Prevalence And Factors Associated With Post-Caesarean Section Wound Sepsis In A Private Hospital In Ghana: A Retrospective Audit

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Abstract

Introduction: Post-Caesarean Section wound sepsis remains a significant concern in maternal healthcare, particularly in low-income countries such as Ghana. Various risk factors can contribute to the prevalence of Post Caesarean Section (CS) wound sepsis, including obesity, diabetes, immune-suppressive disorders, previous CS, medication use, lack of pre-incision antimicrobial care, prolonged labour, and surgery.

Aim: This study aimed to investigate the prevalence and risk factors associated with post CS wound sepsis at Family Health Hospital over a one-year period.

Methods: A retrospective audit analysing electronic patient records of all women who underwent CS delivery between January 1, 2019 and December 31, 2019, at Family Health Hospital was conducted. Data collection and analysis were conducted using Microsoft Excel and IBM SPSS version 25, respectively. Statistical tests, including chi-square analysis, were employed to examine the association between selected independent variables and the prevalence of surgical site infection.

Results: The prevalence of post CS wound sepsis in this study was 5.17% which is within the normal global prevalence range. The number of CS done was equally distributed with an average of 9 procedures per month. There was no statistically significant relationship between the risk factors studied such as Antepartum infection, Anaemia, and Post CS wound sepsis.

Conclusion: This study aimed to contribute valuable insights into the prevalence and risk factors of post CS wound sepsis, which could inform discussions and strategies to reduce maternal mortality rates, particularly in resource-constrained settings for safe CS delivery and post-operative care. By identifying key risk factors, healthcare providers and policymakers can implement targeted interventions to improve obstetric care and outcomes for women undergoing CS delivery in low-income countries.

Keywords: Sepsis, post-caesarean section infection, surgical site infection, maternal healthcare

Introduction

Caesarean Section (CS) is one of the most common obstetric procedures in Ghana. Post CS wound sepsis constitute a substantial burden on health systems in developing countries.[1] Post CS wound sepsis is one of the most common complications for patients who have undergone CS.[2] It is a widespread contributing factor to maternal mortality.[2] Some studies suggest its increase could be due to antimicrobial resistance.[3] Furthermore, post CS wound sepsis can lead to septic shock if poorly managed. The current global post CS wound sepsis prevalence is 3.7-24.2%.[4] Studies in some Low-and-Middle-Income Countries (LMIC) such as India and Brazil reported incidence rates of 24.2% and 11-25%, respectively.[5] However, post CS infection rates in High-Income-Countries (HIC) appears to be lower, for instance the National Nosocomial Infection System (NNIS) in the USA, reports an incidence of 3.5% in low-risk women and 8.11% in high-risk women. The risk factors observed for CS wound infections are obesity, diabetes, immune-suppressive disorders, a previous CS, medications like steroids, lack of pre-incision antimicrobial care, prolonged labour and surgery.[6] CS is usually done under aseptic conditions, nevertheless, the risk of post CS wound sepsis always exists which puts post CS wound sepsis as one of the most common nosocomial infection.[7] The rate of CS surgery is increasing globally and thus, wound sepsis – the most common complication of CS, is also increasing by 3-15%.[2] In Ghana, the rate of CS is 6.59% and women age 30-34 years are more likely to have a CS.[8]

In health facilities that do not have the capacity to carry out CS safely or treat post CS complications, wound sepsis is associated with maternal mortality rate of up to 3%.[9] In Sub-Saharan Africa post CS wound sepsis ranges between 1.7%-10.4%.[10] This has been attributed to poor access to health care services which is below 3% and thus, leading to poor postnatal follow-up and wound care.[11] In the African context, post CS wound sepsis is associated with poverty, environmental pollution, poor pre-operative care, malnutrition, anaemia, wound contamination, poor antibiotic selection and poor immunity.[12]

The majority of post CS wound sepsis have pathogens that are methicillin-resistance, thus, this poses as a healthcare challenge due to the limited class of drugs available in several health centers.[13]

