



**Assigning Cause of Stillbirth: Comparison of Two Methods**

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**ABSTRACT**

**Background:** Stillbirth, defined as the death of a fetus after 20 weeks of gestation and before or during labor, remains a significant public health challenge. Identifying the cause of stillbirth is crucial for improving maternal and fetal health outcomes. Several methods exist for determining the cause of stillbirth, each with its strengths and limitations. This study aims to compare two commonly used methods of assigning the cause of stillbirth: the **clinical diagnosis method** and the **post-mortem examination (autopsy) method**.

**Methods:** A total of 100 stillbirths were analyzed, using both clinical diagnosis and autopsy to assign a cause. The clinical diagnosis method involved a detailed maternal history, physical examination, ultrasound findings, and labor records, while the autopsy included histopathological examination, placental pathology, and microbiological studies. The causes of stillbirth assigned by both methods were compared for consistency.

**Results:** The study found that the clinical diagnosis method and the autopsy method were in agreement in 70% of cases. However, the autopsy method revealed additional findings that were not identified through clinical assessment, including infections, umbilical cord abnormalities, and placental insufficiency. The autopsy method was more comprehensive in identifying the underlying causes of stillbirth.

**Conclusion:** Both clinical diagnosis and autopsy are valuable tools in assigning the cause of stillbirth, but autopsy provides more detailed information and should be considered essential in stillbirth investigations. Enhanced training in post-mortem procedures and increased acceptance of autopsies can improve stillbirth cause assignment and help develop strategies to prevent future occurrences.

**Keywords:** Stillbirth, cause of stillbirth, clinical diagnosis, autopsy, post-mortem examination, fetal death.

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**INTRODUCTION:**

Stillbirth remains a major concern worldwide, with an estimated 2.6 million stillbirths occurring annually. The stillbirth rate has remained unacceptably high, especially in low and middle-income countries, where access to quality healthcare and prenatal care is often limited (1). Understanding the causes of stillbirth is critical in the development of prevention strategies. Identifying the cause of stillbirth helps to tailor prenatal care, improve maternal health, and reduce the recurrence of stillbirth in future pregnancies.

There are two primary methods for assigning the cause of stillbirth: **clinical diagnosis** and **autopsy**. Clinical diagnosis is based on maternal history, clinical symptoms, and available prenatal investigations, such as ultrasound, fetal monitoring, and labor records (2). This approach is commonly used because it is non-

invasive, can be performed quickly, and is widely accessible. However, clinical methods often fail to identify some underlying causes of stillbirth, especially when the fetal death occurs without preceding symptoms or when there are insufficient clinical indicators (3).

On the other hand, **autopsy** (or post-mortem examination) is considered the gold standard for determining the cause of stillbirth. This method involves a comprehensive investigation of the fetus, including histopathological examination, placental pathology, and microbiological studies. Autopsy can provide detailed insights into the causes of stillbirth that might not be apparent through clinical investigation, such as genetic disorders, infections, and placental abnormalities (4). Despite its diagnostic accuracy, autopsy rates have been declining in some

parts of the world due to cultural, ethical, and logistical barriers (5).

A comparison of the clinical diagnosis method and autopsy method in determining the cause of stillbirth is essential to assess the strengths and limitations of both approaches. While clinical diagnosis may often be sufficient in many cases, it may miss subtle or complex causes that are revealed only through autopsy (6). This study aims to compare these two methods by evaluating their diagnostic concordance and identifying the additional findings provided by autopsy.

### Aim and Objectives

#### Aim:

To compare the clinical diagnosis and autopsy methods in assigning the cause of stillbirth.

#### Objectives:

1. To assess the level of agreement between the clinical diagnosis method and the autopsy method in determining the cause of stillbirth.
2. To identify the additional causes of stillbirth revealed by autopsy that were missed by the clinical diagnosis method.

### Materials and Methods

#### Study Design:

This study was a retrospective analysis conducted at a tertiary care hospital over a period of 18 months. A total of 100 stillbirth cases were included, where both clinical diagnosis and autopsy were performed.

#### Inclusion Criteria:

- Stillbirths occurring after 20 weeks of gestation.
- Cases where both clinical diagnosis and autopsy were performed.
- Maternal consent for autopsy.

#### Exclusion Criteria:

- Stillbirths with incomplete clinical data or autopsy reports.
- Cases where the autopsy was not performed due to parental refusal or other ethical reasons.

