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BACTERIAL ISOLATES AND THEIR ANTIBIOTIC SENSITIVITY PATTERN FROM POST SURGICAL WOUND INFECTIONS IN POST NATAL WOMEN ATTENDING A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Background: Surgical site infections (SSI) is among the most common causes of health care associated infections of which post caesarean wound infection is a major cause of long duration hospital stay, high morbidity and mortality especially in resource-limited settings. **Materials and Methods:** 644 pus samples were collected from patients with purulent discharge, fever (>38C), pain or tenderness, localized swelling redness. Samples were prcocessed for staining and culture& sensitivity following standard microbiological techniques. **Results:** Out of 644 samples 214 were in age group of 25-29 yrs. 32% were primigravida and 60% were multipara (1-4). Out of 644 infected cases 92.2% were culture positive. Staphylococcus aures 32% was the primary pathogen identified followed by gram negative oragnisms Escherichia coli 28% and Klebseilla sp 16%. Staphylococcus was more sensitive to amikacin and gentamicin. Gram negative organism were more sensitive to cephalosporins. **Conclusion:** Proper assessment of risk factors that predispose to SSI, identification of the microorganisms and their sensitivity pattern is necessary to formulate the antibiotic policy is necessary so as to reduce the incidence of surgical site infections.

KEYWORDS: Post natal, post surgical infection, caesarean, pus.

1. INTRODUCTION

Surgical site infections (SSI) is among the most common causes of health care associated infections of which post caesarean wound infection is a major cause of long duration hospital stay, high morbidity and mortality especially in resource-limited settings.[1-3] It is associated with predictable and preventable risk factors.[1] Infection occurs when the first line of host defense-the cutaneous or mucosal barrier between environmental microorganisms and the host's internal milieu is impaired. Infections due to surgical treatment include wound infection, postoperative abscess, postoperative peritonitis, other post-operative body cavity infections and other health care associated infections.[2] The common microorganisms causing post natal SSI include *Staphylococcus* species, *Enterococcus faecalis*, *Escherichia coli*, *Proteus mirabilis*, and *Pseudomonas* species. *Staphylococcus aureus* is the most commonly isolated bacteria in wound infections after cesarean section.[3] Post natal SSI depends on certain factors like patient general condition, nutritional status, maternal age, virulence of organism, premature rupture of membranes and surgical techniques used.[5]

Post Caesarean wound infection increases in proportion to number of Caesarean Sections which is increased in recent times. It also depends on the health care workers and the facilities for woman health care during delivery. The CDC and the American College of Obstetricians and Gynecologists strongly suggest Caesarean Sections should be reduced, particularly in low-risk women, because it has been widely proven that, unless otherwise indicated, spontaneous vaginal delivery is safer.[6]

Better advances in medicine, surgical techniques, anaesthetic techniques, many antibiotics, advances in the operating room maintenance after the introduction of the lamellar air flow systems and the body exhaust systems lead to substantial reduction in postoperative infection rate from 70% in pre-Listerian era to less than 1% in the developed countries.

Despite of these best results wound infection still remains a major cause of post-operative morbidity and mortality.[7] The widespread use of antimicrobial prophylaxis has decreased but not eliminated the severe postoperative infections and the overall SSI rates are 3 – 15% after Caeserean Section. These rates are increased in presence of other risk factors.[8]

Now a days there has been a growing prevalence of Gram negative bacteria than Gram positive bacteria as a

cause of severe infections in many hospitals. Moreover, the widespread use of antimicrobials, together with increased duration of time have led to major problem of resistant microorganisms. So there is need to obtain a sound knowledge of empirical antimicrobial agent by antibiotic policy for the emergency treatment like if patient lands into sepsis.[9] In addition, antimicrobial susceptibility testing is done to obtain unpredictable acquired resistance of microorganisms. The present study focus on bacteriological profile and antimicrobial susceptibility profile in post natal surgical site infections. As per WHO data, one in three patients receiving a surgical procedure in low-income/middle-income countries is predisposed to SSIs. Of the different types of surgical wound infections, caesarean wound infections are of specific interest, as they cause major infectious caesarean complications and are associated with increased health care costs and maternal morbidity.[10]

2. MATERIALS AND METHODS

This observational study was undertaken in the Department of Microbiology from July 2018 to January 2020 in patients who were admitted in the Tertiary Care level teaching hospital, in Hyderabad under department of obstetrics &gynaecology.

