A prospective study of wound infections after laparotomy in obstetrics and gynaecology department

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ABSTRACT

Postoperative wound infection is of great importance to both surgeon and patient. All surgeons know that postoperative wound infection means morbidity, anxiety, longer hospitalization, higher cost; not to forget the embarrassment to the surgeons. However, it is still a common surgical complication despite other advances in modern medicine. This study was conducted to find out the incidence of postoperative wound infection and to survey the risk factors for wound infection in obstetrics and gynaecology department of Nepal medical college teaching hospital (NMCTH). A prospective study of all the cases with infected wound after laparotomy and lower segment cesarean section done in NMCTH in obstetrics and gynaecology department was carried out in this study from Chaitra 2068 to Falgun 2069. The frequency of wound infection was 5.87%. Most of the wound infection after lower segment cesarean section occurred in emergency cases (16 out of 19). Seventy percent of patients had preoperative hospital stay range of 0-2 days whereas the range was 3-18 days for the rest 30%. The range of blood loss was 150-300 ml in nearly 75.7 % of patients. Duration of operation was 1-2 hours in 89.2% cases. Only 48.6% of wound infection was identified within 8th postoperative day. Number of infected cases getting prophylactic antibiotic was 25 (67.6%). BMI was >25 in 62.2% of patients. Type of skin incision was pfannenstiel in 94.6%. Skin was closed subcuticularly with vicryl no. 1 in 81.1%. Staphylococcus aureus was isolated in swab culture in 24.3%. Resuturing was required in 18.9% of cases.

Keywords: Wound infection, obstetrics and gynaecology, risk factors.

INTRODUCTION

Surgical site infections are the second most frequently reported infections of all nosocomial infections among hospital patients.1 The Centers for Disease Control and Prevention (CDC) definitions of surgical wound infection divides it into two major categories: (a) an organ/space surgical site infection (SSI), and (b) superficial and deep incision infection. An SSI may be in any anatomic area that was opened or manipulated during a surgical procedure other than the incision itself. This would include most of the infections that develop after hysterectomy. It must develop within 30 days of the procedure and be accompanied by one of the following: diagnosis by a surgeon or attending physician; an abscess or other evidence of infection identified during reoperation or by radiologic or histopathologic examination; aseptically obtained organ/space fluid or tissue, the culture of which resulted in bacterial isolates; or purulent drainage from a drain placed through a stab wound into the organ/space.2 Surgical wound infection is classified into four groups in relation to contamination and increasing risk of infection. Clean wounds are those that are elective, primarily closed and undrained, nontraumatic, uninfected, no inflammation encountered, no break in aseptic technique, respiratory, alimentary, genitourinary tracts not entered. Clean-Contaminated wounds are those where alimentary, respiratory, or genitourinary tract entered under controlled conditions and without unusual contamination, appendectomy, vagina entered, genitourinary tract entered in absence of culture-positive urine, minor break in technique, mechanical drainage. Contaminated wounds are those with open, fresh traumatic wounds, gross spillage from gastrointestinal tract, entrance of genitourinary tract in presence of infected urine, major break in technique, incisions in which acute nonpurulent inflammation is present. Dirty or Infected are those with traumatic wound with retained devitalized tissue, foreign bodies, fecal contamination, or delayed treatment, or wounds from a dirty source, perforated viscus encountered, acute bacterial inflammation with pus encountered during operation.2 The surgical wound infection rate per 100 operations in the United States by wound class is 2.1% for clean, 3.3% for clean-contaminated, 6.4% for contaminated, and 7.1% for dirty or infected cases.2 Post operative wound infection is not only a leading cause of prolonged hospital stay but a major cause of increased overall surgical cost in developing countries.3,4 In order to control and prevent post operative wound infection in our environment there is the need to access the relative contribution of each aetiologic factor. Some risk factors can be controlled by the surgeon, whereas others cannot be influenced by the

surgeon or operative team and must be dealt with as they occur. Several factors may increase the infectious morbidity of postoperative patients for example obesity, emergency operations, preoperative prolonged hospital stay, blood loss during surgery, duration of operation, prophylactic antibiotics, type of incision, type of closure, surgeons' skill etc.2,5-7 In today's environment of cost containment, an increased hospital stay and the added likelihood of additional surgical intervention associated with wound infection are important targets for prevention. Most patients with wound infection were diagnosed after discharge from the hospital. In our population, among whom transportation problems and remote residence are prevalent, strategies for infection surveillance should be integral to discharge planning. The present study was done to find out the trend of wound infection in obstetrics and gynaecology department of Nepal Medical College Teaching Hospital (NMCTH).

