 Annexure 2

Anatomical Normal Values in Healthy Young Adults

Organ	Weight (grams)	Type of Measurement	Value (cm)
Adrenal	**4-7**	Length Width Thickness	4.5 3 0.5
Aorta		Length Diameter- Ascending Descending Abdominal Wall Thickness	42-50 2.5 1.5-2 1.2-1.5 0.15-0.2
Bladder	**30-60 (empty)**	Wall thickness	0.2-0.3
Cerebellum	**150**		
Cerebrum	**1300-1450 (Male)** **1250-1300 (Female)**	Vertical diameter Sagittal diameter	16-17 (Male) 15-16 (Female) 12-13 (Male) 11-12 (Female)
Heart	**275-340 (Male)** **230-290 (Female)**	Length Width Thickness of left ventricle Thickness of right ventricle Thickness of atria Circumferences: Mitral Aortic Pulmonary Tricuspid Pulmonary Artery	11.4-14 7.5-10 0.9-1.2 0.2-0.3 0.1-0.2 10-11 7.5-8 8.5-9 12-13 8-8.5

Intestines		Small	6000
		Large	1000-1500
Kidneys	**150 (Left)** **140 (Right)**	Length Width Thickness Thickness of cortex Cortico-medullary ratio	11.5 6 3.5 0.6-0.8 1:3
Liver	**1400-1650**		
Lungs	**Very variable** **950 (Male)** **790(Female)**		
Oesophagus		Length Wall thickness	25-30 0.6-0.8
Ovaries	**2.5-5**	Length Width Thickness	3.5-4 1.5-2 1-1.5
Pancreas	**70-120**		
Parathyroid	**0.03-0.04**		
Pineal	**0.16**	Length Width	1 0.5
Pituitary	**0.6-0.8**	Length Width Thickness	0.8 1.2 0.6
Prostate	**15-20**	Length Breadth Thickness	3 4 2
Seminal Vesicles		Length width Thickness	4-4.5 1.5-1.7 0.8-1
Spinal Cord		Antero-posterior diameter: Cervical Thoracic Lumbar	 1.3 1 1.2

Spleen	**125-195**	Length Width Thickness	10-12 7-8 2.5-4
Stomach	**125-175**	Length (Greater curvature) Wall thickness	25-30 0.6
Testicles	**14-18**	Length Width Thickness	4-5 2.5-3.5 2-2.8
Thyroid	**20-35**		
Ureters		Length	28-30
Uterus **Nulliparous** **Multiparous**	 **40-60** **75-125**	Length Width Thickness Length Breadth Thickness	7 4 2.5 8 5 3.5
Placenta	**450-600**	Diameter Thickness	15-20 1.5-3

*Data from Pryce D.M., Ross C.P., Ross's Post Mortem Appearances, Sixth Edition Oxford University Press, 1961

1.5 Annexure 3

Normal weight of heart in relation to body length

Body Length (cm)	**Heart Weight (grams) Males**	**Females**	**Body length (cm)**	**Heart Weight (grams) Males**	**Females**
135	254	219	**168**	317	277
136	256	220	**169**	319	279
137	258	222	**170**	321	281
138	260	224	**171**	323	283
139	262	226	**172**	325	285
140	264	227	**173**	327	286
141	266	229	**174**	329	298
142	268	231	**175**	330	290
143	270	233	**176**	332	291
144	272	235	**177**	334	293
145	273	236	**178**	336	295
146	275	238	**179**	338	297
147	277	240	**180**	340	299
148	279	242	**181**	342	300
149	281	243	**182**	344	302
150	283	245	**183**	346	304
151	285	247	**184**	348	306
152	287	249	**185**	349	307
153	289	251	**186**	351	319
154	291	252	**187**	353	311
155	292	254	**188**	355	313
156	294	256	**189**	357	315
157	296	258	**190**	359	316
158	298	259	**191**	361	328
159	300	261	**192**	363	320
160	302	263	**193**	365	322
161	304	265	**194**	367	323
162	306	267	**195**	368	325
163	308	268	**196**	370	327
164	310	270	**197**	372	329
165	311	272	**298**	374	331
166	313	274	**199**	376	332
167	315	275	**200**	378	334

