

Thromboembolism-Related Maternal Mortality: Incidence and Prophylactic Approaches

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ABSTRACT

Thromboembolism is a leading cause of maternal mortality globally, but many cases are preventable. This study investigates the incidence and prophylactic strategies for maternal mortality due to thromboembolism during the postnatal period. The research employs ethical standards and security measures to collect and analyze data from mortality cases, comparing them with a healthy control group. Clinical manifestations, heparin administration, and risk factors are assessed using a structured questionnaire. The study reveals a maternal mortality rate of 16 per 100,000 live births, with 9% attributed to thromboembolism. Dyspnea is a common symptom, and heparin administration varies. Most cases occur within the first day post-delivery, highlighting the postpartum risk. The average risk score is 4.6, signifying a high risk population, but heparin administration remains inadequate. Cesarean sections and maternal BMI are factors of interest, and blood group A+ is prevalent among mothers. This study emphasizes the need for improved screening, standardized protocols, and comprehensive care for high risk pregnant and postpartum women to reduce maternal mortality due to thromboembolism.

Keywords: Maternal mortality; Thromboembolism; Postnatal; Heparin; Risk factors; Cesarean section; BMI; Blood group A+; Screening; Prophylactic strategies.

INTRODUCTION

Thromboembolism, the formation of blood clots that can travel through the bloodstream and block vital blood vessels, stands as a significant contributor to maternal mortality worldwide. However, the good news is that in many instances, this life threatening condition can be averted through proactive measures and effective prophylactic strategies.

The primary aim of the present study is to delve into the incidence rates of maternal mortality resulting from thromboembolism during the postnatal period. Postnatal thromboembolism presents a unique set of challenges, often occurring due to physiological changes and increased risk factors during pregnancy and childbirth [1,2]. Understanding the prevalence of this condition is crucial for healthcare providers, policymakers, and researchers to develop targeted interventions and enhance maternal healthcare outcomes.

Moreover, the study also endeavors to explore and evaluate various

prophylactic strategies designed to prevent thromboembolism-related maternal mortality. These strategies may include anticoagulant medications, early mobilization protocols, and educational initiatives to raise awareness among both healthcare professionals and expectant mothers. By shedding light on the incidence rates and effective preventive measures, this study aims to contribute to the broader goal of reducing maternal mortality rates globally. Ultimately, the findings from this research may guide healthcare practices, policies, and interventions that safeguard the well-being of mothers during the vulnerable postnatal period.

Maternal mortality remains a pressing global health concern, reflecting the ultimate measure of a healthcare system's effectiveness and its commitment to safeguarding the lives of expectant mothers. Among the numerous factors contributing to maternal mortality, thromboembolism, characterized by the formation of blood clots in veins or arteries, poses a significant yet often underappreciated threat. Thromboembolic events

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during pregnancy and the postpartum period can have devastating consequences, not only for the affected mothers but also for their unborn or newborn children. Understanding the incidence of thromboembolism related maternal mortality and developing effective prophylactic strategies is imperative for improving maternal healthcare and reducing the burden of preventable deaths [3]. The intricate relationship between thromboembolism and maternal mortality, shedding light on the incidence rates, risk factors, and the latest advancements in prophylactic approaches. By comprehensively examining the interplay between these critical components, we aim to provide a comprehensive overview of the current state of knowledge in this field, ultimately contributing to the advancement of evidence based practices that can save the lives of expectant mothers and protect the wellbeing of their families.

MATERIALS AND METHODS

In the pursuit of understanding and mitigating the alarming incidence of maternal mortality due to thromboembolism, this case series study was meticulously conducted with the utmost commitment to ethical and security standards. The data regarding maternal mortality cases were meticulously collected, ensuring strict adherence to the ethical guidelines and security protocols set forth by the Ministry of Health of the country [4]. This not only safeguarded the confidentiality and privacy of the individuals involved but also ensured that the research was conducted with the highest standards of integrity and accountability.

To derive meaningful insights and draw valid comparisons, the data on maternal mortality cases were thoughtfully juxtaposed with that of a carefully selected healthy control group. This allowed for a comprehensive analysis, facilitating the identification of patterns, risk factors, and potential preventive measures. By contrasting the two groups, the study aimed to shed light on the specific factors that increase the susceptibility to thromboembolism related maternal mortality during pregnancy, labor, or the postpartum period [5].

One of the key methodologies employed in this research was the administration of a questionnaire titled "the evaluation of risk factors for maternal mortality following thromboembolism during pregnancy, labor". It delved into aspects such as medical history, lifestyle factors, and potential predispositions that could contribute to the development of blood clots during the perinatal period. By utilizing this tool, the researchers were able to gather comprehensive data that facilitated a deeper understanding of the factors at play and their respective impacts.

The study adhered rigorously to ethical and security standards, ensuring the integrity of the research process [6]. By comparing maternal mortality cases with a healthy control group and utilizing a well-structured questionnaire, it sought to illuminate the complex interplay of risk factors, ultimately paving the way for more effective preventive measures and healthcare interventions in the critical context of thromboembolism during pregnancy, labor, or the postpartum period. The findings from this study have the potential to inform healthcare policies and practices, with the overarching goal of reducing maternal

mortality rates and safeguarding the lives of expectant and new mothers.

RESULTS

The maternal mortality rate is a critical indicator of a country's healthcare system, reflecting its ability to provide safe and effective care for expectant mothers. In this particular case series study, the maternal mortality rate was observed to be 16 per 100,000 live births, underlining the significance of investigating the contributing factors, particularly in cases of thromboembolism-related deaths [7].

