ORIGINAL ARTICLE

Surgical Site Infection in Obstetrics Practice

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ABSTRACT

Objective — *To determine the frequency of surgical site infection (SSI), the etiological factors and its management in elective and emergency cesarean sections.*

Study design — *Observational study.*

Place & Duration of study — *Department of Obstetrics and Gynaecology, Islam Teaching Hospital Sialkot, from September 2010 to October 2012.*

Methodology — *Five hundred patients undergoing elective/emergency cesarean section for various indications were included. A minimum follow-up of three months was made. The patients were divided into two groups. Group – I, comprised of 267 (53%) cases of elective cesarean sections, while in group – II, 233 (47%) cases who were non-booked and presented in emergency, were included. The standard preoperative assessment was done in both the groups.*

The surgical aseptic technique was same in both the groups including antibiotic prophylaxis. All the patients were admitted for at least 5 days postoperatively and dressings changed on 3rd postoperative day and on 5th day before being discharged. The follow-up was done on 8-10th day including assessment for surgical site infections.

Results — *A total of 29 (5.8%) patients had surgical site infection. The frequency of surgical site infection in group – I was 4.8% (n=13) and in group – II 6.8% (n=16). Of the total twenty nine cases of SSI in both the groups, 20 (68 %) were superficial in nature, 6 (21 %) deep and 3 (10%) occurred in organs/body cavities. Escherichia coli was the most common organism isolated (n=12 - 48%) followed by Staphylococcus aureus in 6 (24%) cases. All the cases of wound infection were noted on outdoor visits i.e. after a week or so of surgery.*

Conclusion — *Length of stay and duration of surgery were found to be minor risk factors responsible for causing surgical site infection.*

Key words — *Surgical site infection, Cesarean section, Wound infection.*

INTRODUCTION:

Surgical site infection accounts for 20% of all healthcare-associated infections. Cesarean section is a common surgical procedure performed worldwide.[1] Recovery after cesarean section can be more demanding for women who develop a postoperative SSI. Indeed, some of these infections can be very serious, and lead to severe health problems or even death.[2] It is important to take all infection control measures that can help to prevent this type of infection.[3] Cesarean sections are performed as emergency or elective procedures depending upon the indications. Elective operation is defined as a cesarean section that was planned at least 24 hours before the intervention.[4]

SSI is defined as infection occurring in surgical wound within 30 days of operation. It can be superficial, deep incisional or organ/ space related. Host susceptibility, degree of microbial contamination of a surgical site and duration of operation are reliable predictors of surgical site infection risk.[5-7] Approximately 5% of patients undergoing surgery develop SSI.[8] SSI results in failure of wound healing with subsequent increased treatment costs, a greater

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likelihood of admission to the intensive care unit, prolonged hospital stay and higher postoperative mortality.[9] The goal of this study was to find out the frequency of surgical site infection in elective and emergency cesarean sections, etiological factors and its management.

METHODOLOGY:

After approval of hospital ethics committee, this observational study was carried out in the Department of Obstetrics and Gynecology, Islam Teaching Hospital, affiliated to Islam Medical College Sialkot, from September 2010 to October 2012. In the study, five hundred patients undergoing elective/emergency cesarean section were included.

The patients' age group was between 18-41 year and belonged to American Society of Anesthesiologists (ASA) physical status class 1-3 as well as medically optimized ASA-class 4 patients. The patients were distributed into two groups. In group – I, 267 (53%) patients were included. These were elective booked cases. In group – II, 233 (47%) patients were included. These were non-booked cases, who presented in emergency with or without having the antenatal clinic visits.

The standard preoperative assessment was done in both the groups including blood complete examination, urine analysis, blood sugar and obstetric ultrasound. The regional and general anesthesia was given under standard protocols. The surgical aseptic technique remained same for all the patients. Antimicrobial prophylaxis included injection cephradine 1gm intravenous one hour before making an incision.

