

## E69 The Importance of Postmortem Investigations in Intrauterine Fetal Death: Case Studies and a Review of the Literature

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**Learning Overview:** After attending this presentation, attendees will know why the fetal autopsy and placental examination should be common practice in studying the causes of intrauterine fetal deaths. The only maternal and gestational clinical history in most cases is not enough to determine the cause of death and today many cases are still unanswered. The forensic pathologist, therefore, has an essential role in the management of intrauterine fetal deaths.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by demonstrating that the purpose of postmortem investigation is to determine the causes of death and its mechanisms, as well as to help both health care professionals and parents understand the complex dynamics of intrauterine fetal death by reducing the number of unexplained cases and thus manage future pregnancies. For this reason, the results obtained by the forensic pathologist must always be integrated with clinical information in order to have a complete picture so as to identify the cause of the unfortunate event.

The World Health Organization (WHO) defines intrauterine fetal death as the loss of the fetus after the 22<sup>nd</sup> week of gestation or, in the case of unknown dating, for a birth weight greater than or equal to 500 grams. Intrauterine fetal death is one of the most frequent adverse events in pregnancy and contributes to a large part of perinatal mortality with an important economic and social impact. Stillbirth complicates 6 per 1,000 pregnancies in the United States, or approximately 1 in 160 pregnancies.<sup>1</sup> A variable but important percentage (15%–60%) of stillbirths still remain unexplained today.<sup>2</sup> The purpose of this study is to quantify the contribution of the postmortem and placental examinations in identifying the cause of intrauterine fetal death.

Reported here is the analysis of 11 cases of intrauterine fetal death carried out through a retrospective study conducted in the period between 2014 and 2017. For each case, this study proceeded to analyze the medical record with the relative maternal and partner data, the results of the external fetal and autopsy examination, as well as the macroscopic and histological placental examination. Fetal autopsies and placental histological examination were performed using a standard protocol. The average maternal age was 30.4 years; 63.6% of intrauterine fetal deaths were in the age group between 30 and 39 years. One or more maternal risk factors were present in all cases examined (weight gain, 54.5%; cigarette smoking, 22.2%; diabetes mellitus type II, 22.2%; arterial hypertension, 11%). The risk of stillbirth increased with gestational age; 72.8% of cases occurred after the 36<sup>th</sup> week and no cases occurred before the 29<sup>th</sup> week. Diseases of the umbilical cord, placenta, and amniotic fluid were responsible for 90.9% of the cases of intrauterine fetal deaths. The results gained from the clinical history and external fetal examination made it possible to track the cause of death only in 18.2% of the cases. By adding to these data the results of the fetal autopsy and placental examination, it was possible to establish the cause of death in 90.9% of cases; 9.1% of intrauterine fetal deaths remained unexplained. This study also highlights how external fetal examination only would have led in most cases to a wrong diagnosis of death. Accurate analysis of postmortem placental and fetal examination is essential to reduce the number of unresponsive intrauterine fetal deaths. Advances in histo-pathological and forensic science will make it possible in the future to eliminate the percentage of still-unexplained stillbirths. Linking clinical and histopathological examinations is essential to understand what happened during the gestational period and to prevent a similar outcome in a subsequent pregnancy.

### Reference(s):

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2. Gardosi, Jason, Sue M. Kady, Pat McGeown, Andre Francis, and Ann Tonks. Classification of Stillbirth by Relevant Condition at Death (ReCoDe): Population Based Cohort Study. *BMJ* 331, no. 7425 (2005): 1113–1117.

### Forensic Sciences, Stillbirth, Forensic Autopsy