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PERINATAL AUTOPSY PROCEDURE

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Review
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Abstract

Perinatal Autopsy is the name given to postmortem examination in fetus and / or newborn period. In the perinatal period there is rapid growth and complex changes occur. During this growth and development, many factors cause anomalies, growth retardation and even death. Today, most of the pregnancies are closely monitored, fetuses with severe anomalies are detected in the early period by various methods and the pregnancy is terminated with the consent of the family. In this case, confirming the pathological autopsy anomaly with the consent of the family according to the gestational week and the presence of other concomitant anomalies may be a guide for other pregnancies to be planned. It is recommended to send and evaluate all reproductive losses to the pathology laboratory. In all perinatal autopsies, an informed consent form should be completed. The autopsy procedure should be explained in detail and the limitations of the evaluation should be shared.

Key Words: Perinatal autopsy, Procedure, Fetal anomalies.

Özet

Perinatal Otopsi fetus ve/veya yenidoğan dönemindeki postmortem incelemeye verilen isimdir. Perinatal dönemde hızlı büyüme olur ve kompleks değişiklikler meydana gelir. Bu büyüme ve gelişme sırasında birçok etken anomalilere, büyüme geriliğine ve hatta ölüme neden olur. Bugün, hamileliklerin çoğu yakından takip edilir, şiddetli anomalileri olan fetuslar erken dönemde çeşitli yöntemlerle tespit edilir

ve hamilelik ailenin rızasıyla sonlandırılır. Bu durumda gebelik haftasına göre aile onamıyla yapılacak patolojik otopsi anomalinin doğrulanması ve eşlik eden başka anomalilerin varlığının saptanması, beraberinde planlanacak diğer gebelikler için yol gösterici olabilir. Tüm reprodüktif kayıpların patoloji laboratuvarına gönderilmesi ve değerlendirilmesi tavsiye edilmektedir. Tüm perinatal otopsilerde, bilgilendirilmiş bir onam formu doldurulmalıdır. Otopsi prosedürü ayrıntılı olarak açıklanmalı ve değerlendirmenin kısıtlamaları paylaşılmalıdır.

Anahtar kelimeler: Perinatal otopsi, Prosedür, Fetal anomaliler.

1. Introduction

Perinatal Autopsy is the name given to postmortem examination in fetus and / or newborn period. Although it is similar to adult autopsy, it is different from it. Because in the perinatal period, unlike adults, there is a rapid growth, the development of the fetus depends on maternal health and the microenvironment of the uterus (Désilets, 2011). Perinatal autopsy requires more experience and knowledge than adult autopsy, and the examination takes more time. Therefore, it is recommended to be performed by pathologists interested in perinatal pathology following a certain procedure. In this article, firstly the perinatal autopsy procedure will be presented, then the purpose, contribution and limitations of autopsy will be discussed in the light of the literature.

1.2. Perinatal autopsy procedure

The perinatal autopsy procedure consists of certain stages. These stages should be followed carefully. The standard procedure consists of 3 stages: preanalytical, analytical and postanalytical.

1.2.1. Preanalytical stage

In all autopsies, embryo, fetus and newborn infant should be applied before pathology laboratory, laboratory admission, control and preparation stages. All perinatal autopsies should be checked to ensure that the informed consent form is fully completed.

It should be checked by the clinician that the autopsy request form is complete. The clinical request form should contain identification information, information about the mother's previous pregnancies, information / examinations of the mother's pregnancy, information on the abortion

or birth, information on the neonatal period, clinical preclination (cause of death) and whether the fetus can be withdrawn.

The fetus / baby should be properly transported to the autopsy room or stored in a cold environment if the procedure is to be carried out later. The autopsy room should be ready for space, personnel and equipment. At this stage, after all the controls are performed, the autopsy material is accepted and the process is continued to begin the analytical period.

1.2.2. Analytical stage

Pathology laboratory includes preparation, control, external evaluation, internal evaluation, organ dissection and finally suture procedure in autopsy room. The autopsy room should have sufficient space and adequate lighting for operation and storage. Measurement instruments and dissection instruments must be fully available for autopsy. Occupational safety measures must be taken.

First, the identity of the fetus / baby should be checked and the autopsy request form should be reviewed in detail. Photographs must be taken to include the whole body. In special cases (such as skeletal dysplasia), radiography should be performed. In special cases, samples should be taken for additional investigations (genetic examination, microbiological examination and biochemical examination).

Since analysis is performed at this stage, it will be useful to work on draft reports. In autopsy, weight and external measurements should be completed first. Body weight, sitting height, heel-to-heel distance, foot length, head (occipitofrontal) circumference, abdominal circumference, chest circumference, facial measurements, biparietal circumference, nipple distance, femoral length (US guided), umbilical cord length note to draft report it should be. Measurements should be compared with expected norms for gestational age.

Later, a complete external examination is performed to assess fetal maturation, maceration and the presence of any anomaly. Skin: appearance, turgor, incision scar, drain, catheter, trauma scar etc. Facial dysmorphia: head, hair, face, nose, eyes, ears and mouth and so on. Body orifices: lip-palate, koana, anus and so on. Limbs: finger, symmetry, muscle tone, nail, hand, palm and so on. Body: nipple, umbilical cord, external sex organs, back, columna vertebralis, etc. and all tissue defects should be noted in the draft report.

For detailed and complete internal examination; Incision of the skin, opening of the neck and thorax and removal of organs, opening of the abdomen and removal of the organs of the upper

abdomen, removal of organs of the genitourinary system, opening of the head cavity, removal of the brain organ, removal of the spinal cord are required. The volume of the collections, organ weight and dimensions should be noted in the draft report.

