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Original Research Article

Post operative wound infection: a descriptive study

Kavitha Kallakuri, K. Suprada*, B. Rao Bahadur, K. Gangadhar Rao

Department of Obstetrics and Gynecology, NRI Medical College, Chinnakakani, Andhra Pradesh, India

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***Correspondence:**
Dr. K. Suprada,
E-mail: suprada.kothapalli@gmail.com

ABSTRACT

Background: Surgical site infections is the third most commonly reported nosocomial infection which has an adverse impact on the hospital as well as the patient. This study was designed to evaluate the frequency, clinical presentation, common risk factors and different organisms involved.
Methods: This study was performed at NRI Medical college, Chinnakakani. This is an Observational descriptive study over a period of one year from September 2022 to September 2023. Biodata of the patients together with their clinical features, diagnosis, type of surgery performed and the development of any complications including wound infection was noted and the data analyzed.
Results: Out of 1509 patients in the study, 1101 belonged to obstetrics and 408 to gynaecology surgery. The overall incidence of surgical site infection in the study was 7.9%; 86 (7.8%) in obstetrics group and 33 (8%) in gynaecology group developed infection. Age more than 50 years was found to be a risk factor for postoperative wound infection. Obesity is known to be a well-established risk factor for postoperative wound infection. It was noted that surgical site infection was more common in patients that had low haemoglobin levels pre-operatively. The increased susceptibility to infection in diabetics is an established risk factor.
Conclusions: Meticulous surgical technique, proper sterilization, judicious use of antibiotics, improvement of ward environments, control of malnutrition and obesity, treatment of infective foci and diseases like diabetes helps control the morbidity of surgical wound infections.

Keywords: Incidence, Pathogen, Postoperative infection, Risk factors, Surgical site infection

INTRODUCTION

Infection of a wound may be defined as invasion of organisms through tissues following a breakdown of local and systemic host defences.[1] Major wound infection is seen when a wound discharges pus and may need a secondary procedure to be sure of adequate drainage; there may be systemic signs or delay in return home. In minor wound infection there is discharge of pus or serous fluid without associated excessive discomfort or systemic signs.[2]

Wound infection is the commonest and most troublesome disorder of wound healing.[3] It is reported, SSI is associated to a 2- to 11-fold increase in the risk of mortality with 75% of SSI-associated deaths directly attributable to the SSI.[4]

The absolute prevention of surgical wound infection seems to be an impossible goal. It is the second commonest nosocomial infection and causes patient discomfort, prolonged hospital stay, more days off work and increased cost of therapy; the cost of an operation increase by 300% to 400%.[5,6]

A successful surveillance program includes the use of epidemiologically-sound infection definitions and effective surveillance methods, stratification of SSI rates

according to risk factors associated with SSI development, and data feedback.[7,8]

This study was designed and carried out in Department of obstetrics and gynaecology, NRI medical college, chinnakakani in order: 1) To find out our infection rate, 2) To see the clinical features of patients with SSI, 3) To find out the common organisms involved in different wound infections, and 4) To find out the risk factors for postoperative wound infections.

METHODS

This descriptive observational study was performed at the NRI Medical College, Chinnakakani from September 2022 to September 2023.

Inclusion criteria

Patients underwent obstetrical and gynaecological surgeries.

Exclusion criteria

Patients already received antibiotics for >1 week. Patients failed to come for follow up. Refusal to participate in the study.

The relevant information of all the patients was entered on a proforma especially designed for the study which contained details about biodata, clinical features, possible risk factors, diagnosis, complications including wound infection, organisms isolated, hospital stay and outcome. Since this was a descriptive study, therefore no inferential tests were applied. The statistics were reported after calculation by SPSS version 10.0 on computer.

RESULTS

Out of 1509 patients in the study, 1101 belonged to obstetrics and 408 to gynaecology surgery. The overall incidence of surgical site infection in the study was 7.9%; 86 (7.8%) in obstetrics group and 33 (8%) in gynaecology group developed infection.

