STILLBIRTHS TAKING PLACE IN HOSPITALS - A NEW ACADEMIC EXERCISE FOR SRI LANKAN FORENSIC PATHOLOGISTS -

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Introduction

Service of Sri Lankan forensic pathologists are mainly sought for unnatural deaths and sudden natural deaths. Even though natural sudden deaths comprise the majority of medico-legal autopsies in Sri Lanka, in-depth analysis of such by a medical team (with ancillary investigations) is occasionally demanded because of less further actions after the inquest. However, recent frequent requests by obstetricians for inquests in stillbirths (happens in hospitals) has widened the team approach in forensic pathology field in Sri Lanka.

Stillbirths are registered in Sri Lanka if maturity is beyond 22 weeks. In international classification of deaths, World Health Organization defines stillbirths as the death of a fetus that has reached a birth weight of 500gm or if birth weight is unavailable, gestational age of 22 weeks or crown to heel length of 25cm[1]. Stillbirths can be antenatal (inside uterus before commence of delivery) or intrapartum deaths (during delivery)[2].

Indications for autopsies

Autopsies of stillbirths are requested by inquirer of sudden deaths through inquests (legal inquiry of sudden deaths) or as a pathological autopsy (hospital autopsy requested by medical officers). Stillbirths that take place outside of hospital are routinely referred for inquests because of the necessity for exclusion of infanticides. Intrapartum neonatal deaths are usually referred for inquests as a safety precaution for possible allegation of medical negligence. Antenatal stillbirths had not been referred for inquests or pathological autopsies in the last decade. However stillbirths taking place in hospitals are recently being investigated for academic interests. Obstetricians and relations are interested to know as to what had happened to the fetus? What could have been done in order to prevent? And what might happen in next pregnancies and so on?

Pre-autopsy preparation

Collection of all relevant data is the most important step. Bed head ticket of the mother, antenatal clinic notes, investigation reports and detailed history of the mother are minimum requirements.

Discussions among the obstetrician, pathologist, pediatrician and forensic pathologist will bring up the areas where attention is most needed. Sometimes further reading before commencing the autopsy may be vital[3].

Autopsy examination

Thorough autopsy with external examination, opening of body cavities, organ dissections with special attention to congenital abnormalities and estimation of maturity should be performed. Postmortem findings belong in to a cause/causes of death and the effects of that cause should be specially looked for. Knowledge on causes of stillbirths, mechanisms and postmortem findings are essential for the forensic pathologist.

Macerated stillbirths are clearly ante-partum stillbirths and those changes will help to estimate time duration of the dead of

the fetus inside the uterus [4]. Caput succedaneum on presenting part will indicate that the fetus had been alive while delivering. Absence of changes due to respiration will establish the stillbirth recorded in hospital documents. But artificial respiration can produce artifacts.

Causes of stillbirths

Causes could be commonly natural or infrequently unnatural.

Unnatural causes

Trauma to the fetus or maternal passage, chemicals, poisons and deliberate induction of premature delivery to cause natural death due to prematurity are well known unnatural causes. Road traffic accidents and falling down stairs are common among traumatic causes. Attention for the injuries in newborn's body, investigations for chemicals and poisons will help to exclude majority of unnatural causes.

Natural causes

Spontaneous causes are divided in to five groups.

A- maternal causes
B- placental causes-
C- fetal causes
D- problems during delivery
E- Sudden antenatal death syndrome- this is a new group proposed by Cacciatore and Collins in year 2000[5]. Real causes will be apparent in future with the advancement of investigations.

