STANDARD OPERATING PROCEDURES

FOR FETAL PATHOLOGICAL AUTOPSY

AIIMS, PATNA

1. Introduction

Foetus is a term that refers to product of conception irrespective of gestational age. Foetal death is defined as death prior to its complete extraction or expulsion from its mother, the death being indicated by the absence of any signs of life. It is divided further as early (<22 weeks of gestational age); intermediate (22-27 weeks gestational age) and late (>= 28 weeks gestational age). Of these in Indian scenario where age of viability is taken as 28 weeks, early and intermediate are designated as abortions whereas **late are known as stillbirths.**

Autopsy has been important in medicine since the 15th century and has contributed greatly to the clinical knowledge. It has a valuable role in the counselling of the families after the loss of a developing baby in the womb and can help the grieving process. Its findings may improve parental understanding and alleviate concerns over prenatal events. Genetic conditions or obstetric factors of relevance to future pregnancies may also be identified.

The key objectives of autopsy examination of a dead foetus are identification of cause(s) of death, elucidation of pathogenic mechanism and quality control of clinical mechanism if possible. Thankfully stillbirths are uncommon and hence foetal autopsy is even rarer. However, whenever indicated, foetal autopsy should be offered and an SOP for its systematic conduct is proposed below.

This SOP is for systematic conduct of foetal pathological autopsy at AIIMS, Patna and will be offered to:

a. Inborn cases
b. Non-medicolegal cases
c. For foetuses >28 weeks of gestation

2. Objectives

- **To provide information regarding the baby to the bereaved family** by
  a. Establishing the immediate cause of stillbirth or factors that may have contributed to the pregnancy loss
  b. Identifying the immediate cause of intrauterine death if possible
  c. Identifying concomitant diseases, particularly those with implications for subsequent pregnancies (e.g. growth restriction, malformation, maternal diabetes etc)
  d. Identifying evidence of genetic disease if any and to allow determination of the likely recurrence risk.
- To provide pathology input for local perinatal mortality, foetal medicine or clinical genetics review meetings
- To provide information for audit purposes (e.g., antenatal diagnosis, pregnancy and intrapartum care
- To provide information for national clinical outcome review programmes and local or national congenital malformation registers.

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3. Pathology which may be encountered at autopsy

- Amniotic infection sequence
- Oligohydramnios
- Growth restriction: symmetric, asymmetric (nutritional)
- Viral/protozoal infection (CMV, Rubella toxoplasmosis, other)
- Congenital malformation (all systems)
- Hydrops fetalis · Foetal akinesia sequence
- Placental and umbilical cord disease
- Changes in the baby and placenta secondary to intrauterine death

4. Specific health and safety aspects

The results of the antenatal infection screen report will accompany the foetus sent for autopsy. The foetal autopsy should be undertaken using universal precautions that will significantly protect against accidental transmission.

5. Consent

In case of any patient with antepartum stillbirth, foetal pathological autopsy will be offered to the patient by the Dept of Obstetrics & Gynaecology and acceptance or denial will be recorded in the **informed consent form** prior to the delivery of the foetus itself and consent may be taken again after the birth of the stillborn baby. The consent form should also have details of the foetal autopsy procedure and why it is performed. The parents should be made aware that they also have the right to refusal and only if they will consent the autopsy procedure will be carried out. Also, that for this purpose, photographs may be taken for record purposes and also that after pathological autopsy, certain organs may be preserved. The consent form should also specifically mention about what the family desires to be done with regards to disposal of the body of the still born after autopsy. (*A copy of Informed Consent form is attached in Annexure 1).*

- Regardless of the gestation, post-mortem examination may only be performed if informed consent has been given by the parents.
- The pathologist performing the autopsy must see the completed consent form before commencing the autopsy.
- Any limitations on the scope of the autopsy must be complied with.
- Any concerns regarding the validity of the consent should be resolved before commencing the autopsy

6. Clinical information relevant in a case of stillbirth

Following relevant information needs to be recorded by the gynaecologist on duty in labour room in cases of stillbirth:

- CR Number.
- Maternal age/date of birth
- Maternal height, weight and BMI.
- Relevant medical and family history, including consanguinity.
- Obstetric history, previous pregnancies/deliveries, including previous foetal and neonatal losses (and if post-mortem examination had been carried out), malformation and growth restriction and other complications.

