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POST CAESAREAN SECTION WOUND INFECTION: MICROBIOLOGICAL PATTERN AND SUSCEPTIBILITY IN A TERTIARY CARE HOSPITAL, JHALAWAR

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Introduction:

Surgical site infection (SSI) is the third most common nosocomial infection. According to CDC's National Nosocomial Infection Surveillance system 38% of all nosocomial infections in surgical patients are surgical site infections (SSI).[1] They have been responsible for the increasing cost, morbidity and mortality related to surgical operations .Even in hospitals, with modern facilities and following standard protocols of pre operative preparation and antibiotic prophylaxis, SSI continues to be a major problem[2]

A surgical site infection is defined as an infection which occurs at the incision / operative site (including drains) within 30 days after surgical operation if no implant is left in place / within 1 year if an implant is left in place. The CDC definition describes three levels of surgical site infection; 'Superficial incisional' affecting the skin and subcutaneous tissue, 'Deep incisional', which affects the fascial and muscle layers and 'Organ or Space infection' which involves any part in the body other than the incision that is opened or manipulated during the surgical procedure.[3] Surgical site infections are almost always bacterial in origin. They may be caused by endogenous or exogenous sources. Endogenous sources include bacteria from the patient's skin, mucous membranes or hollow viscera.[4] Endogenous organisms are usually aerobic gram-positive cocci (e.g. staphylococci), but may include fecal flora (e.g. anaerobic bacteria and gram negative aerobes). Exogenous sources of SSI pathogens include the operating room environment (including air), operating room personnel and all tools, instruments and materials brought to the sterile field during an operation. Exogenous flora is primarily aerobes, especially gram-positive organisms (e.g. staphylococci and streptococci).[5] Caesarean deliveries is one of the most common procedure performed worldwide. It is a clean contaminated type of surgery. Determinants of infection may be related to the host(such as tobacco use; limited prenatal care; obesity; corticosteroid use; nulliparity; twin gestations; and previous CD) ,intrapartum and operative factors (such as chorioamnionitis; premature rupture of membranes; prolonged rupture of membranes;

prolonged labor, particularly prolonged second stage; large incision length; subcutaneous tissue thickness > 3 cm; subcutaneous hematoma; lack of antibiotic prophylaxis), type of procedure (emergency/elective), previous caesarean section, and environment of the operating room, microbe, malnutrition and low socioeconomic status further exacerbate the risk of infection in caesarean sections.[6] Understanding SSI and the variables affecting it with careful pre, inter and post surgical prevention and management of associated risk factors and following stringent infection control practices in the operation room can help to achieve minimal infection rate in patients undergoing caesarian delivery.[7]

Objective:

To know the rate of surgical site infection following caesarean delivery and to determine the frequencies of various pathogens causing SSI with their antibiotic resistance pattern.

Material and Methods:

This is a retrospective study conducted on patients with caesarean delivery done at a tertiary care hospital, Jhalawar. A total no of 180 samples were received from April 2018 to November 2018.

Inclusion criteria: Women with wound infection during hospital stay or within 30 days following surgery.

In patients with surgical site infection, two sterile cotton swabs were used to collect the discharge from the infected wound. Swabs were brought to the laboratory as early as possible. Smear was prepared from one swab and subjected to Gram staining and screened for presence of pus cells and microorganisms. Second swab was plated on Blood agar (BA), Chocolate agar (CA) and MacConkey's agar (MA) .The Blood agar and MacConkey's agar plates were incubated aerobically at 37°C for 18 to 24 hours. The Chocolate agar plate was incubated in 5% CO2 at 37°C for 18 to 24 hours.

After obtaining pure colonies, further identifications were done by using the standard microbiological technique, which includes Gram stain, colony morphology and biochemical tests. Antimicrobial susceptibility testing was carried out on each identified organism by disc diffusion method on Muller Hinton agar (MHA) and blood agar as recommended by the Clinical and Laboratory Standards Institute (CLSI).The zones of inhibition were measured and compared with the guidelines. The reliability of the findings was guaranteed by implementing quality control measures throughout the whole processes of the laboratory work. The reference strains used as control were E. coli (ATCC 25922), P.aeruginosa (ATCC 27853), and Staphylococcus aureus (ATCC 25923).