Ensure the completion of the suture process. Organ dissection should be completed and the organs should be properly fixed. If sent, placenta examination and sampling must be done.

1.2.3. Postanalytical stage

After the autopsy procedure is completed, delivery of the fetus to the family, organ sampling and evaluation, and preparation of the autopsy report. After the autopsy is completed, the consent form of the fetus / infant older than 16 weeks, which will be taken back by the family, should be signed by the person concerned and delivered to the morgue. Those in the lower gestational week should be kept until the report is completed and then be discharged with other materials.

Organ sampling should be completed within 2 weeks and brain dissection should be completed at the end of the 3rd week. For the evaluation of fetal maturation; Weights, external measurements, cerebral gyral pattern and histological parameters: lung maturation, nephrogenic zone, costochondral junction etc. used. Measurements and evaluation results should be compared with the expected values for the gestational week. Measurements used to determine gestational week are available in different sources (Guihard-Costa, 2002; Keeling, 2007.; Gilbert-Barness, 2014).

Wigglesworth perinatal causes of death classification is used to determine the cause of death (Wigglesworth ,1980). Final autopsy reporting should be completed within 1 month.
The final autopsy report should include:

1. Diagnosis as a result of the completion of all examinations and evaluation of the findings
2. Detailed macroscopic findings (external examination, internal organ dissections, etc.)
3. Detailed microscopy findings (for all organs)
4. Clinical information
5. Clinicopathological correlation

In some cases it is not possible to perform a standard autopsy procedure. Abortions of spontaneous or medical pregnancies with gestational week less than 20 weeks are considered.

Late abortion materials (9-20 weeks) should be examined as a mini-autopsy. Fetal weight and external measurements should be made. The placenta must be evaluated. Early abortion materials (embrio) should be examined externally and measured.

In cases where informed consent is not obtained from the patient, only a limited evaluation will be possible. In this case, weight measurement, external measurements, external examination (skin inspection, dysmorphia findings, etc.), photographs, X-ray, needle biopsy from the major organs and placenta should be examined. The findings should be reported by adding that the patient's consent was not given.

Cases with normal karyotype with prenatal fetal malformation are the most important causes of fetal autopsy (D'Costa, 1995). The main objectives of perinatal autopsy are: determination of gestational age, evaluation of growth and development, detection of congenital anomalies, clinical diagnosis and analysis, determination of cause of death and determination of possible recurrence risk (Desilets, 2011; Barness, 2007).

The diagnosis of postmortem autopsy is important in evacuated pregnancies due to prenatal congenital anomaly. This verification; The family is important in terms of Obstetrician and epidemiological consequences. The advanced Ultrasonography (USG) technology provides a significant diagnostic approach to fetuses with congenital anomalies, and USG and Autopsy findings are highly correlated. This correlation was reported to be higher after 16 weeks of gestation (Stuksnaes, 2015). Perinatal autopsy may cause a 22-76% change in diagnosis (De´ silets, 2011). Phadke reported that perinatal autopsy provided 79.1% definitive diagnosis, 97.8% confirmation of USG findings, and 33% additional findings (Phadke, 2010).

Factors affecting the outcome of perinatal autopsy; perinatal loss type, autopsy rates and protocols, experience is reported as antenatal diagnosis and hospital level (Gordijn, 2002). Although perinatal autopsy rates are higher than in other age groups, parental evaluation of the perinatal evaluation is sufficient and social, cultural and religious reasons decrease the experience of the procedure (Chisherter, 2007; Khong, 2006).

There are studies comparing autopsy and Magnetic Resonance Imaging **(**MRI**)** results in the literatüre (Thayyil, 2010a). However, traditional autopsy is accepted as the gold standard for today. Post-mortem imaging with MRI and/or Computerized tomography (CT) may allow diagnosis of certain abnormalities in cases where parents do not accept traditional autopsy. This represents a new development for the concept of minimally invasive autopsy. However, postmortem MRI imaging is not recommended as a substitute for traditional autopsy until

sufficient evidence is available for the accuracy and cost-effectiveness of such an approach (Thayyil, 2010b; Sonnemans, 2018).

2. Materials and Methods

This review is organized with the guideline of the Pediatric and Perinatal Pathology Working Group of the Federation of Pathology Associations and literatüre. Reporting according to the guideline it consists of clinical history, macroscopic examination, microscopic examination and diagnose.

3. Results and Discussion

Perinatal pathology is an area of expertise that is based largely on autopsy, investigating the mechanisms and causes of reproductive losses (Aksoy,1994). In the perinatal period there is rapid growth and complex changes occur. During this growth and development, many factors cause anomalies, growth retardation and even death. Today, most of the pregnancies are closely monitored, fetuses with severe anomalies are detected in the early period by various methods and the pregnancy is terminated with the consent of the family. In this case, confirming the pathological autopsy anomaly with the consent of the family according to the gestational week and the presence of other concomitant anomalies may be a guide for other pregnancies to be planned. It is recommended that all reproductive losses be sent to the pathology laboratory and evaluated. In all perinatal autopsies, an informed consent form should be completed. The autopsy procedure should be explained in detail and the limitations of the evaluation should be shared.

4. Conclusion

As a result, the perinatal autopsy, especially the autopsy performed by an experienced perinatal pathologist, remains the gold standard for detecting congenital anomalies, clinical diagnosis and analysis, determining the cause of death and determining the risk of recurrence.

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