

To Assess the Incidence and Factors Predisposing to Surgical Site Infection (SSI) in Patients Who Have Undergone Caesarean Section in Tertiary Care Hospital of Udupi District, Karnataka- A Retrospective Study

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Abstract

Caesarean Section (CS) is a life-saving surgical procedure when certain complications arise during pregnancy and labour. Currently, 18.6% of all births occur by cesarean section globally. **Aim:** To determine the incidence of surgical site infections in patients who have undergone Caesarean Section through record analysis and to identify the factors predisposing to surgical site infections (SSI) with Caesarean Section (CS). **Design:** Retrospective cross-sectional survey design was used for this study. The study was conducted at tertiary care hospital of Udupi district, Karnataka from January 2017 to March 2017. Consecutive 305 post-operative case records of Caesarean Section were enrolled in the study. The sample is selected purposively as per their availability in record room. **Methods:** It was a retrospective study screening the records of pregnant women who underwent cesarean section in selected tertiary care hospital from 1st January 2015 to 31st December 2015 and came for followup or readmission with surgical site infection at the incision site or not got discharged due to surgical site infection for a period of 6 weeks. **Results:** A total of 305 record are viewed, about 35.8% (n=107) were performed in elective and 64.92% (n=198) undertaken on emergency list. A total of 20 post-operative cases diagnosed with Surgical Site Infection were studied during the specified period. Of these n=17 (85%) had superficial infection and n=2 (10%) deep SSI and n=1 (5%) had organ space SSI. Odds ratio calculation and *p*-value calculation shows that booking status and wound closing material are responsible to develop SSI.

Keyword- Retrospective review, Incidence, Predisposing factor, SSI, CS.

Introduction

¹The word Caesarean Section is imitative from the Latin verb, 'caedere' meaning (supine stem cesium), 'to cut'. A Byzantine-Greek historical encyclopaedia says Caesarean Section name came from infamous Roman

Ruler Gaius Julius Caesar. Currently, 18.6% of all births occur by caesarean section globally. America and Caribbean region has the highest caesarean section rates of 40.5%. In Asia, present rates of caesarean section are 19.2%. Between 1990 and 2014 the rate has increased 12.4% (from 6.7% to 19.1%).

⁵Surgical site infection is defined as an infection that occurs at the incision/operative site (including drains) within 30 days after the surgical operation if no implant is left in place/within 1 year if an implant is left in place. According to the CDC's National Nosocomial Infection Surveillance system, 38% of all nosocomial infections in surgical patients are surgical site infections. The rate

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of surgical site infection after Caesarean Section range from 3%- 5%.

⁷The incidence reported of surgical site infection following the caesarean section varies widely. Postpartum wound infection varies from approximately 2%- 10%. Surgical site infection arose more recurrently in women with poor nutrition, extremes of maternal weight (underweight or obese), little prenatal care, prolonged labor or rupture of membranes, long duration of surgery, general anaesthesia, multiple procedures, and young maternal age.

Background of the study:

³A retrospective cross-sectional study was done to assess the incidence of surgical site infection and identify risk factors, common bacterial pathogens and antibiotic sensitivity in Nizwa Hospital, Oman. A total number of 7923 caesarean section women's, 211 (2.66%) had developed surgical site infection. The study results suggest that the wound infection is highly associated with women with diabetes ($P=0.001$), premature rupture of membrane ($P<0.001$), mildly or moderately or severely anaemic ($P=0.035$). The overall study concluded that to reduce the number surgical site infection and prevent the risk factors it is necessary to maintain aseptic surgeries, implement infection prevention practices and give antibiotic prophylaxis to reduce morbidity in women undergoing caesarean section.

⁴Farret, Dalle, Monteiro, Wurdig Riche, & Antonello (2015) conducted a retrospective case-control observational study that was conducted in Femina hospital in Porto Alegre, Brazil to determine the risk factors and impact of antibiotic prophylaxis for surgical site infection on caesarean section. A total number of 8180 caesarean section records were reviewed and 118 (1.44%) were diagnosed as having surgical site infection. Among them 56 (70.9%) had a superficial skin infection, ten (12.6%) had a deep incisional and 14 (17.7%) had an organ/space surgical site infection.

⁶A prospective study was conducted as a part of the Scottish Surveillance Healthcare-Associated Infection Programme in a city hospital of Glasgow. The data was collected in two phases, during the inpatients stay and in the community setting until 30th postnatal day from 715 women. Among all 715 cases of caesarean section, 80 (11.2%) cases developed surgical site infection. Development of surgical site infection occurred within the hospital stay for 22 (27%) patients, 57 (71%)

developed after discharge and one (2%) diagnosed after re-admission. The majority, 90% of the surgical site infection were superficial. The study concluded that an intensive surveillance program with engaged clinicians and infection control personnel was effective to reduce healthcare-associated infection.

²A prospective cross-sectional study was carried out by the Department of Gynaecology and Obstetrics, at Butare University Teaching Hospital. surgical site infection was identified during hospital stay or 30 days of the post-caesarean section following readmission. Data were collected by questionnaire and telephone interview. In this study among 323 mothers, 4.9% developed surgical site infections. Most of the surgical site infection was categorized as superficial skin infection 75%, deep 12.5% and organ space surgical site infection 12.5%. The study concluded that close monitoring of prolonged labor and routine visit on the 4th postnatal day can be a measure to control surgical site infection.