Table 1: Total no. of obstetrical surgeries.

Obstetrical surgeries	Number
Primary elective LSCS	48
Primary emergency LSCS	525
Repeat elective LSCS	280
Repeat emergency LSCS	170
Tubectomies (mini laprotomy and DPL)	81

Most patients are in the age group of 26-40 years. Age more than 50 years was found to be a risk factor for postoperative wound infection (Table 3).

Most patients have a Quetelet Index between 20-30 kg/m^2. Obesity and a Quetelet index of more than 40 was identified as a risk factor for postoperative wound infection (Table 4).

Table 2: Total no. of gynaecological surgeries.

Gynaecological surgeries	Number
Hysterectomies	247
Laproscopic surgeries	85
Others	170

Table 3: Age distribution and surgical site infection.

Age in years	No.	SSI	Percentage
16-25	94	07	7.4
26-40	985	79	8.0
41-50	407	29	7.1
51-60	23	4	17.3

Table 4: Obesity and surgical site infection.

Quetelet index	No.	SSI	Percentage
11-20 kg/m^2	27	2	7.4
21-30 kg/m^2	706	12	1.69
31-40 kg/m^2	353	18	5.09
41-50 kg/m^2	180	29	16.1
51-60 kg/m^2	151	17	11.2
>60 kg/m^2	92	41	44

Anaemia

The pre-operative range of haemoglobin level is shown in Table 5. Pre-operative transfusions were carried out to bring the level of haemoglobin to at least 10 gms/dl. Inspite of this correction it was noted that surgical site infection was more common in patients that had low haemoglobin levels pre-operatively; the more the anaemia the more was the incidence of SSI.

Table 5: Haemoglobin level and SSI.

Hgb (gm/dl)	No.	SSI	Percentage
<8	75	10	13.3
8-9	196	20	10.2
9-10	226	20	8.84
10-11	364	39	10.7
11-12	422	20	4.73
12-13	226	10	4.42

Diabetes

About 135 patients had proven diabetes mellitus in the series; 45 (33.33%) amongst them developed surgical site infection. In contrast to this only 120 (8.79%) out of the 1374 non-diabetic patients developed postoperative surgical site infection, proving that diabetes mellitus is a risk for surgical site infection.

Clinical features of wound infection noted

The pattern of wound infection and the common causative organisms are noted and mentioned in the Table 6.

Table 6: Type of surgical site infection and organisms.

Organisms	No.	%
Staphylococcus aureus	51	42.8
Escherichia coli	34	28.5
Staphylococcus pyogens	10	8.4
E. coli+Klebsiella/Pseudomonas	24	20.1

The first dressing was changed on the 3rd postoperative day or before if the patient complained of severe pain in the wound, there is fever or soakage of the dressing. The time of appearance of the wound infection was within three weeks following surgery. Wound dehiscence appeared in the second post-operative week. No patient developed septicaemia or any other life threatening condition.

Results of culture taken from wound

Positive cultures were obtained from infected wounds. The commonest bacterial isolates were *Staph. aureus*, *E. coli*, *Klebsiella*, *Pseudomonas* and *Streptococci*. The sensitivity results revealed that the Staph. aureus was sensitive to gentamycin and cefuroxime.

Postoperative hospital stay

Duration of hospital stay was increased due to development of wound infection. In mild cases, surgical intervention was not required and patients were discharged on oral antibiotics.

But when wound discharge developed and required surgical intervention, the patient remained in the ward for more than the expected duration; 50 patients with SSI stayed between 2-5 days, 39 for 5-10 days and 30 of them between 10 to 20 days.

Treatment of patients with SSI

Conservative measures were taken with minor wound infections; 32 out of the 119 patients initially received medication. 11 patients later developed suppuration and needed wound drainage. The stitches were removed and the wounds laid open, pus was sent to the laboratory culture and sensitivity, and antibiotics continued.