*Data from Bernard Knight, Forensic Pathology, Second Edition; Oxford University Press; 1996. Page 596

1.6 Annexure 4

Age related weight of brain

Age (Years)	Brain Weight (grams)	
	Men	Women
17-19	1340	1242
20-29	1396	1234
30-39	1365	1233
40-49	1366	1240
50-59	1375	1200
60-69	1323	1178
70-79	1279	1121

*Reference:
Bernard Knight Forensic Pathology, Second Edition; Oxford University Press; 1996.

1.7 Annexure 5

Hazard Group 3 Pathogens

6.1 Viruses Hepatitis B and C, Human Immunodeficiency Viruses types 1 and 2 (HIV), Dengue, Hantavirus spp, Rabies, Yellow fever, Rift Valley fever, Chikungunya Creutzfeldt- Jacob disease (CJD)
6.2 Bacteria Brucella, Bacillus anthracis, Burkholdia, Coxiella burnetti, Mycobacterium tuberculosis, Mycobacterium avium intracellulare, Mycobacterium leprae, Rickettsia spp., Salmonella typhi, Yersinia pestis.
6.3 Fungi Histoplasma capsulatum, Coccidiodes immitis, Paracoccidiodes braziliensis, Penicillium marneffci
6.4 Parasites Echinococcus spp., Leishmania braziliensis, Leishmania donovani, Naegleria fowleri, Plasmodium falciparum, Trypanosoma spp.,

*Reference;
Guidelines on autopsy practice R .C. Path September 2002

1.8 Annexure 6

Pathological Post-mortem Report

Name of the deceased	Name of the person identifying the deceased
Bed Head Ticket	Ward
Hospital	Date of admission
Date of death	Date of autopsy
Name of the trainee pathologist/ pathologist conducting the post-mortem	Name of the reporting pathologist
	Date of reporting

Type of Post-mortem examination- Full post mortem ☐ limited post mortem ☐

General examination

Weight (if measured) ☐ Height/crown-heel length of the deceased ☐. Complexion ☐ Colour of the eyes, ☐ hair ☐

Marks of identification- Scars, ☐ tattoos, ☐ moles ☐

Any obvious disabilities (e.g. amputated limbs, contractures) ☐

External examination

Pallor ☐ jaundice, ☐ cyanosis, ☐ swelling of the legs, ☐ xanthelasma ☐, rashes, ☐ petechial haemorrhages, ☐ bruises, ☐ injuries or wounds, ☐ tongue biting, ☐ any obvious syndromes (neurofibromatosis, Marfan's syndrome), ☐ Other . ☐

Comments:

Internal Examination

Chest cavity:

Haemorrhage ☐ Pneumothorax ☐ Air embolism ☐

Pulmonary Thromboembolism ☐ Other ☐

Cardiovascular System

The pericardium: effusions ☐ Adhesions, ☐ Haemopericardium ☐

Great vessels: Presence of thrombi /emboli ☐

Heart: Weight ☐ Thickness of left ventricle ☐

Coronary arteries Narrowing- ☐

Thrombi ☐

Atria -: Thrombi, ☐ Vegetations, ☐ Valvular abnormalities, ☐

Congenital abnormalities, ☐ Abnormality of the valve rings ☐ Valve rupture ☐

Papillary muscle rupture ☐

Aorta ☐ Pulmonary artery ☐

Coronary ostia ☐ Other ☐

Respiratory system

Trachea: Foreign body ☐ Tumour ☐

Bronchi: Secretions ☐ Foreign body ☐ Congestion ☐

Tumour ☐

Pleura - Effusions ☐ Adhesions ☐ Plaques ☐ Tumour ☐

Lung: Weight-Right lung ☐ Left lung ☐

Haemorrhagic spots, ☐ Consistency of the cut surface ☐

Consolidation ☐ Abscesses, Apical cavities, ☐ Fibrosis, ☐ Emphysema, ☐ Caseous necrosis ☐ Tumours. ☐