The patient was diagnosed to have wound infection if they presented with one of the following signs or symptoms. Fever (>38C), pain or tenderness, localized swelling, heat, redness, abscess, purulent discharge from the wound. A total of 644 women who had an infection due to cesarean section (CS) were included in the study group.

Pus sample from patients with infection (purulent discharge) was collected early in the morning before dressing of the wounds using sterile swab sticks from deep inside the wound. Samples were transported immediately to the laboratory and processed immediately. Smear was prepared from the swab and subjected to gram stain and examined under microscope. The swab was then inoculated on Blood agar and Mac Conkey agar. Culture plates were incubated aerobically at 37^{o}C for 18-24 hrs. Plates were examined for growth and samples with no bacterial growth were reported as no bacterial growth. Bacterial colonies were subjected to gram stain and pathogens were identified by motility and biochemical reactions as per standard microbiological techniques. The antibiotic susceptibility pattern of the isolates was determined by the Kirby-Bauer disk diffusion method.

3. RESULTS

Out of the total 8055 cesarean sections conducted during the study period, 644 patients had wound infection and were included in the study.

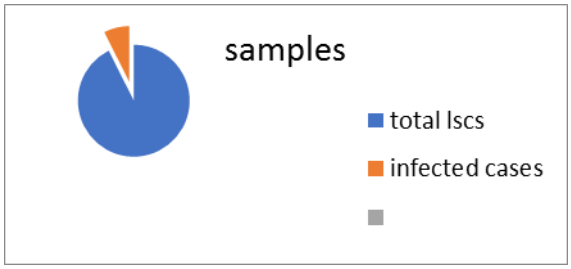

Fig 1: No of samples.

7.9 % cases had post operative surgical site infection.

Table 1: Type of LSCS surgery.

Type	Number	Percentage
Elective LSCS	426	5%
Emergency LSCS	7629	95%
Total	8055	100

Out of total cases 95% were emergency surgeries.

Table 2: Age wise distribution.

Age	Number of cases
18—24	68
25—29	216
30—34	189
35-40	94
Above 40	77
Total	644

Out of the total cases the maximum affected age group was between 25-29 yrs.

Table 2: Distribution of cases according to para.

Parity	Number of cases
0	206 (32%)
1-4	386(60%)
>5	52(8%)
Total	644(100%)

60% of the infected cases were of individuals with 1-4 para.

Table 4: Risk factors associated.

Risk factor	Number	% wound 'infection
Registration status		
Registered	250	39%
Non registered	394	61%
Economic status		
BPL	335	52%
Above BPL	309	48%
Operation time		
< 60 min	206	32%
>60 min	438	68%

Table 5: Distribution according to occupation.

Occupation	Number	Percentage
Home makers	298	46.2
Agriculture workers	158	24.5
Domestic maids	92	14.2
Street hawkers	74	11.4
Others	22	3.41
Total	644	

46.2% of the total cases were home makers followed by agriulture workers 24.5%.

Table 6: Culture positive.

Culture	Number
No bacterial growth	49 (7.6%)
Culture positive	595(92.4%)

Out of 644 samples 92.4%were culture positive.

Table 7: Culture positivity.

Type of Surgery	culture positive	(%)
Emergency	541	91
Elective	54	9

91% of culture positive samples were from emergency operated cases

Table 8: Organisms isolated.