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- History of current pregnancy, including: period of gestation (POG) as per last menstrual period (LMP) & estimated delivery date (EDD), antenatal Infection screening test records, abnormal findings from ultrasound or other antenatal investigations records. (copies of all if possible should be attached)
- History of hypertension/bleeding/pyrexia/membrane rupture etc should be recorded.

7. Raising requisition for Foetal Autopsy on HIS

In case of willingness of parents to proceed with the foetal autopsy is recorded in the informed consent form, **REQUISITION FORM FOR FOETAL PATHOLOGICAL AUTOPSY** (attached in *Annexure 2*) will be filled and duly signed. After this, request for autopsy will be raised on HIS and billing for Rs 3000/- for the same will be commenced by the patient party.

8. Management at the time of stillbirth delivery in Labour Room

At the time of stillbirth delivery, the Gynaecologist on duty in the Labour Room and the Neonatologist attending the birth will thoroughly examine the baby externally taking measurements like length, weight of the fetus and placenta and will record the same on a prescribed format **"STILLBORN EXAMINATION FORM**" (attached in *Annexure 3*).
This record may be accompanied with photographs that should include: Anterior supine, lateral, back with hands and feet and genitalia. The gynecologist will note the gross examination findings of placenta, cord and membranes. In case of twin foetuses, chorionicity will be confirmed by ascertaining number of placentae, whether they are fused and by presence or absence of intermembrane leaves i.e., two leaves or four leaves.. Whether the stillborn is fresh or macerated will be noted. Head to toe examination will be done by the neonatologist and any gross abnormal or syndromic features will be recorded in the form and photographed as well.

For those stillborn cases **where consent for fetal autopsy is given** and billing receipt is obtained,

- 5- 10ml blood will be withdrawn from foetal heart using 10ml syringe by the gynecologist on duty and preserved in heparinized vial for karyotyping.

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- 5ml blood from foetal heart or cord blood will also be withdrawn in plain vials for serology that will be sent to Department of Microbiology for testing for IgM rubella, IgM cytomegalovirus and IgM toxoplasma.
- Then, the foetus and placenta will be placed in a container with 10 % formalin and will be sent to Department of Forensic Medicine and Toxicology along with duly signed informed consent form, billing receipt and clinical information relevant for autopsy with filled Stillborn Examination form.

A team from The Department of Forensic Medicine and Toxicology along with Department of Pathology and Anatomy will carry out the Fetal Pathological autopsy.

9. The autopsy procedure details

- Requires availability of **appropriately sized instruments** for small and very small foetuses; balances for weighing foetuses and organs (to at least nearest 0.1 g); charts of normal values (body weight and measurements, organ weights and placenta weight).
- **Whole body X-ray** is done for gestational assessment, malformation, etc. It is recommended in all cases and mandatory for suspected skeletal dysplasia and will be conducted in the institute mortuary under department of Forensic Medicine & Toxicology.
- **Photography** is recommended in all cases, essential to document external and internal abnormalities. Digital photography and secure storage is preferred.
- **Routine external body measurements** (body weight, crown-rump length, crown-heel length, foot length, occipito-frontal circumference)
- **Detailed external examination** will be done including: muscle bulk, maceration, local/generalised oedema, pallor, dysmorphic features, assessment of patency of orifices (including choanae) and palatal fusion, limbs, hands and feet and genitalia will be conducted .
- A Midline I, T- or Y-shaped skin incision will be given on the body of the dead foetus and examination of all internal organ systems will be done system-wise as follows with preservation of specimens for histopathological examination:

  - ·**Central nervous system (CNS) examination**:

- median posterior or transverse posterior parietal scalp incision

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- observation of maturity to assist gestational assessment

Detailed systematic examination of other internal organs including:

- umbilical arteries and vein, ductus venosus
- in situ examination of the heart and great vessels with sequential segmental analysis of malformations
- in situ examination of thoracic and abdominal organs; consider removing in continuity to assess abnormal structures crossing diaphragm
- weights of internal organs (minimum: brain, heart, lungs, liver, kidneys, thymus, adrenals, spleen) will be recorded
- apply special dissection techniques where appropriate.