Out of the 300 maternal mortality cases studied 10 attributed to thromboembolism. This statistic highlights the need for specific attention and targeted interventions in addressing thromboembolism during pregnancy, labor, and the post-partum period. Analyzing the demographic and clinical data further, it was found that the mean gestational age at the time of maternal mortality was 32.5 weeks. This suggests that thromboembolism can pose a risk throughout pregnancy, even in the relatively advanced stages. Early recognition and preventive measures are imperative. Clinical manifestations played a crucial role in identifying potential thromboembolism cases. Dyspnea, reported in 88.8% of the cases, emerged as a prominent symptom [8]. This respiratory distress symptom can often be overlooked or attributed to other factors during pregnancy, making it imperative for healthcare providers to be vigilant in its assessment. Tachycardia, though less common, was still present in 18.5% of cases, further emphasizing the importance of clinical vigilance and prompt intervention (Table 1).

Cases	Time of VTE (per day after cesarean)	VTE score
Case 1	1	5
Case 2	1	5
Case 3	1	7
Case 4	1	6
Case 5	1	5
Case 6	1	1
Case 7	1	5
Case 8	1	8
Case 9	1	4
Case 10	1	8

Table1: VTE score based on Royal College of Obstetricians and Gynecologist.

The administration of heparin, an anticoagulant, emerged as a noteworthy aspect of the study. Surprisingly, 59.3% of cases did

not receive heparin at all, highlighting a potential gap in thromboembolism prevention strategies. Of those who did receive heparin, the dosage and timing varied. Five patients received heparin before surgery, one after surgery, and five both before and after surgery. This variance in practice suggests the need for standardized guidelines and protocols regarding heparin administration in pregnant and postpartum women at risk of thromboembolism.

Tragically, the study found that 5 of the cases resulted in maternal mortality within the first hours after delivery, while the remaining cases succumbed between 2 to 12 days post-delivery. This timeframe underscores the persistent risk of thromboembolism in the postpartum period, even after the immediate delivery related risks have subsided [9].

The assessment of thromboembolism risk using the Royal College of Obstetricians & Gynecologist (RCOG) guideline revealed an average risk score of 4.6. This score signifies a substantial risk, indicating that a significant number of women in the study population were predisposed to thromboembolism, thereby reinforcing the importance of robust preventive strategies and heightened clinical awareness. It provides crucial insights into maternal mortality attributable to thromboembolism during pregnancy, labor, and the post-partum period [10]. The findings underscore the need for standardized protocols in assessing risk, administering heparin, and closely monitoring clinical manifestations. With a maternal mortality rate of 16 per 100,000 live births and the prevalence of thromboembolism related deaths, healthcare systems should prioritize comprehensive and proactive measures to reduce the incidence of these tragic events, ultimately safeguarding the lives of expectant and new mothers.

DISCUSSION

This study delves into the risk factors for thromboembolism in 10 maternal mortality cases, shedding light on several noteworthy aspects. The mean gestational age at which these events occurred was approximately 33 weeks and 6 days, with a significant portion involving premature births. This aligns with previous research findings indicating that delivering at a gestational age of less than 36 weeks is a risk factor for Venous Thromboembolism (VTE).

The use of a risk score calculator emerges as an effective tool for determining the duration of heparin therapy. However, in this study, it's revealed that even though the mean thromboembolism risk score was 4.6 (indicating a high risk population), only half of the cases with a score exceeding 4 received heparin. This highlights the need for consistent risk assessment and prophylactic measures, especially in deprived areas where access to score calculation may be limited.

Interestingly, the average age of the cases was 33.2 years, slightly lower than the often associated age of 35 years as a thromboembolism risk factor during pregnancy. This suggests that other variables may contribute to the elevated risk of thromboembolism in this population. Similarly, the timing of thromboembolism events in this study revealed that over 70% occurred in the first day after delivery, with approximately half

of them happening intrapartum, emphasizing the urgency of swift and accurate identification of prophylactic indications.

Cesarean sections were identified as having a higher risk of VTE compared to vaginal deliveries, likely influenced by surgical indications and post-surgery conditions. Maternal Body Mass Index (BMI) was also considered a risk factor, although it was only above 30 in a few patients in this study. Inherited thrombophilia, a positive family history, and prior VTE episodes were linked to increased risk in other studies, which aligns with the presence of such cases in this research.

The most common blood group among the mothers in this study was A+, echoing findings from other studies conducted in Iran. Additionally, factors such as multiple pregnancies, heart disease, high blood pressure, and stillbirths were prevalent among the cases and likely contributed to their increased risk. Conversely, certain factors like severe bleeding and rupture of membranes emerged as important risk factors in thromboembolism, emphasizing the significance of precise monitoring and timely interventions to prevent maternal deaths. It underscores the importance of consistent risk assessment, prophylactic measures, and vigilant monitoring to reduce the incidence of these life threatening events during pregnancy and the postpartum period.

CONCLUSION

A significant contributor to maternal mortality was the failure to identify high risk patients and the subsequent omission of prophylactic heparin prescriptions. This observation underscores the critical need for improved screening methods to identify pregnant and postpartum women at elevated risk of thromboembolism. Furthermore, the study highlights the necessity for enhanced care and treatment protocols for these high risk patients. Healthcare providers must be well versed in recognizing the signs and symptoms of thromboembolism and be proactive in prescribing heparin when indicated. The findings emphasize the urgency of implementing accurate screening measures, standardizing protocols, and ensuring comprehensive care for high risk pregnant and postpartum women. These measures collectively hold the potential to significantly reduce maternal mortality attributed to thromboembolism, saving countless lives in the process.

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