Twice day dressings were done with povidone-soaked gauze packs. Finally, antibiotics were changed on receiving the sensitivity report.97 out of 119 patients underwent surgical intervention i.e. drainage, secondary suturing and deep tension suturing. There was no mortality in this study.

DISCUSSION

Despite advances in the operative techniques and better understanding of the pathogenesis of wound infection, postoperative wound infection continues to be a major source of morbidity and mortality for patients undergoing operative procedures. Its rate varies in different countries, different areas and even in different hospitals. The postoperative wound infection rate in our study was 7.9% amongst the cases, which is higher as the usually reported rates vary from 1% to 4%, though most studies document a rate of less than 2%.[9]

In our series the patients received prophylactic antibiotic at the time of induction of anaesthesia in all the cases. Single dose prophylactic antibiotic therapy is a recommendation.[10]

Patients with age of more than 50 years had a higher incidence (17.3%) of postoperative wound infection in this study as compared to 7.4% in patients having age less than 26 years. An odd ratio for surgical wound infection is 1.2 for every 10 years of age.[11] It can be due to multiple factors like low healing rate, malnutrition, malabsorption, increased catabolic processes and low immunity.[12]

Obesity is known to be a well-established risk factor for postoperative wound infection. In this study a body mass index of more than 40kg/m^2 was associated with a higher rate of postoperative wound infection. Obesity contributed as strongly as the surgical procedure category to a patient's likelihood of acquiring a surgical site infection.[13]

Anaemia itself is not an established factor for postoperative wound infection. However, a higher incidence of postoperative wound infection was noted with initial low haemoglobin levels. It can be due to the effect of blood transfusions, which were given preoperatively to bring the haemoglobin level up to 10 gm/dl.

The rate of postoperative wound infection in diabetic patients was 33.33% in this study, which is significantly higher, though sugar levels were controlled before operation by giving insulin. The increased susceptibility to infection in diabetics is an established risk factor.[14]

Simple wound abscess was the common presentation in our cases. Although wound infection is the commonest cause of dehiscence, only two cases were seen in our series. No case of septicaemia, spreading cellulitis or necrotizing fascitis was noted in this study. A positive culture is not necessary for the diagnosis of wound infection.[15] However, all our cases were cultured and few were reported positive.

Staphylococcus aureus has been described as the most common single pathogen involved in postoperative wound infections. In our series this organism was isolated from 42.8% cases, and was sensitive to cefuroxime and co-amoxiclav. *E. coli* was the second and *Klebsiella* the third

most common pathogen. Most of the Gram -ve organisms were sensitive to amoxicillin, co-amoxiclav, cefuroxime and amikiacin.

The average postoperative hospital stay in our study was five days in uncomplicated cases and 15 days in cases of wound infection (range 8-25 days). Surgical site infection delays the recovery of the patient by about one week and in some cases significantly prolong the duration of hospital stay.[16] Estimation of cost on wound infections was not assessed but it was obviously high.

Limitations of this study was that it was limited to single centre, so that results might not apply to other patient population. A multicentre study would be more fruitful invalidating the results of this study.

CONCLUSION

Despite modern surgical and sterilization techniques and prophylactic use of good antibiotics, postoperative wound infection remains a major contributory factor of patient's morbidity. The overall postoperative wound infection rate of 7.9% is acceptable but more attention is required as the universally acceptable rate being less than 2%. This can be achieved by taking proper measures to improve our operation theatres and wards environments, and methods of sterilization. The common correctable risk factors are malnutrition, anaemia, obesity, presence of infective foci, diabetes, hygienic conditions. These achievable preventive measures should be taken to save the economic burden on the patient, hospital and the community as a whole. Improper and prolonged use of antibiotics should be avoided as it can lead to the development of resistant strains of micro-organisms.

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