

Surgical Wound Infections in Obstetrics and Gynaecology – A Study from Tertiary Care Hospital

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ABSTRACT:

Introduction: One of the most common infections at gynaecology department is surgical site infection. The study was carried out to determine the incidence of post-operative wound infection in obstetrics and gynaecological surgeries along with the causative organisms and their susceptibility patterns.

Materials and Methods: This was a prospective observational study conducted at, Smt NHL Municipal Medical College VS General Hospital Ahmedabad during June 2018 to March 2019. Wound swabs were collected aseptically from post-operative wound infections and microbiological examination was performed as per standard protocol.

Results: A total of 3616 surgeries were included in the study. 115 specimens collected from post-operative wounds were shown bacterial growth and the incidence of post-operative wound infection was found to be 7.29%. Post-operative wound infection rate was high in swabs collected from emergency LSCS wounds 95 (82.60%). Staphylococcus aureus (17.39%) was the predominant bacteria isolated. Majority of the Gram positive and Gram negative bacteria were susceptible to antibiotics such as Amikacin, Augmentin, Cefepime/Sulbactam, Piperacillin/ Tazobactam. All Gram positive cocci and Gram negative bacilli were susceptible to Linezolid and Imipenem respectively.

Conclusion: In the present study, post-operative wound infection rate was found to be high in swabs collected from emergency LSCS wounds. Staphylococcus aureus was the predominant bacteria isolated. Local surveillance efforts are imperative to provide surgeons with information for choosing empirical or directed therapy.

KEYWORDS: Post-operative wound, Staphylococcus aureus, Obstetrics and gynaecology.

I. INTRODUCTION:

Nosocomial infection constitutes a major public health problem worldwide. The most common types of nosocomial infections that could occur in a hospital set up are surgical wound and other soft tissue infections, urinary tract, respiratory and blood stream infections.^[1] The Centers for Disease Control define an SSI as “an infection related to an operative procedure that occurs at or near the surgical incision within 30 days.”^[2] Postoperative infection is one of the most important and leading causes of increased morbidity, such as greater antibiotic usage, more reoperations, and prolonged hospital and intensive care unit (ICU) stays, thus also augmenting treatment costs and increasing resource utilization.^[3]

One of the most common infections at gynaecology department is surgical site infection. The obstetric and gynecological procedures at high risk of post-operative infection include caesarean and abdominal hysterectomy.^[4] Compared with women delivered vaginally, those delivered by caesarean section at increase risk of infection (2-fold - 20- fold)^[5] The overall incidence of wound sepsis in India is from 10%-33%. However, the incidence of wound complications in the obstetric population varies with rates ranging from 2.8% to 26.6%.^[6] Infections can be divided into groups on the basis of mechanism and the etiological factor. Microorganism responsible for causing post-operative wound infection can be endogenous (a patient's internal flora causes the infection) or exogenous (the infection is caused by microorganisms acquired from the hospital environment).^[6]

Microbes most commonly involved in causing post-operative wound infections are Staphylococcus aureus, E. coli, Pseudomonas aeruginosa, Enterobacter, Klebsiella. In choosing antibiotic determination of causative organism is important. Susceptibility pattern of bacteria responsible for causing infections vary greatly. Knowledge of the most likely organism and the prevailing antibiotic sensitivity/resistance pattern will be useful to initiate empirical treatment. Other than microbes, there are many factors within the patient and his environment, both local and general, which ultimately determine the outcome. These local factors such as hematomas, seromas, suture material, poor surgical technique, degree of contamination and also age, nutrition, hygiene, and other associated disease play an important role in the etiology of postoperative wound infection.^[7] Thus the study was carried out to determine the incidence of post-operative wound infection in obstetrics and gynaecological surgeries along with the causative organisms and their susceptibility patterns.

II. MATERIALS AND METHODS

This was a prospective study conducted at Smt NHL Medical College and VS General Hospital during June 2018 to March 2019. The study population consisted of 3616 patients who underwent surgery were included. Operated patients were followed up regularly, during the post-operative period. Risk factors of patients were also taken into consideration. The wound was checked on 4th post-operative day routinely and earlier and later according to the complaints of patients. Wound beds were prepared before specimen collection, where the wound immediate surface exudates and contaminants were cleansed off with moistened sterile gauze and sterile normal saline solution.