It goes without saying that, in order to meet the goal set by the United Nations' Sustainable Development Goal (SDG) 3.1, we must aim to drastically reduce post-caesarean section wound sepsis. Tackling this challenge also has benefits for the health care system since post CS wound sepsis leads to prolonged hospital stays. Implementing regular hand hygiene, keeping wounds clean and covered, strict aseptic preparation of surgical sites, appropriate antibiotic prophylaxis and appropriate use of theatre wear are steps to mitigate post CS wound infection. The use of monofilament sutures, subcuticular sutures and covering surgical incisions with dressings able to absorb exudates are some of the best practices to be adopted.[14] This study aimed to investigate the prevalence and risk factors associated with post CS wound sepsis at the study site over a one-year period.

Methods

This research was conducted at Family Health Hospital (FHH), a 24-hr private hospital with a 70-bed capacity located in Teshie, a coastal town in the Ledzokuku Municipality, in the Greater Accra Region of Ghana. The hospital functions as a general community hospital with specialist services that include obstetrics and gynecology and pediatrics. A retrospective audit of patient records of all women who were delivered by CS at FHH in a 1-year period between 1st January, 2019 and 31st December, 2019 was done. Patients' electronic records were accessed to identify women diagnosed with post CS endometritis or surgical site infection. Patients' information on clinical course, outcome, subsequent hospital admission, repeat surgery, severe morbidity and mortality were captured.

Data collected was initially entered into Microsoft Excel and later transferred to IBM SPSS version 25 for analysis. The results were analyzed using frequencies, means, proportions and percentages and were presented in summary tables and charts. Chi-square test was performed on categorical data

to test association between selected independent variables and the proportions of women with surgical site infection.

Results

A total of 114 women were identified as having delivered by Caesarean Section (CS) in the study period (1 January, 2019 – 31 April, 2019). Nine (9) women were excluded, due to minimal or lack of clinical records. Finally, a total of 105 patients with complete records were included in the analysis, with an average of 9 procedures per month. Most of the women (73%) were between the ages of 31 and 40 (Figure 1), while the mean age was 33.7 years and a standard deviation of 2.67.

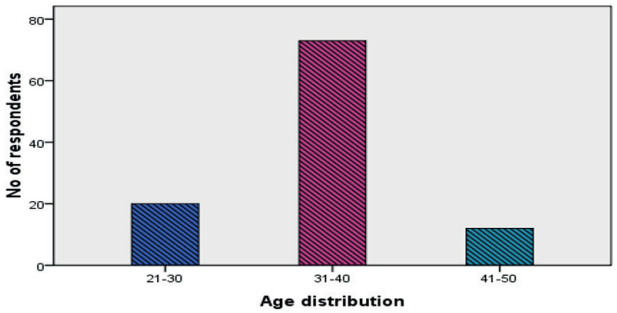

Figure 1 Age distribution of the study population.

Sixty-three percent of the women were multiparous at the time of CS. None of the women were found to have smoked cigarettes either before or during the pregnancy. Approximately 86.7% of the women had only their weight available without their respective heights and therefore BMI could not be calculated.

Majority (69.5%) of the women had blood hemoglobin (Hb) > 11g/dl) before the procedure. Only 1 (0.95%) of the women was known to be HIV positive, however there was no additional information such as when the diagnosis was made, when antiretroviral therapy was started or compliance with therapy. Diabetes Mellitus was diagnosed or known in 6 (5.71%) of the women. This included both pre-gestational and gestational diabetes.

Hypertensive disorders were present in 16.2% of the women included. This included preeclampsia.The number of women who had antepartum infection were 21 (20%). The gestational age in completed weeks at delivery ranged from 35 to 42 weeks. Also 21 (20%) went into labour before caesarean section was performed. Those with a history of Premature Rupture of Membranes (PROM) before CS were 7(6.7%) and 6 women (5.71%) were identified with post CS wound sepsis. Anaemia, HIV, diabetes, hypertension, antepartum infection, hemoglobin, labor prior to CS, premature rupture of membranes (PROM) did not show significant relationship with post CS wound sepsis in our study.

Discussion

This study was a retrospective audit of records of women who delivered by CS at Family Health Hospital (FHH) to ascertain the prevalence and risk factors associated with Post-Caesarean Section wound sepsis at Family Health Hospital, Teshie, Greater Accra Region.