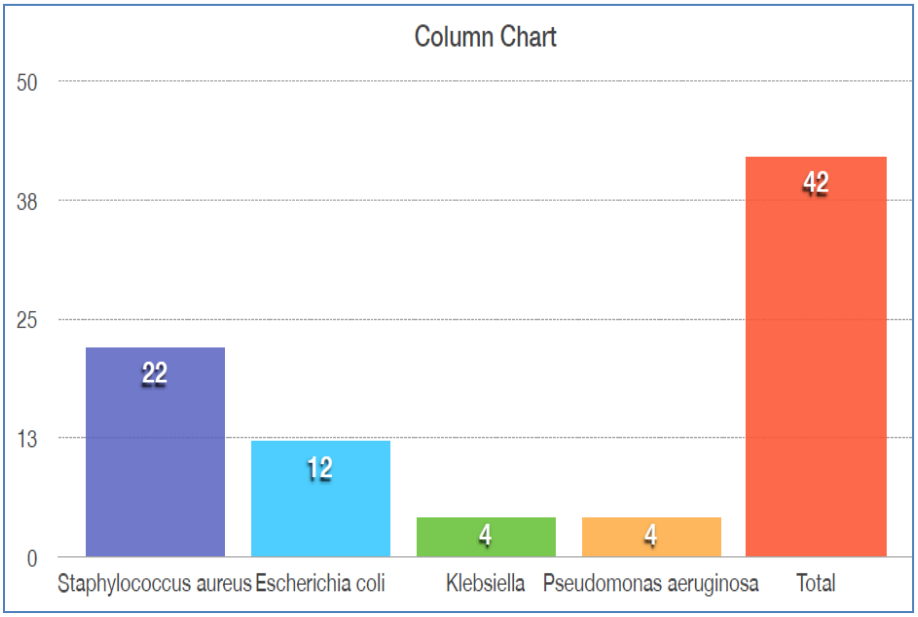
Table 1:

Number of resistance pathogens to antimicrobial agents(%)

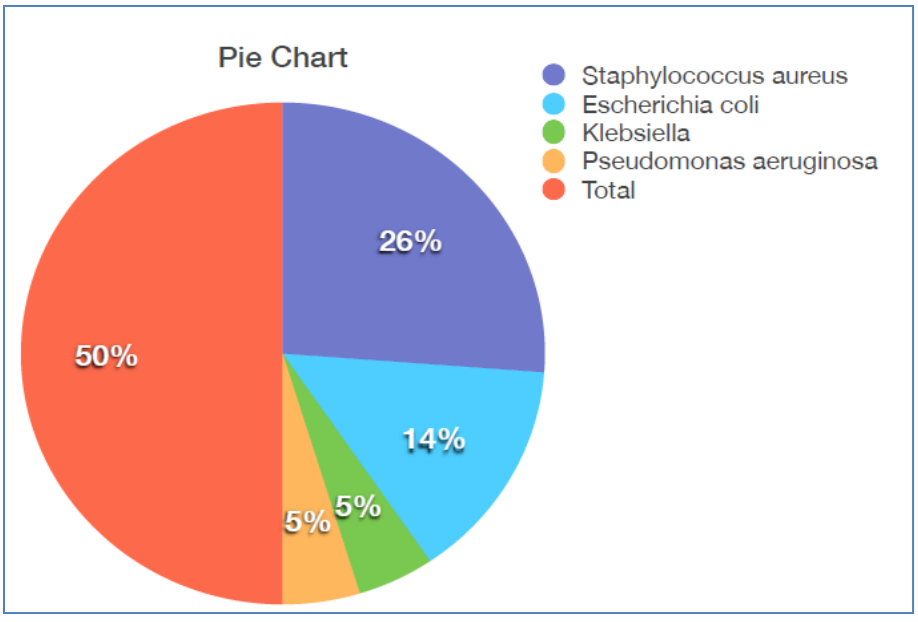
Antibiotic	S. aureus	P. aeruginosa	Other GNB
Gentamycin	8(36.36%)	4(100%)	5(31.25%)
Cefoxitin	11(50%)	ND	ND
Penicillin	19(86.36%)	ND	ND
Erythromycin	15(68.18%)	ND	ND
Tetracycline	11(50%)	ND	16(100%)
Ciprofloxacin	12(66.67%)	3(75%)	11(68.75%)
Cotrimoxazole	10(45.5%)	ND	10(62.5%)
Cefotaxime	ND	ND	5(31.25%)
Ceftazidime	ND	0(0%)	ND
Amikacin	1(4.54%)	0(0%)	3(18.75%)