Table.1: Incidence of post-operative infection in various surgeries

Type of surgery	Total no. of surgeries(n=3616)	Post-operative infection
Obstetrics (Em and EI LSCS)	3424	107(3.12%)
Vaginal and Abdominal Hysterectomy	192	8(4.16%)

Dressed wounds were cleansed with non-bacteriostatic sterile normal saline after removing the dressing. Aseptically the end of a sterile cotton-tipped applicator was rotated over 1 cm² area for 5 seconds with sufficient pressure to express fluid and bacteria to surface from within the wound tissue. Two wound swabs were taken from each wound at a point in time to reduce the chance of occurrence of false-negative cultures and to increase the chance of recovering bacterial pathogens. It is also indicative of contamination in that if the two swab samples differ in types of organisms during presumptive test.^[8]

All the swabs collected were sent to the department of microbiology for microbiological processing. The specimens were inoculated on blood, chocolate and Mac Conkey agar plates and incubated aerobically for 24 to 48 hours at 37°C. Bacteriological culture and examination was done following standard microbiological techniques.^[9]

III. RESULTS

A total of 3616 surgeries were included in the study. 115 specimens collected from wounds shown the growth bacteria and the incidence of post-operative wound infection was found to be 7.29%. Staphylococcus aureus is the predominant organism infecting LSCS surgeries. No other organism is particularly associated with specific surgery

Incidence of post-operative infection in various surgeries are 3.12% in obstetrics surgery and 4.16% in vaginal and abdominal hysterectomy. In over study infection rate was more in gynecological cases then obstetrics cases due to longer operation time and more tissue damage.

Table.2: Wound infection rate in different type of operation

Type of surgery	Emergency	Elective
Obstetrics	95	12
Gynaecology	-	8
Total	95(82.60%)	20(17.39%)

Maximum numbers of obstetrics cases were emergency operations. Risk of contamination was high due to prolonged labour, PROM, repeated vaginal examination and uncorrected anemia. Malnutrition and lower socioeconomical class further exacerbated the risk of infection in caesarean section.

Table.3: Type of skin incision

Skin incision	N(%)
Pfannenstiel	105(91.30%)
Right Paramedian	10(8.69%)

Type of skin incision was pfannenstiel in 91.30%.

Chances of wound gap in vertical incision(Right Paramedian) was high but nowadays most of the patients operated with pfannenstiel incision so number of wound gap was high in it.^[18]

Table.4: Bacteria isolated from post-operative wound specimens

Bacteria	Number (%)
No growth	89(77.39%)
Staphylococcus Aureus	20(17.39%)
E.coli	2(1.73%)
Pseudomonas aeruginosa	2(1.73%)
Klebsiella species	1(0.86%)
Enterococci	1(0.86%)

A total of 26 bacteria were isolated from 115 swab specimens collected from post-operative wound infection. Stahylococcus aureus (17.39%) was the predominant bacteria isolated. E.coli (1.73%) and Pseudomonas aeruginosa (1.73%) were second predominant bacteria isolated.

Staphylococcus Aureus is normal body flora of human. Staphylococcus Aureus causes infection when body temperature cooler than the normal skin temperature and slightly acidic environment.

Table.5: Susceptibility pattern of bacteria isolated from post-operative infections.

Bacteria	Amp	Ak	Gen	Cip	Aug	Cfs	Pit	Lz
S.aureus (20)	7	17	9	12	14	16	17	20
E.coli (2)	1	1	1	1	2	1	2	NT
P.aeruginosa(2)	1	2	1	2	1	2	2	NT
Klebsiella (1)	1	1	1	1	1	1	1	NT
Enterococci(1)	1	1	1	1	1	1	1	1

Amp-Ampicillin, Ak-Amikacin, Gen-Gentamycin, Cip- Ciprofloxacin, Aug-Augmentin Cfs-Cefeperazone/Sulbactum, Pit-Piperacillin/Tazobactum, Lz- Linezolid.