Detailed examination of placenta and umbilical cord will be done including:

- trimmed weight (after extraplacental membranes and cord detached)
- dimensions of placenta (width in two planes and thickness)
- umbilical cord: length, diameter, insertion into placental disc, number of vessels, coiling, lesions
- membranes: appearance – fetal surface/chorionic vessels: appearance, infection
- maternal surface: completeness, craters
- slicing will be done at approximately 1 cm intervals to evaluate parenchyma for colour and focal abnormalities

10. Regarding Organ retention

Specific consent shall be sought for retention beyond the release of the body, for the purpose of examining the organs. Brain may be retained for macroscopic and histological assessment. In practice, submersion for a minimum of 2–3 days in 20% formalin (±5% acetic acid) will usually produce sufficient fixation to allow adequate sectioning and block sampling.

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11. Histopathological examination

Recommended blocks of following organs are required at full pathological autopsy:

- thymus
- heart (septum and free walls)
- lungs (right and left – each lobe)
- liver (both major lobes)
- pancreas
- spleen
- adrenal glands
- kidneys
- muscle and diaphragm
- stomach, small and large bowels
- larynx/trachea and thyroid
- bones: rib including growth plate in stillbirth; long bone (including growth plate), vertebral body and skull mandatory for suspected skeletal dysplasia
- brain: includes cerebral cortex and periventricular white matter (frontal, parietal, temporal and occipital), deep grey matter (caudate, striatum, thalamus), hippocampus, midbrain (inferior colliculi), pons, medulla (inferior olives), cerebellum with dentate nucleus. Sampling may be more restricted if there is advanced autolysis
- other organ lesions as appropriate
- placenta (at least three full-thickness blocks, plus focal lesions)
- membrane roll
- umbilical cord (at least two)

12. Other samples (as indicated by history and macroscopic findings)

For genetic study, samples from skin/muscle/cardiac blood of the stillborn foetus or from foetal side of placenta may be sent for genetic study to a standardised genetic laboratory outside the institute until this service is available at AIIMS, Patna.

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In case, sample is not sent for genetic study immediately, retention of the tissue sample in heparinised vial and freezing may be considered as future DNA resource.

13.Autopsy report

Foetal Pathological Autopsy report (*Annexure 4*) will be signed by Forensic Medicine & Toxicology, Anatomy and Pathology experts and dispatched to the Department of Obstetrics and Gynaecology from where requisition for Fetal Pathological autopsy was raised. This report will include the following sections:

- Demographic and identification data
- Details of autopsy consent and limitations
- Body weight and appropriateness for gestation
- Body measurements · list of main findings
- Clinicopathological summary
- Summary of clinical history
- Systematic description of external and internal findings and placental examination
- Organ weights with relevant reference values and ratios
- Details of ancillary tests taken and results of the same
- Histopathology reports

14.If required, Disposal according to BMW guidelines

If the body of the stillborn foetus is not taken back by the parents for last rites within three (3) days, it will be disposed as per the standard Biomedical Waste Management (BMW) guidelines of the institute.

15.Handing over of the Final Report on Stillborn Foetus

A *Final Report on Stillborn Foetus (Annexure 5)* signed by the Consultant In Charge will be generated and handed over to the parents/mother from the Department of Obstetrics & Gynaecology after counselling with the Consultant In Charge. A copy will be kept in records in the office of Obstetrics & Gynaecology and another copy will be attached to the mother’s case record file in the Medical Record department.

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16. Regarding Scientific Publication/Presentation

In case data on foetal autopsy is required for scientific publication/presentation, faculties involved from respective departments will be given adequate credit.

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