Surgical Site Infection and Factors Responsible For It After Emergency Cesarean Section

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ABSTRACT

Objective — *To determine the frequency of surgical site infection and factors responsible for it after emergency cesarean section at public sector hospital.*

Study design — *Cross sectional analytic study.*

Place & Duration of study — *Department of Obstetrics & Gynecology, Jinnah Postgraduate Medical Center (JPMC) Karachi, from July 2018 to January 2019.*

Methodology — *Patients who underwent emergency cesarean section were enrolled after taking informed consent. Patients were followed after surgery up to one month and observed for the development of surgical site infection (SSI). Data collected and analyzed on SPSS version 16. Quantitative data was presented as mean and standard deviation and qualitative variables as frequencies and percentages. Chi square test was applied to find out association of surgical site infections with risk factors. A P < 0.05 was considered as significant.*

Results — *Among 145 patients who had emergency cesarean section 35 (24.1%) developed surgical site infection. Mean age of the patients was 30.93 years. Significant association of surgical site infection was found with anemia (P=0.020), diabetes mellitus (P=0.001), and prolonged hospital stay (P=0.000).*

Conclusions — *Increased rate of surgical site infection and multiple modifiable risk factors were identified in this study. Optimization of maternal health is imperative in the control of surgical site infection. Aseptic techniques and reduction of hospital stay may help in reducing SSI.*

Key words — *Cesarean section, Risk factors, Surgical site infection, Emergency surgery.*

INTRODUCTION:

Over the past few decades cesarean section rate has i ncreased globally, up to 41% in USA and China.[1-3] It is associated with morbidity and mortality that include surgical site infection. This is reported to be the most common infection in community hospital setting.[4] According to WHO recommendation postoperative wound infection rate should be 10 to 15 %.[5,6] Wound infection rate is reported between 9.1% to 24.3% in previous studies conducted across Pakistan.[7-10] Post cesarean section SSI results in increase maternal morbidity such as prolonged hospital stay, repeated surgical interventions, prolonged use of broad spectrum antibiotics, delayed wound healing, risk of hysterectomy in addition to physical, psychological, financial burden and on quality of life.[11,12]

In developed countries surgical site infections are less in comparison with developing countries. Poverty, malnutrition, anemia, scarcity of facilities, unhygienic conditions, obesity and diabetes mellitus are some of the predisposing factors leading to high SSI rate in developing countries.[13] This study was conducted to report data from a tertiary care hospital on this important issue. It will help in planning strategies to reduce high surgical site infection rate.

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METHODOLOGY:

Women who underwent emergency cesarean section were enrolled in this cross sectional study conducted in the Department of Obstetrics & Gynecology, Jinnah Postgraduate Medical Center Karachi, from July 2018 to January 2019. IRB approval was taken and Informed consent was obtained from all the patients.

Brief history for demographic information and obstetric history was taken. Patients with singleton pregnancy, gestational age = 36 weeks, 18 to 40 years of age were included. Patients with history of hospitalization within the last month, recent infection like pneumonia, UTI or cellulitis, skin diseases, hypo or hyperthyroidism, connective tissue disorder, chorioamnionitis, renal impairment, chronic obstructive pulmonary disease, asthma, chronic liver disease, and congestive cardiac failure were excluded from the study. Prophylactic antibiotic, injection Amoxiclav 1gm intravenously and injection metronidazole 500mg intravenously were given to all the patients one hour before surgery. Cases were followed up from surgery till 30 days postoperatively for the development of wound infection. Wound was observed on 3rd postoperative day and patients were discharged from the hospital and advised to visit at weekly interval for one month.

All patients who had superficial infection involving the skin/subcutaneous tissue, deep infection involving the fascial/muscle layers and organ/space infection were identified and management done according to the severity of surgical site infection.

Data was entered and analyzed on SPSS version 16. Mean and standard deviation were calculated for continuous variable like maternal age, BMI, preoperative hemoglobin, duration of surgery and length of hospital stay. Frequencies and percentages were calculated for categorical variable like gestational age, parity, socio economic status, occupational status, educational status and premature rupture of membrane >12 hours. Chi-square test was applied to find out the association of surgical site infection with risk factors.