NT-Not tested

All Gram positive cocci were susceptible to linezolid (100%). All Gram negative bacteria were susceptible to imipenam (100%). Most of the Gram positive and Gram negative bacteria were susceptible to antibiotics such as amikacin, augmentin, cefeperazone/sulbactum, piperacillin/ tazobactum. But this is not in

agreement with the study conducted by Bhadauria AR and HariharanC.^[6] According to them , sensitivity for amoxyclav (39.44%) was found to be more. Other antibiotics found to be sensitive were gentamycin (20.66%) and cefotaxime (27.72%). Amikacin (10.80%) also showed least activity against the bacteria from post-operative woundinfections.

Table.6: Treatment

Treatment	N(%)
Dressing+antibiotics	16(13.91%)
Dressing+antibiotics+resuturing	99(86.08%)

Resuturing was required in 86.08% of cases.

IV. DISCUSSION

In the present study, overall post-operative wound infection rate was found to be 7.29%. Incidence of post-operative wound infection was more in emergency LSCS (82.60%) compared to elective LSCS (60%) Reported rates of post- cesarean SSI vary greatly, from 0.3% in Turkey and 11.6% in Brazil to 18.3% in Saudi Arabia.^[10,11,12]As per Bhadauria AR et al,^[6] incidence of post-operative wound infection (S.S.I.) was more in emergency obstetric patients (51.17%) Diabetes, anaemia, advanced age and multiparity were common risk factors in post-operative wound infected patients.maximumnumber of obstetric case were emergency operations.Types of skin incision was pfannensteil in 91.30%.chances of wound gap is high in vertical skin incision. Most of patients undergoing hysterectomies were usually above forty years of age and may have medical disorders like diabetes mellitus. A study by Awan et al,^[13] did not identify anemia as a risk factor of SSI.For most SSIs, the source of pathogens is the endogenous flora of the patient’s skin, which consists of predominantly aerobic gram-positive cocci^[14]

However ,gynecologic procedures pose a unique challenge inthat potential pathogenic microorganisms may come from the skin or ascend from the vagina and endocervix to the operative sites ,including the abdominal incision and vaginal cuff. The endogenous vaginal flora is a complex and dynamic mix of pathogenic and nonpathogenic bacteria composed of facultative and obligate anaerobic gram positive and gram negative species.therefore ,gynecologic SSIs are more likely to be polymicrobial and may include gram negative bacilli,enterococci ,group B streptococci and anaerobes as a result of incisions involving the vagina and perineum.

Staphylococcus aureus (17.39%) was the predominant organism isolated from surgical siteinfection.

This is similar to the study conducted by Mpogoro FJ et al.^[15]But according to Bhadauria AR et al 6 E.coli (36.62%) was the predominant bacteria isolated. Staphylococcus aureus was accounted only for 4.69%

All Gram positive cocci were susceptible to linezolid (100%). Resuturing was required in 86.08% of cases.

Decreasing overall bacterial counts in the vagina has been proven to reduce the risk of SSI in gynecologic surgeries.^[16]Traditionally, povodine-iodine preparations were used in the vagina, but trends are shifting towards chlorhexidine-based preparations. Chlorhexidine more effectively reduces vaginal bacterial counts and remains effective even in the presence of blood, unlike povodineiodine. In concentrations of 4% or less, the solution seems to be well tolerated and its use is supported by the American College of Obstetricians and Gynecologists.^[17]

V. CONCLUSION

In the present study, post-operative wound infection rate was found to be 7.29%. Post-operative wound infection rate was high in swabs collected from emergency LSCS wounds95(82.60%). Stahylococcus aureus was the predominant bacteria isolated. Our study suggests that antibiotic prophylaxis has a role in the management of patients undergoing abdominal gynecologic surgery. Local surveillance efforts are imperative to provide surgeons with information for choosing empirical or directed therapy.

We also found that most cases of wound infection were dignosedafter discharge from the hospital. Studies of this question cannot reiy on hospital databases alone. Careful and stringent follow up of patients with specific instructions on wound checkes in needed if adverse infections outcomes are to be addressed in a timely fashion and if outcome data are to be considered complete.

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