Table 2:

ORGANISMS ISOLATED	NO. OF CASES(%)
Staphylococcus aureus	22
Escherichia coli	12
Klebsiella	4
Pseudomonas aeruginosa	4
Total	42



Graph 1:



Graph 2:

Discussion:

Developing SSI is a traumatic experience. In spite of introduction of principles of antisepsis and advances in infection control practices such as improved operating room ventilation, sterilization methods, barriers, surgical technique and availability of antimicrobial prophylaxis, surgical site infections still remain a serious problem.

In this study the prevalence rate of post-caesarean section wound infection was 23.33% which was consistent with the infection rate seen in other studies. Anikar et al.[8] reported rate of 10.06% and M.S.Venkataraman et al[9] 24.7% for clean contaminated surgeries.

The most common pathogenic organisms causing SSI in present study were found to be Staphylococcus aureus .This was similar in findings from Morhason- Bello IO et al.[10]This organism is a normal skin commensal, and may have contaminated the wound during surgery possibly due to poor surgical technique.[11] Escherichia coli was the second commonest isolated organism followed by Pseudomonas aeruginosa and Klebisella. This was similar in findings from Khadijah Hassan et al.[12] Presence of enteric organisms could be attributed to the patient's normal endogenous microbial fecal flora. Special interest in Staphylococcus aureus surgical site infection is mainly due to its predominant role in hospital cross infection and emergence of virulent antibiotic resistant strains. In the present study, 86.36% Staphylococcus aureus strains from the infected wound were resistant to penicillin. Ineffectiveness of penicillin in Staphylococcus aureus has been reported in other studies also.[13,14] Eleven out of Twenty-two (50%) strains of Staphylococcus aureus were methicillin-resistant but only 4.54% of the strains were resistant to Amikacin. All strains of Pseudomonas aeruginosa were resistant to gentamicin, which was one of the antibiotics used for antimicrobial prophylaxis. Gram-negative bacilli other than Pseudomonas aeruginosa, which were isolated from the infected wound exhibited resistance to tetracycline, Ciprofloxacin, Cotrimoxazole, Cefotaxime, Gentamycin, Amikacin in decreasing order.

Summary and Conclusion:

A total of 180 samples of Caesarian delivery included in the present study.The overall Surgical site infection rate was 23.33%.In the infected wounds, Staphylococcus aureus was the commonest isolate followed by Escherichia coli, P.aeruginosa and Klebisella .83.36% strains of Staphylococcus aureus isolated were resistant to Penicillin.50% of these Staphylococcus aureus were MRSA(Methicillin resistant Staphylococcus aureus).Gentamycin is of no value in treatment of Pseudomonas aeruginosa wound infection. Other Gram -negative bacilli (other than P.aeruginosa) isolated from the infected wound were resistant to Tetracycline and 68.75% of these isolates were sensitive to gentamicin. Though organisms isolated from the infected wounds were sensitive in varying percentage to some of the antibiotics used for antimicrobial prophylaxis, inappropriate use of antibiotics may pose a problem in future. One of the interventions in prevention of surgical site infection would be optimization of antimicrobial prophylaxis.

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