RESULTS:

A total of 145 women had emergency cesarean section. Age of the patients was from 21 years to 36 years with the mean age of 30.93±7.28 year. Thirty-five (24.1%) patients developed surgical site infection (table I). Mean duration of surgery was 2.15 hours and mean length of hospital stay 8.86 days. Sixty-six (45.5%) cases were in age group 20–30 years while 79 (54.5%) between 31 to 40 years. Eighty-seven (60%) patients had gestational age < 40 weeks whereas 58 (40%) were at > 40 weeks of gestation. Sixty (41.4%) patients had parity of < 4 while 85 (58.6%) were mothers of > 4 children.

Fifty-one (35.2%) patients belonged to lower income group, 73 (53.1%) to middle income group while 21 (14.5%) patients were from high income group. Nineteen (13.1%) patients had premature rupture of membrane. In age group from 20 years to 30 years, 13 (37.1%) patients had surgical site infection while in 31 years to 40 years age group 22 (62.9%) patients developed wound infection. Only two patients developed wound infection after premature rupture of membrane. Thirty (85.7%) patients with SSI had gestational age >40 weeks and 5 (14.3%) were at < 40 weeks of gestation.

Significant association of surgical site infections was found with anemia (P=0.020), diabetes mellitus (P=0.001), prolonged hospital stay (P=0.000) while insignificant association was found with BMI > 27kg/m^2 (P=0.093) and prolonged operation time (P=0.139). Details are given in table II.

DISCUSSION:

Surgical site infection is potentially the most serious complication associated with cesarean section. With the rising cesarean section rate across the world its inherent risks are also expected to be on the rise including SSI, hence it has a clinical significance.[13] Mean age of the patients in this study was 30.93 year which is in accordance with another study.[13]

In this study 35 patients developed SSI. Jabbar et al reported 24.3% wound infections rate in their study.[9] Surgical site infection rate reported in study at Novo Scotia was 2.7%,[14] 5.9% in a study from

Table I: Demographic Variables (n=145)

Variables	Mean	Standard Deviation	Minimum – Maximum
Age (Year)	30.93	± 7.28	21 – 37
Duration of Surgery (Hours)	2.15	± 1.16	1 – 4
Length of Hospital Stay (Days)	8.86	± 2.62	6 – 12
Preoperative hemoglobin (gm/dl)	11.76	± 1.47	9 – 13

Table II: Association of Surgical Site Infection With Risk Factors

		Surgical Site Infection			P-Value
		Yes (n=35)	No (n=110)	Total (n=145)	
BMI	< 27 kg/m	20	45	65	0.093
	>27 kg/m	15	65	80	
Anemia	Yes	20	85	105	0.020
	No	15	25	40	
Diabetes Mellitus	Yes	13	75	88	0.001
	No	22	35	57	
Prolonged Hospital Stay	Yes	11	80	91	0.000
	No	24	30	54	
Prolonged Operation time	Yes	8	40	48	0.139
	No	27	70	97	

Thailand,[15] 48% in study from Tanzania,[16] and 12% Pakistan.[17] High rate of development of surgical site infection observed in our study. This may be due to high turnover of patients, large number of un-booked and referred cases with complications.

Majority (62.9%) of our patients who developed SSI were in the age group 31 years to 40 years With increasing age risk of SSI has also increases as observed in another study.[18] Anemia was found in 58.6% patients who developed SSI and had significant association. The prevalence of anemia in obstetric population is exceptionally high in developing countries. It adversely affects the wound healing due to low tissue oxygen supply thus may promote the development of wound infection. In study Ghazi et al 82% patients were found anemic who had emergency cesarean section.[19]

Diabetes mellitus was significantly associated with wound infection in index study which is similar to the another study from rural India.[20] Diabetes mellitus especially the poorly controlled, is associated with other comorbid like obesity resulting in less tissue oxygen supply, delayed wound healing and promotes growth of microbial organism hence increasing wound infection rate. Prolonged hospital stay results in the transmission of hospital acquired infections and leads to wound infections in the presence of concomitant comorbid conditions. Emergency cesarean section with its inherent complications itself associated with prolonged hospital stay as noted it another study.[21]

CONCLUSIONS:

Increased frequency of surgical site infection was observed in this study. Multiple modifiable factors identified to be involved in the development of SSI that included anemia, diabetes mellitus, and prolonged hospital stay.

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