Hilum: Vessels ☐ Enlarged nodes ☐ Number of enlarged nodes ☐

Other ☐

Abdominal cavity

Ascites ☐ Collections of pus, ☐ Blood or faecal matter ☐

Rupture of a viscus ☐

Evidence of recent surgical intervention. ☐ Enlarged mesenteric nodules ☐

Tumour deposits ☐ Other ☐

Gastrointestinal system

Mouth, tongue and oesophagus

The mouth- ulcers, ☐ injuries ☐ tumours. ☐ other ☐

Tongue- ulcers, ☐ injuries ☐ tumours. ☐ other ☐

Oesophagus - ulcers, ☐ injuries ☐ tumours. ☐ other ☐

Stomach: ulcers, ☐ varices ☐ tumours. ☐ other ☐

Intestines

Injury ☐ ulceration, ☐ strictures, ☐ toxic dilation, ☐ volvulus, ☐ gangrene ☐ tumours ☐

Mesentery: haemorrhage ☐ injury ☐ tumour deposits. ☐

Hepatobiliary System

Liver:

Weight ☐ liver injury, ☐ fatty change, ☐ colour, ☐ cirrhosis ☐ abscess ☐ tumour ☐ other ☐

Gall bladder: Presence of stones ☐ tumour ☐ other ☐

Biliary tract Presence of stones ☐ tumour ☐ other ☐

Pancreas:

Haemorrhage ☐ necrosis ☐ tumours ☐

Spleen

Weight ☐ Rupture. ☐ Infarctions, ☐

diffuse nodularity, ☐ focal lesions ☐

Endocrine glands

Pituitary gland: weight ☐ tumour ☐

Thyroid: Weight ☐

Multinodular goiter ☐ thyroiditis ☐ tumour. ☐

Parathyroid gland: Weight ☐

Number of glands identified ☐ Focal lesions ☐

Adrenal: Weight of right adrenal ☐ Weight of left adrenal ☐

Haemorrhage ☐ tumour ☐

Kidneys, ureters and bladder

Kidney

Weight of right kidney ☐ Weight of left kidney ☐

The capsule of the kidney: nodularity ☐ scarring ☐ cysts ☐

petechial haemorrhages ☐ abscess formation ☐

Distortion of pelvi-calyceal system ☐ Calculi ☐ Abscess ☐

caseation tumour ☐ other ☐

The renal artery: stenosis. ☐

The bladder: calculi ☐ hypertrophy of the bladder wall ☐

haemorrhage ☐ tumour. ☐

Pelvic cavity

Pouch of Douglas: blood, ☐ pus, ☐ rupture of a viscus ☐

petechiae, ☐ adhesions, ☐ abscesses ☐

Uterus, fallopian tubes and ovaries.

The uterus: Weight ☐ evidence of pregnancy ☐ abortion ☐

products of conception ☐ foreign bodies ☐ instrumentation ☐ rupture ☐ haemorrhage ☐

Retained placental parts ☐ tumours. ☐

The fallopian tubes: ectopic pregnancy tumour.

Prostate Weight ☐ tumour ☐

Testes Tumour ☐ other ☐

Rectum and anus

Ulceration ☐ tumour. ☐

Brain

Circle of Willis: Thrombosis ☐ atherosclerosis ☐ aneurysms. ☐

Brain: Weight ☐ haemorrhage ☐ infarction ☐ injury ☐ flattening of gyri ☐ narrowing of sulci ☐ tumour ☐ other pathology ☐

Cerebellum: haemorrhages ☐ infarction. ☐ tumour ☐

other ☐

Brain stem:

Pons haemorrhages ☐ infarctions ☐ tumour ☐.

Midbrain: haemorrhages ☐ infarctions ☐ tumour ☐.