All the patients were admitted for at least 5 days after operation and dressings changed on 3rd post-operative day and on 5th day before being discharged from the hospital. The follow-up in outpatient was done on 8-10th day including assessment for surgical site infection. Minimum follow-up of three months was made.

Patients who presented with signs and symptoms of SSI were managed according to the severity and samples of pus were sent for culture and sensitivity. In superficial incisional SSI, only skin or subcutaneous tissues were involved. In deep incisional SSI, there was purulent discharge from the deep incision, but not from organ or space compartment.[10] Data was compared and analyzed by SPSS version 17. Chi-square test and Spearman's Rank correlation were used to check interdependence between the two groups elective/emergency variables.

RESULTS:

The frequency of surgical site infection in group – I was 4.8% (n=13) while in group – II 6.8% (n=16). The general demographic data of both the groups are shown in table-I. A total of 29 (5.8%) patients had surgical site infection. Among the total twenty nine cases 68 % were of superficial nature, 21 % deep and 10% occurred in organs/body (table-II). The technical data of the cases with evidence of surgical site wound infection is highlighted in the table-II. Single microbial infection was found 12 (39%) and polymicrobial infection in 13 (42%) cases. All the cases of wound infection presented on outdoor visits i.e. after a week or so of surgery.

Risk factors like personal hygiene and nutritional status, anemia and handling by dai/ local health worker and duration of surgery played a significant role in causing surgical site infection. Our study revealed a surgical site infection rate of 5% in cases of elective cesarean section while it was 7% in emergency cases. The significance of the results using Chi-square test statistical results is shown in table -II.

In all the cases of superficial and some of deep SSIs, patients were managed by repeated dressings and broad spectrum oral antibiotics on outpatient basis. Deep SSI required readmission and the wounds were laid open and repeated dressings along with broad spectrum antibiotics parenterally continued. Out of three patients having peritonitis, one underwent laparotomy for drainage of collected pus and drains were placed; in one with collection of pus in left iliac region, ultrasound guided aspiration was carried out, three times, along with intravenous broad spectrum antibiotics according to culture sensitivity reports. One patient having severe form of endometritis was managed conservatively as indoor patient. There was no mortality.

Single microbial infection was noted in 12 (39%) cases and polymicrobial infection in 13 (42%). E.coli was the most common organism isolated followed by Staphylococcus aureus. E. coli was isolated in 14 (48 %) cases of surgical site infection. In two cases E. coli was isolated along with Pseudomonas aeruginosa and in the others with Staphylococcus aureus and Proteus. Staphylococcus aureus was grown in 6 (20 %) cases. Chi-square test statistical results are shown in table-III. The value of correlation co-efficient (r) was 0.781 and is depicted in table- IV. The correlation is significant at the 0.01 level.

DISCUSSION:

Hospital infection control programs are essential

Table I: General Demographic Data n=500	
Group I – elective	267 (53%)
Group II – emergency	233 (47%)
Age (year)	18 – 42 (Mean 26.86)
Personal hygiene status and nutrition	Good – 299 (60%) Satisfactory – 120 (24%) Poor – 81 (16%)
Smoking (Hukka)	40 (8%)
Obesity	84 (17%)
Co-existent infections at a remote site	47 (9%)
Immunosuppression	Nil
Length of preoperative stay	Same day surgery – 418 (84%) + one day – 82 (16%)
Blood transfusion	34 (7%)
Anemia	138 (28%)
Malignancy	Nil
Previous Cesarean scar	186 (37%)
Diabetes mellitus	34 (7%)
Hepatitis B status (Positive)	26 (5%)
Hepatitis C status (Positive)	59(12%)
History of LHW/dai handling	96 (19%)
Duration of surgery	< 60 minutes – 482 (96%) 60-90 minutes – 14 (3%) > 90 minutes – 4 (1%)
Total patients with SSI	29 (5.8%)

component of the quality of healthcare services. Surgical site infections are one of the most common types of nosocomial infections.[11] This study focused on obstetrics surgical practice and cesarean section procedure was addressed as it is the most commonly performed surgery.