MATERIALS AND METHODS

Study design:

A prospective study of all the cases with infected wound after laparotomy and lower segment cesarean section done in NMCTH in obstetrics and gynaecology department was carried out in this study during the period of twelve months from Chaitra 2068 to Falgun 2069.

Aim:

To study the incidence and survey the risk factors of postoperative wound infections in obstetrics and gynaecology department in NMCTH.

Ethical clearance and patient consent:

The ethical clearance was taken through the ethical clearance committee of NMCTH, Atterkhel. A verbal patient consent was taken in this study.

Inclusion criteria:

All cases of wound infections after laparotomy done in NMCTH in obstetrics and gynaecology department.

Exclusion criteria:

Wound infections after laparotomy not done in NMCTH

Sample size and sampling:

All patients who had cesarean sections and abdominal gynaecological operations in NMCTH during the period of twelve months from Chaitra 2068 to Falgun 2069 were included in the study. The working definition of wound infection was the presence of purulent discharge from the wound with or without a positive bacteriological culture. Data collection included total number of operated cases, total number of obstetric and gynaecological wound infections, age of patients, preoperative hospital stay, emergency or elective cases, blood loss, duration of operation, type of incision, type of closure, material used for closure, length of post operative hospital stay, day of wound infection identified, prophylactic antibiotic given or not, body mass index (BMI), type of organisms isolated in swab culture and treatment given.

Statistical analysis and software:

All the collected data were entered in Microsoft Office Excel Worksheet and statistical analysis was done using Statistical Package for Social Sciences (SPSS) version 16.0. Statistical analysis was done with appropriate statistical methods and compared with international standard literature. Significance of correlation was tested statistically. Different statistical test of significance were applied to find the P value. P value less than 0.05 was considered statistically significant.

RESULTS

The frequency of wound infection was 5.87% (Table-1). Maximum number of obstetric cases was emergency operations (Table-2). The mean age of obstetric cases was 27±5.5 and of gynaecological cases was 47.67±7.8 (Table-2). The mean day of preoperative hospital stay was 2.95±3.3 (Table-3). Seventy percent of patients had preoperative hospital stay range of 0-2 days whereas the range was 3-18 days for the rest 30%. The mean blood loss was 328.38±306.1 (Table-3). The range of blood loss was 150-300 ml in 75.7% of patients. The mean duration of operation was 1.3±0.5 hours (Table-3). Duration of operation was 1-2 hours in 89.2% cases. The mean postoperative day of wound infection identified was 11.73±11.3 and the mean postoperative hospital stay was 8.57±4.5 (Table-3). Only 48.6% of wound infection was identified within 8th postoperative day. Number of infected cases getting prophylactic antibiotic was 25 (67.6%) (Table-3). BMI was >25 in 62.2% of patients (Table-4). Type of skin incision was pfannenstiel in 94.6% (Table-5). Skin was closed subcuticularly with vicryl no. 1 in 81.1% (Table-6). Staphylococcus aureus was isolated in swab culture in 24.3% (Table-7). Resuturing was required in 18.9% of cases (Table-8).

Table-1: Incidence

	Total number of operations	Wound infection n (%)
Obs	468	19 (4.05%)
Gynae	162	18 (11.11%)
Total	630	37 (5.87%)

Table-2: Wound infect ion rate in different type of operation and the mean age

	Emergency	Elective	Age (yrs, X±SD)
Obs	16	3	27.00±5.5
Gynae	0	18	47.67±7.8
Total n (%)	16 (43.2%)	21 (56.8%)	

Table-3: Trend of wound infection in relation to different factors

	Obs	Gynae	Overall
Pre operative hospital stay (days, X±SD)	2.68±4.09	3.22±2.26	2.95±3.3
Blood loss (ml, X±SD)	384.2±406.9	269.4±126.1	328.38±306.1
Duration of operation (hrs, X±SD)	1.1±0.5	1.5±0.4	1.3±0.5
Post operative day of wound infection identified (days, X±SD)	12.8±9.8	10.6±12.8	11.73±11.3
Post operative hospital stay (days, X±SD)	7.2±3.3	10±5.2	8.57±4.5
Number of patients getting prophylactic antibiotics (n)	14	11	25