A - Maternal causes

- Preeclampsia, HELLP syndrome, acute fatty liver of pregnancy.
- Recreational drugs, alcohol, nicotinic, drug abuse, contraindicated drugs in pregnancy.
- Rhesus diseases
- Past dates- more than 42 weeks of gestation
- Irradiation therapy.
- Chronic illnesses like Diabetes, hypertension, renal disorders, liver diseases, thyroid diseases, systemic lupus erythematosus and bleeding disorders.
- Ante-partum hemorrhage
- Anemia
- Polyhydramnios
- Infections :
  rubella, influenza, toxoplasmosis, syphilis, Malaria urinary tract infection, listeria monocytogenes [6] (bacteria found in meat able to cross placenta), Maternal flora (Group B staphylococci, enterobacter, enterococci, esherichia coli, mycoplasma, streptococci, ureaplasma)
- History of previous stillbirths
- Low birth weights
- Genetic diseases in family
- Maternal obesity

B - Placental causes

- Separation of placenta to early from uterus (placental abruption)
- Large placental infarction
- Placental infections
- Thrombosis
- Circulatory disorders :
  fetal thrombotic vasculopathy and stem vessel thrombosis, fetal vascular narrowing, hemorrhagic endovasculitis, subchorionic fibrin deposition, perivillous fibrin deposition, intravillous fibrin deposition, massive basal plate fibrin deposition, massive parenchymal fibrin deposition[7].
- Placental calcification and premature ageing due to smoking, nanobacteria, diabetes and hypertension

C - Fetal causes

- Bacterial infection like pneumonia, specially when there is dribbling of mother.
- Congenital abnormalities in cardiovascular system.
- Congenital abnormalities of central nervous system:
  Anencephaly, Craniorachischisis, Holoprosencephaly,

Hydranencephaly, Hydrocephalus, Microcephaly.

- Chromosomal aberrations, trisomes.
- Intrauterine growth retardation.
- Dawn's syndrome, Edward's syndrome.
- Iso-immunization.
- Hydrops fetalis due to alloimmunization and Hydrops of unknown origin.
- Fetal haemorrhage such as feto-fetal, feto-maternal and inside the fetus[8].

D - Problems during delivery (intra-partum causes)

- Prolonged labor
- Obstructed labor
- Mal-presentations
- Intrapartum asphyxia due to prolong labor, meconium aspiration or umbilical cord compression[9].
- Intra cerebral hemorrhage mainly subdural hemorrhage :

  May be due to delivery, instrumentation or vacuum extraction. Rupture of bridging veins, tears of falx cerebri and tentorium are the causes for subdural hemorrhage[8].
- Fetal respiratory failure due to unknown cause
- Prolapsed umbilical cord
- Short umbilical cord (less than 30cm) can be compressed, constricted or ruptured
- Umbilical cord entanglement- cord wrap around extremity, body or neck of the fetus or knotted itself[10]. Entanglement of cord can constrict blood vessels of cord as well as blood vessels of fetus such as neck veins.
- Torsion (twisting umbilical cord around itself).
- Entangled umbilical cords in mono amniotic twins.

When umbilical cord around round neck causing constriction is explained at the inquest, non-medical people such as lawyers and relations are reluctant to accept it because fetus doesn't respire, depends on maternal circulation and arterial constriction need moderate pressure. It is difficult to explain slight pressure around neck cause constriction of neck veins leading to cerebral ischemia and death.

In teaching hospital Kurunegala, intrauterine growth retardation, obstructed delivery due to large babies, congenital heart diseases (single ventricle), hepatomegaly, and negative autopsies were the findings in autopsies of stillbirths occurred in the hospital.

Since this is a new area in forensic pathology several practical problems are also currently observed. They are;

1. Unavailability of history and health notes– tracing of all health documents and history of mother are very important. If the mother cannot attend the inquest, visiting the mother's ward and obtaining the history is vital.
2. Familiarity about nature of organs and size with weight are important to exclude artifact.
3. Unavailability of investigation facilities.
4. Lack of postmortem findings of lot of causes of stillbirths.
5. Unavailability of placenta during autopsy.

Conclusion

Even though an autopsy of stillbirth happened in hospital is a new academic challenge, multi disciplinary approach with thorough autopsy dissection of body and placenta, detailed history and investigations can ascertain cause of death or at least probable cause of death in majority of cases. In remaining autopsies identification of risk factors may be achievable. Percentage of negative autopsies will be invariably high for hospital stillbirths in all institutions. Pre-autopsy preparation including tracing all maternal health documents, maternal history and team discussion is the most important step. Exclusion of foul play except induction of premature delivery is an achievable task with the help of history, exclusion of injuries and poisons.

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