Even though the literature review was done on surgical site infection on caesarean section for assessing predisposing factors from 2007 to 2017 the investigator couldn't find any published article from the Karnataka state. The current study was planned to assess the incidence and factors predisposing to develop surgical site infection in the caesarean section to get the status of surgical site infection and adopt preventive measures.

The study wants to determine the incidence of surgical site infections in patients who have undergone caesarean section through record analysis and also to identify the factors predisposing to surgical site infections and antibiotics used in those patients with caesarean section.

Method

The retrospective cross-sectional survey design was found appropriate to meet the required objective of the present study. Formal administrative permission was obtained from the Institutional Research Committee and Institutional Ethical Committee. Permission was taken from the respective Head of the Department. Data were collected from January 6th, 2017 to 4th February 2017. All the hospital number was collected along with IP number from medical record department and 20 files per day were checked both IP and OP simultaneously. The purpose of the study was to find out the incidence of SSI and find out factors predisposing to SSI of those pregnant women underwent Caesarean Section in this particular

time period and data was collected in retrospectively from medical records and it was considered necessary to gather information directly from records of cesarean mothers.

Screening the records of pregnant women who underwent cesarean section in selected tertiary care hospital of Udupi district, Karnataka and pregnant women who underwent Caesarean Section from 1st January 2015 to 31st December 2015 and came for followup or readmission with surgical site infection at the incision site or not got discharged due to surgical site infection for a period of 6 weeks post-delivery through caesarean section. Data collection tools were personally obtained by the investigator from each record. The following data collection tools were developed by the investigator- demographic proforma, semi-structured tool to assess factors predisposing to surgical site infection among pregnant women who underwent caesarean section, semi-structured tool to assess the factors predisposing to surgical site infection among cesarean section women, structured antibiotic assessment tool. The time taken to complete the tools was approximately 20 minutes.

Through this study, we want to find out Obstetrical factor and Surgical factor related to development of SSI and antibiotic used to treat SSI in post-CS. For identifying each record demographic proforma was used. The semi-structured tool was used to assess factors predisposing to surgical site infection among pregnant women who underwent cesarean section and for assessing antibiotic used in post-Caesarean Section mother, the antibiotic assessment tool was formulated.

The data obtained from records were analyzed using "SPSS" 16 version. Here, data related to demographics, factor assessing to surgical site infection, cesarean section assessment tool, and the tool to assess antibiotic use practices were transferred directly to "SPSS" version 16. Missing data are coded as 999. Descriptive and inferential statistics were used to analyze the data. Frequency and percentage were used to calculate prevalence, univariate and multiple logistic regression wares used for analysis of data related to factors predisposing to surgical site infection among cesarean section. Total 305 mothers' data were included in this study.

Findings

The analysis of the study findings is categorized into the following sections:

Section 1: Incidence of occurrence of surgical site infection

Section 2: Description of sample characteristics

Section 3: Factors predisposing to the development of surgical site infection- Obstetric factors and Surgical factor

Section 4: Description of antibiotic usage among women after caesarean section

Section 1: Incidence of occurrence of surgical site infection.

This section describes the incidence of the occurrence of surgical site infection among 305 pregnant women who underwent caesarean section. The occurrence of surgical site infection was based on presence of one or more symptoms (tenderness, redness, discharge, pain, coping any other).

Section 2: Description of sample characteristics.

This section describes the characteristics of 305 pregnant women who underwent caesarean section. The sample characteristics include age, height, weight, BMI, parity, previous history of surgical site infection, previous abdominal surgery and premorbid disease condition. Frequency and percentage distribution were calculated for describing the sample characteristics of women who developed surgical site infection and who did not develop surgical site infection.

Mother who didn't develop SSI among them, majority 180 (63.2%) of the pregnant women who underwent Caesarean Section belonged to the age group of 25-32 years, 202 (77.7%) had height more than 150cm, 174 (66.9%) had weight between 50-70kg, 121 (47.5%) had BMI of 25.1-30.1, 167 (58.6%) were multigravida, 162 (56.8%) had Caesarean Section and other abdominal surgeries in the past, 196 (68.8%) had no previous premorbid disease condition.

Mother who develop SSI, among them majority 15 (75%) of the women belonged to age between of 25-32 years, nine (56.2%) of women's height was more than 150cm, eight (50%) had weight in between 50-70kg, seven (43.8%) had BMI of 20-25, 13 (65%) were multigravida, nine (45%) had no history of previous surgeries, ten (50%) had no previous premorbid disease condition.

Section 3: Factors predisposing to the development of surgical site infection.

Obstetrics and Surgical factors that are responsible for developing an infection. The univariate analysis and odds ratio of each factors are describing in Table 1.

Among women who had taken antenatal care from a tertiary care hospital odd depicts 3.572 {1.29-9.970 (95% CI) and p-value of 0.52} less chance of developing surgical site infection because of a routine investigation, antenatal high-risk assessment, proper timing of conducting delivery.

Suturing the wound with Ethilon and Vicryl will reduce the chance of developing surgical site infection 1.421 times i.e. OR 1.421 {1.084-24.159 (95% CI) and p-value 0.486}.

Conclusion

Based on the findings and interpretation of the present study, the following conclusion was drawn:

- The incidence of surgical site infection among women who underwent caesarean section was only 6.9%.
- The present study shows booking status, wound closing material have a significant associative risk factor in developing women's surgical site infection in who underwent caesarean section. However, to some extent patient above 25 years of age had more risk for developing surgical site infection.

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