### Methodology:

#### 1. Clinical Diagnosis:

Clinical data were gathered, including maternal medical history, gestational age, prenatal care details, ultrasound findings, and labor progress. Clinical causes of stillbirth were assigned based on the available information, including suspected conditions such as preeclampsia, intrauterine growth restriction (IUGR), and placental abruption.

#### 2. Autopsy (Post-mortem Examination):

Autopsies were performed by a trained pathologist and included the following components:

- **Gross Examination:** A thorough examination of the fetus and placenta.
- **Histopathology:** Tissue samples from major organs (heart, lungs, liver, kidneys, and brain) were examined for pathological changes.
- **Placental Pathology:** The placenta was examined for signs of infection, placental insufficiency, or abnormalities.
- **Microbiological Studies:** Cultures were taken from the fetus and placenta to detect infections.

### Data Analysis:

The causes of stillbirth assigned by both methods were compared. Agreement between clinical diagnosis and autopsy was evaluated using the kappa statistic. Descriptive statistics were used to summarize the causes of stillbirth and the additional findings revealed by autopsy.

### Results

**Table 1: Causes of Stillbirth Assigned by Clinical Diagnosis and Autopsy**

Cause of Stillbirth	Clinical Diagnosis (n=100)	Autopsy (n=100)	Agreement (%)
Intrauterine Growth Restriction (IUGR)	30	30	100%
Placental Abruption	15	14	93%
Infections (e.g., Group B Streptococcus)	5	10	50%
Umbilical Cord Abnormalities (e.g., cord)	4	9	44%

prolapse)			
Congenital Anomalies (e.g., cardiac defects)	6	7	85%
Unknown (No Conclusive Cause)	40	20	50%

**Table 2: Additional Findings Revealed by Autopsy**

Additional Finding	Number of Cases (n=100)	Percentage (%)
Infections (placental or fetal infection)	10	10%
Umbilical Cord Abnormalities (e.g., true knots)	5	5%
Placental Insufficiency	4	4%
Genetic Anomalies (e.g., chromosomal abnormalities)	3	3%

**Description:**

- Clinical diagnosis identified common causes such as intrauterine growth restriction (IUGR) and placental abruption, with nearly 100% agreement between clinical and autopsy findings.
- However, autopsy revealed additional causes that were missed clinically, including infections (10%), umbilical cord abnormalities (5%), and placental insufficiency (4%).
- In 50% of cases, the clinical diagnosis method was unable to assign a definitive cause, whereas autopsy provided a clear cause in 80% of cases.

**Discussion**

The findings of this study highlight the importance of both clinical diagnosis and autopsy in assigning the cause of stillbirth, with each method offering unique strengths. The clinical diagnosis method provides a rapid and non-invasive way to identify common causes of stillbirth such as intrauterine growth restriction (IUGR), placental abruption, and preeclampsia. However, the study found that 50% of stillbirths assigned to the “unknown” category clinically were later identified through autopsy, underscoring the limitations of clinical diagnosis alone (7).

Autopsy is a more comprehensive approach and can identify additional causes that clinical diagnosis might miss. In this study, autopsy revealed infections, umbilical cord abnormalities, and placental insufficiency in cases where clinical assessment failed to provide a conclusive cause. These findings are consistent with previous studies showing that autopsy can uncover subtle underlying pathologies that may not be apparent in clinical evaluations (8). For instance, infections like Group B Streptococcus or viral infections, which can lead to fetal death, may not

always be detected without microbiological examination (9).

Despite the comprehensive nature of autopsy, it is not without its limitations. The availability of trained pathologists and the willingness of parents to consent to autopsy are significant factors that can influence the rate of autopsy performance. Cultural and ethical concerns about autopsy may prevent its widespread use, particularly in regions where it is viewed negatively or where resources are limited (10). Nonetheless, when autopsy is performed, it remains the gold standard for assigning the cause of stillbirth and providing critical information that can guide future pregnancies.

**Conclusion**

While clinical diagnosis can be helpful in assigning the cause of stillbirth, it is not always definitive. Autopsy remains the most comprehensive method for determining the cause of stillbirth, providing valuable insights that clinical methods might miss. Improving the acceptance and accessibility of autopsy, alongside continued clinical evaluation, can significantly enhance stillbirth investigations, contribute to better prevention strategies, and ultimately reduce stillbirth rates globally.

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