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# Surgical Wound Infections in Obstetrics and Gynaecology - A Study from Rural 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 Vinayaka missions medical college and hospital during August 2016-October 2017. Wound swabs were collected aseptically from post-operative wound infections and microbiological examination was performed as per standard protocol.*

***Results:*** *A total of 230 surgeries were included in the study. 21 specimens collected from post-operative wounds were shown bacterial growth and the incidence of post-operative wound infection was found to be 9.13%. Post-operative wound infection rate was high in swabs collected from emergency LSCS wounds7 (3.04%). Stahylococcus aureus (31.03%) was the predominant bacteria isolated. Majority of the Gram positive and Gram negative bacteria were susceptible to antibiotics such as amikacin,augmentin,cefeperazone/sulbactum, piperacillin/tazobactum. All Gram positive cocci and Gram negative bacilli were susceptible to linezolide and imipenam respectively.*

***Conclusion:*** *In the present study, post-operative wound infection rate was found to be 9.13%. Post-operative wound infection rate was high in swabs collected from emergency LSCS wounds7 (3.04%). Stahylococcus aureus was the predominant bacteria isolated. All Gram positive cocci and Gram negative bacilli were susceptible to linezolide and imipenam respectively. Local surveillance efforts are imperative to provide surgeons with information for choosing empirical or directed therapy.*

***Keywords:*** ***Post-operative wound, Stahylococcus aureus, Obstetrics and gynaecology.***

## 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 vaginal and abdominal hysterectomy and Caesarean section.[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]


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Microbes most commonly involved in causing post-operative wound infections are E. coli, Pseudomonas aeruginosa, Staphylococcus aureus, Enterobacter, Klebsiella, Bacteroides fragilis, and Enterococcus. 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.

## Materials and Methods

This was a prospective observational study conducted at Vinayaka missions medical college and hospital during August 2016-October 2017. The study population consisted of 230 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. 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]

## Results

A total of 230 surgeries were included in the study. 21 specimens collected from wounds shown the growth bacteria and the incidence of post-operative wound infection was found to be 9.13%. Incidence of post-operative infection in various surgeries shown in table.1. A total of 29 bacteria were isolated from 21 swab specimens collected from post-operative wound infection. Monomicrobial growth was seen in 15 (71.43%) samples followed by polymicrobial growth was seen in 6(28.57%) samples. Stahylococcus aureus (31.03%) was the predominant bacteria isolated. E.coli (24.13%) and pseudomonas aeruginosa (24.13%) were second predominant bacteria isolated (Table.2). Staphylococcus aureus is the predominant organism infecting LSCS surgeries. No other organism is particularly associated with specific surgery.

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

| Type of surgery | Total no.of surgeries(n=230) | Post-operative infection |
|---|---|---|
| Total abdominal hysterectomy | 98 | 5(2.17%) |
| Vaginal hysterectomy | 53 | 5(2.17%) |
| Emergency LSCS | 51 | 7(3.04%) |
| Elective LSCS | 15 | 2(0.87%) |
| Laprotomy | 13 | 2(0.87%) |

**Table.2: Bacteria isolated from post-operative wound specimens**

| Bacteria | Number (%) |
|---|---|
| Staphylococcus aureus | 9(31.03%) |
| E.coli | 7(24.13%) |
| Pseudomonas aeruginosa | 7(24.13%) |
| Klebsiella species | 3(10.34%) |
| Enterococci | 2(6.90%) |
| Citrobacter | 1(3.45%) |


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**Table.3: Susceptibility pattern of bacteria isolated from post-operative infections.**

| Bacteria | Amp | Ak | Gen | Cip | Aug | Ipm | Cfs | Pit | Lz |
|---|---|---|---|---|---|---|---|---|---|
| S.aureus (9) | 3(33%) | 8(88%) | 4(44%) | 5(55%) | 7(77%) | NT | 8(88%) | 8(88%) | 9(100%) |
| E.coli (7) | 2((28%) | 6(85%) | 3(42%) | 4(57%) | 6(85%) | 7(100%) | 6(85%) | 6(85%) | NT |
| P.aeruginosa(7) | 2(28%) | 6(85%) | 5(71%) | 6(85%) | 5(71%) | 7(100%) | 5(71%) | 7(100%) | NT |
| Klebsiella (3) | 1(33%) | 3(100%) | 2(66%) | 2(66%) | 3(100%) | 2(66%) | 3(100%) | 3(100%) | NT |
| Enterococci(2) | 1(50%) | 2(100%) | 2(100%) | 2(100%) | 2(100%) | NT | 1(50%) | 2(100%) | 100% |
| Citrpbacter(1) | 1(100%) | 1(100%) | 1(100%) | 1(100%) | 1(100%) | 1(100%) | 1(100%) | 1(100%) | NT |

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

NT-Not tested

## Discussion

In the present study, overall post-operative wound infection rate was found to be 9.13%. Incidence of post-operative wound infection was more in emergency LSCS (3.04%) compared to elective LSCS (0.87%) 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. 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 in that 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 gramnegative 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.[15] Staphylococcus aureus (31.03%) was the predominant organism isolated from surgical site infection. This is similar to the study conducted by Mpogoro FJ et al.[16]

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%.

Decreasing overall bacterial counts in the vagina has been proven to reduce the risk of SSI in gynecologic surgeries.[17]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.[18]

All Gram positive cocci were susceptible to linezolide (100%). All Gram negative bacteria were susceoptible 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 Hariharan C.[6] According to them , sensitivity for amoxyclav (39.44%) was found to be more. Other dantibiotics 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 wound infections.

## Conclusion

In the present study, post-operative wound infection rate was found to be 9.13%. Post-operative wound infection rate was high in swabs collected from emergency LSCS wounds7 (3.04%). Stahylococcus aureus was the predominant bacteria isolated. All Gram positive cocci and Gram negative bacilli were susceptible to linezolide and imipenam respectively. Local surveillance efforts are imperative to provide surgeons with information for choosing empirical or directed therapy.

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