In the present study the frequency of surgical site infection was affected by duration of surgery as reported in literature.[12] The frequency was higher with cesarean sections lasting more than 90 minutes. A similar trend was found in a study by Anvikar et al which reported 2.6% SSI in surgeries of duration less than 1 hour, 4.8% SSI in surgeries lasting between 1-2 hours and 5.4% SSI in surgeries of more than 2 hours duration. [13]

Poor nutritional status, personal hygiene, anemia and handling of cases by the local health workers/dai were important variables influencing SSI. These factors were present mainly in patients of group II. Repeated surgeries i.e. cesarean in patients with previous scars was a prominent factor found in 15 (52%) cases of SSI in present study.

Longer postoperative hospital stay also results in prolonged exposure to the potentially infective hospital environment.[14] This factor was noted in patients who had SSI and were readmitted. However in our patients the preoperative stay was limited to less than one day in both the groups. Length of hospitalization and duration of stay was not significant in our study. In comparing the of rates of SSI in from different countries Jido TA et al from Nigeria reported 9.1% and from Brazil in a study by Wanger MB et al 8.7%.[15,16]

The importance of the study lies in the fact that it is from a developing country from rural set up. This geographical region is important as maternal mortality

Table II: Details of Cases With Surgical Site Infection (n=29)	
Age (Year)	18 – 41 (Mean 25)
Anesthesia	Spinal anesthesia – 20 (69%) General anesthesia – 9 (31%)
Mode of admission	Elective – 13 (42%) Emergency – 16 (58%)
Personal hygiene and nutritional status	Good – 2 (8%) Satisfactory – 10 (33%) Poor – 17 (59%)
Smoking(hukka)	Nil
Obesity	7 (23%)
Coexistent infection	6 (19%)
Length of preoperative stay	Surgery same day – 24 (84%) One day – 5 (16%)
Anemia	16 (55%)
Blood transfusion	10 (32%)
Previous cesearan scar	15 (52%)
Diabetes mellitus	5 (17%)
Hepatitis B (Positive)	7 (23%)
Hepatitis C (Positive)	10 (33%)
Dai/ local health worker handling	16 (56%)
Duration of surgery	< 60 minutes – 22 (71%) 60 – 90 minutes – 5 (16%) > 90 minutes – 2 (7%)
Surgical site infection	Superficial – 20 (65%) Deep – 6 (20%) Space/organ – 3 (9%)
Follow up	3 months – 6 (20%) 6 months – 18 (59%) 12 months – 4 (13%) 24 months – 1 (3.2%)

Table III: Chi-square Analysis.

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	10.400[a]	4	.034
Likelihood Ratio	10.593	4	.032
Linear-by-Linear Association	7.323	1	.007

a. 8 cells (88.9%) have expected count less than 5. The minimum expected count is .15.

is very high and healthcare services are far from ideal. Thus addition of data from this part of the world improves our understanding of variables that influence SSI rates. This shall help in better implementation of infection control protocols and proper surveillance.

Table IV: Spearman's Rank Correlation

Correlations

		u	SSI
u	Pearson Correlation	1	.781**
	Sig. (2-tailed)		.002
	N	16	13
SSI	Pearson Correlation	.781**	1
	Sig. (2-tailed)	.002	
	N	13	13
	**. Correlation is significant at the 0.01 level (2-tailed).		

CONCLUSIONS:

The frequency of surgical site infection was 5% in elective cesarean section while it is 7% in emergency cesarean section. Poor nutritional status, personal hygiene, anemia, previous scar and handling by the local health workers/dai were important variables to be addressed. Length of hospital stay and duration of surgery were found to be minor risk factors responsible for causing surgical site infection. E. coli was the most common organism isolated followed by Staphylococcus aureus.

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