DISCUSSION

A prospective study of all the cases with infected wound after laparotomy and lower segment cesarean section done in NMCTH in obstetrics and gynaecology department was carried out in this study from Chaitra 2068 to Falgun 2069. The frequency of wound infection in obstetrics was 4.05% and in gynaecology was 11.11% in our study which was quite high as compared to a study done by Chia et al.3 In our study the rate of wound infection in obstetrics was lower in comparision to one study where the incidence of surgical site infection was 11.4%.1 The infection rate was more in gynaecological cases than in obstetric cases in our study in contrary to what we had expected because in later cases most of the CS were emergency operations which involved higher risk of contamination from prolonged labour, prolonged rupture of membrane and repeated vaginal examinations. Therefore, other factors like the longer operation time and more tissue damage were probably contributory. Furthermore, most patients undergoing hysterectomies were usually above forty years of age and may have medical disorders like diabetes mellitus. Similar finding was seen in a study done by Chia et al3 In our study most of the wound infections after CS occurred in emergency cases (84.2%) similar to a study where 70.9% of wound infection after CS was seen in emergency cases.6 Studies have shown that a major risk factor for postoperative infection is emergency CS compared with elective CS.8 The mean age of obstetric cases was 27±5.5 and of gynaecological cases was 47.67±7.8 in this study. Similar to our study the median age of wound infection in obstetric cases in one study was 26.5.6 The mean blood loss was 328.38±306.1ml in our study. A study had shown increased wound infection rate with increased surgical blood loss.7 The mean duration of operation was 1.3±0.5 hours in this study. Some studies could not confirm the duration of operation as a risk factor of postsurgical wound infection.7,9 In contrast, a study done by Arabshahi et al showed a significant difference in the duration of surgery between patients with and without surgical site infection.10 The mean postoperative day of wound infection identified was 11.73±11.3 and the mean postoperative hospital stay was 8.57±4.5 in our study. Only 48.6% of wound infection was identified within 8th postoperative day. In a study 95.5% of wound infection was detected before discharge, 75% of wound infection was detected in 7 days and 38.8% had 8-14 days of additional hospital stay due to wound infection.1 Number of infected cases getting prophylactic antibiotic was 25 (67.6%) in our study. In contrast, studies had found that antibiotic prophylaxis significantly decreased infection rates.11-13 BMI was >25 in 62.2% of patients in our study. A study showed that BMI was not a predictor of infection.11 In contrast to this, higher BMI was detected as a risk factor in other studies.5,6,10,14 Type of skin incision was pfannenstiel in 94.6% in this study. Similar to our study, 97.4% had transverse incision in a study.6 Skin was closed subcuticularly with vicryl no. 1 in 81.1% in our study. Use of staples for skin closure was identified as a risk factor in a study.6 In contrast to this, type of skin incision was not associated with wound complication in another study.15 In our study.

Table-4: BMI

BMI	N	%
<20	5	13.5
20-25	9	24.3
>25	23	62.2
Total	37	100

Table-5: Type of skin incision

Skin incision	n (%)
Pfannenstiel	35 (94.6%)
Right paramedian	2 (5.4%)

Table-6: Type of skin closure

Skin closure	n (%)
Subcuticular with vicryl no 1	30 (81.1%)
Mattress with silk	2 (5.4%)
Staplers	5 (13.5%)

Table-7: Swab culture report

Swab culture	n (%)
No growth	23 (62.2%)
Staphylococcus aureus	9 (24.3%)
Klebsiella	2 (5.4%)
E. coli	1 (2.7%)
Enterobactor	1 (2.7%)
E. coli + citrobactor	1 (2.7%)

Table-8: Treatment

Treatment	n (%)
Dressing + antibiotic	30 (81.1%)
Dressing + antibiotic + resuturing	7 (18.9%)

Staphylococcus aureus was isolated in swab culture in 24.3%. The causative organisms were polymicrobial, particularly those responsible for bacterial vaginosis, such as Ureaplasma spp., Mycoplasma spp., anaerobes or Gardnerella vaginalis in one study.[8] Resuturing was required in 18.9% of cases in our study. In contrast, additional surgical procedure was required in 35.7% in a study done by Kamat *et al*.[11]

The limitation of this study is its small sample size. Since in this study we have only surveyed the trend of the possible risk factors of wound infection, we cannot tell for sure that these factors are really the risk factors of these wound infections. To come to this conclusion a comparative study of these factors between infected and non infected cases can be carried out in future. This on going infection surveillance if encouraged will help to minimize the infection rate by identifying and acting on the risk factors involved and have been recommended because they offer increased service quality, safer guidance for the implemantation of preventive measures, and better patient information.

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