Out of the 105 women who delivered by CS, the prevalence of post CS wound sepsis identified was 5.7%. This results agrees with the current post CS prevalence rate of 3.7 to 24.2% of Wloch et al.[4] However, studies in some Low-and-Middle-Income Countries (LMIC) such as India and Brazil reported incidence rates of 24.2% and 11-25%, respectively, which is higher than the results from the current study.[5] Firstly, the low prevalence rate reported in our study can be attributed to the small numbers used in our study and also the study site being a private hospital with lower patient doctor ratio. Secondly, there is high quality of care among CS births in this private hospital with special obstetrics and gynaecology interest with strict adherence to infection prevention protocols and aseptic techniques during wound management.[5,6]

Another reason for the low prevalence observed could be that, majority of the women (69.5%) were older and multiparous (60%). Younger age and nulliparity have been positively correlated with increased risk of post CS wound sepsis even though the cause remains unclear.[4] This may also explain why age was not found to be significantly associated with post CS wound sepsis (p-value = 0.170) in our study.

Anaemia has commonly been described as an associated factor for the development of post-operative sepsis.[1] However, in this study anaemia as risk factor did not show statistical significance (p-value = 0.285). This could be likely due to a very low prevalence of anaemia, given that only 3 (2.86%) patients with post CS wound sepsis presented with a Hb below 11g/dL. This contrasts sharply with that of a South African study, where anaemia was present in 39.4% of participants who later succumbed to pregnancy-related wound sepsis, as severe anaemia can cause reduced resistance to sepsis and slower recovery from infection.[1]

HIV infection was not found to have any statistical association with post CS infection in this study. Earlier reports have observed that women living with HIV infection have a higher risk of post CS wound sepsis especially when they are not yet on Highly Active Antiretroviral Therapy (HAART) or have low Cluster of Differentiation 4 (CD4) count, WHO stage 3 or 4 disease or with opportunistic infections.[15] It is possible that the only woman who was found to be HIV positive was on HAART and as such was not vulnerable to opportunistic infections that will result in post CS wound sepsis.

In the current study, diabetes was not found to be a statistically significant risk factor for post CS sepsis (p-value = 0.535) as none of the women with diabetes (5.71%) developed post CS wound sepsis. The highest risk of sepsis existed in women with pre-gestational diabetes, but those women with gestational diabetes were also at increased risk.[16] Great care should be taken in the FHH setting to achieve optimal glycaemic control, to decrease other risks related to diabetes in pregnancy. The great majority of women had well-controlled blood glucose level with little, or no target-organ involvement by the time of delivery. This, together with the relatively low numbers in general, might explain the lack of statistical significance found in this study.

Hypertension was found not to be a statistically significant risk factor for post CS sepsis (p-value = 0.974). In this study, this can be attributed to a very low rate (5.9%) of hypertensive disorders with post CS wound sepsis in the study population. Nevertheless, women suffering from hypertensive disorders in pregnancy have been shown to have an increased risk of developing post CS wound sepsis.[1] This can be explained by the good care rendered to women at the FHH setting to achieve diserable blood pressure control, in order to decrease other risks related to hypertension in pregnancy.

The presence of active antepartum infection, such as chorioamnionitis, urinary tract infections have been well established by previous reports as a significant independent risk factor for post CS sepsis, especially endometritis.[17] However, the index study did not yield a statistically significant (p-value = 0.747) result as only 33% of the women who presented with antepartum infection had evidence of sepsis after CS.

Women in active labour prior to CS have been found to be independent risk factor for post CS sepsis.[18] The study acknowledges the previously proven association between active labour and post CS sepsis and postulates that this was not used in the index study due to very few women with both active labour and sepsis (1%).

Conclusion

This study was the first audit done on post CS sepsis in the FHH setting. From the study, post CS sepsis showed a prevalence of 5.17% that compares with the current global prevalence. Further studies can be conducted to explore the experiences of patients with post CS sepsis and its predictors.

Conflict of Interest

The authors declare that they have no competing interest.

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