Medulla: haemorrhages ☐ infarctions ☐ tumour. ☐

Spinal cord

. Haemorrhages ☐ infarctions ☐ tumour. ☐ Other pathology ☐

Macroscopic Findings

Microscopic Findings

Results of investigations:

Summary and Conclusion:

Comments:

Signature of reporting Pathologist
Designation

Date

1.9 Guidelines for autopsy investigation of fetal and perinatal death

1.9.1 Introduction:

Information obtained by adequate necropsy examination of fetal and perinatal deaths will be useful at three different levels of clinical practice. It will be useful to the family of the dead baby and clinicians involved in their care. The findings are important for audit of unit polices and practices. Lastly information gained at necropsy examinations will complement clinical data which contribute to regional and national statistics.

All hospital post-mortem procedures are subject to parental consent that must not be exceeded. The following guidelines apply to an unrestricted post-mortem examination.

1.9.2 External examination (Category X)

- Body weight (to nearest gram if less than 5 kg)
- Head circumference (in centimeters)
- Crown-heel and crown-rump lengths
- Foot length
- Apparent gestation
- Degree of maceration (if present)
- Meconium staining of skin, finger nails, external auditory meatus
- Full description to include, e.g. fontanelles, eyes, ears, nose, mouth and palate, digits, palmar

creases, umbilicus and state of cord, genitalia, anus, etc.

- Dysmorphic features {this should be photographed if possible-(category Y)} congenital malformations and deformities
- Other abnormalities (e.g. oedema, abnormal pallor).

1.9.3 Internal examination (category X)

- Comment on cranial, thoracic and abdominal cavities
- Retention and fixation of the brain where practicable, subject to informed consent (category Y)
- Systematic description of major organs and tissues
- Specific reference to ductus arteriosus and umbilical vessels
- Weights of all major organs in a digital balance (to 0.1 g, category Y)
- Comment on muscle and skeleton.

1.9.4 Placenta (category X)

Placenta should be examined in all cases.

- Dimensions
- Trimmed weight (trim the umbilical cord 2cm away from its insertion to the placenta. Trim the membranes at their attachment to the placenta)

- Umbilical cord (length, number of vessels, type of insertion to the placenta, abnormalities)
- Membranes (complete, incomplete, colour, abnormalities)
- Placental form
- Fetal, maternal and cut surfaces.

1.9.5 Histology (category X)

- At least one block of all major thoracic and abdominal organs (right and left lungs, heart, liver, kidney, thymus, adrenals and pancreas)
- Costochondral junction (over 24 weeks gestation)
- Adequate sampling of brain (varies with case: minimum of one block from hind brain and one from cerebral hemispheres)
- Adequate sampling of placenta (cord, membranes, focal lesions, grossly normal parenchyma to include amnion and decidua).

1.9.6 Special procedures and investigations

- X-ray is mandatory for suspected skeletal dysplasia and multiple malformations
- Photography for dysmorphic fetuses and babies without ante-mortem diagnosis; advised for other gross abnormalities

- Bacteriology (blood/spleen/lung/CSF), if clinically indicated
- Virology, if clinically indicated
- Karyotype, if clinically indicated
- Storage of fibroblasts/frozen tissue/DNA, if clinically indicated
- Biochemistry, if clinically indicated
- Haematology, if clinically indicated
- Neuropathology, if clinical or radiological evidence of CNS pathology or the brain appears abnormal on external examination.

1.9.7 Autopsy reports (category X)

The autopsy report should include the following details

- Demographic details
- Date of autopsy
- Details of consent and any restrictions
- Availability of clinical records at time of post-mortem, including anomaly scans if relevant
- Attendance of clinician
- Clinical history
- Systematic description of external, internal and placental examination and results of X-rays and other ancillary investigations

CPSL National Guidelines /

- Summary of major findings including
    a) sex
    b) apparent gestation
    c) estimated timing of death in babies born dead
    d) adequacy of growth and nutrition
    e) presence/absence of congenital abnormalities
    f) major pathological lesions
    g) evidence of chronic stress or disease prior to death
    h) placental examination

- Commentary addressing the clinical questions and significance of pathological findings
- Mode/cause of death
- Record of photographs and any samples retained
- Timely dispatch to clinicians with particular reference to the timing of postnatal appointments.