Organism	Number	Percentage
Staphylococcus	206	32
Escherichia coli	182	28
Klebseilla	103	16
Pseudomonas	71	11
CONS	33	5

Maximum number of isolates were Staphylococcus 32% followed by Escherichia coli 28%

Table 9: Antibiotic sensitivity pattern of gram positive isolates.

Isolate	Ax	Cip	Cot	Ak	Gn	Of	Vn
Stapphylococcus aureus(182)	51 28%	76 42%	131 72%	164 (90%)	146 80%	46 25%	98 54%
CONS (33)	13 40%	18 54%	28 84%	29 88%	25 77%	13 38%	21 65%

Ax- amoxycillin, Cip-ciprofloxacin, Cot- cotrimoxazole, Ak-Amikacin, Gn- gentamicin, Of- ofloxacin, Vn – vancomycin.

Gram positive isolates were sensitive to amikacin, gentamicin and cotrimoxazole.

Table 10: Antibiotic sensitivity pattern of gram negative isolates.

Isolate	Ak	Gn	Ax	Cip	Caz	Ctx	Cp	Cot
Escherichia coli	140 68%	124 60%	85 41%	107 52%	134 65%	169 82%	167 81%	120 58%
Klebseilla sp	59 58%	61 60%	37 36%	49 48%	56 54%	80 78%	82 80%	56 54%
Pseudomonas	34 48%	37 52%	21 29%	28 39%	38 54%	49 69%	48 68%	30 42%

Ak-A mikacin, Gn- gentamicin, Ax- amoxycillin, Cip-ciprofloxacin,Caz-ceftazidime, Ctx-cefotaxime,Cp-cefperazone, Cot- cotrimoxazole.

Gram negative organisms were sensitive to cephalosporins.

4. DISCUSSION

The causes of cesarean wound infection are globally similar, however the relative contribution differ from region to region. The causes include prolonged labor prior to the cesarean section, prolonged period of rupture of membranes, postoperative anemia, skillof the surgeon, duration of operation and multiple vaginalexaminations.[3] One of the most common complications associated with cesarean section (CS) is infectious morbidity which accounts for a considerable increase in the cost of health care.

In this study the prevalence rate of post-caesarean sectionwound infection was 7.9% which was similar to the study conducted by Dahiya, et al who reported 9% incidence.[11]

Emergency CS is an important predictor of SSI as compared to Elective surgery.In the current study, 91% suffered wound infections after emergency surgeries compared 9% in elective cases which was similar to the findings of Chhetry M et al[5], who reported emergency procedures (82.97%) were more likelyto develop SSI as compared to elective cesarean(17%). The probable reason for this difference may be that less time was available for preoperative preparation. This couldalso be due to the outcome of already ruptured membranes in emergency CS or multiple attempts of home delivery by untrained personel, increased external bacterial contamination, lack of timely antibiotic prophylaxis.[5]

In our study, majority of women were in the age group 21 to 25 years. There was no significant variation in age group. There was no significant relationship between the women's occupation and wound sepsis.

In the present study majority of women were in lower middle class and so SSI was common in lower socio-economic class.This may be linked to poor hygiene and nutrition.

In this study 68% of wound infections were in cases operated for more than 1hour compared to surgeries operated for less than 1 hr 32%. This correlated with study conducted in Nepal by Chhetry M et al,[5] which shows 66% of infections in pateints operated for prolonged period. Prolonged operating time leads to more exposure to microorganisms could be associated with SSI.

Among the 644 wound infected samples bacterial growth was reported in 92.4% and 7.6% showed no bacterial growth. Similar rate of culture positivity 87.5% reported by Khadijah Olatayo Hassan et al.[12]

In the present study S.aureus was the predominant pathogen constituting 32% followed by klebsiella sp16%. This correlated with the study conducted by Devi et al who reported 36% staphylococcus followed by klebseilla 23%.[1]

Staphylococcus aures was more sensitive to aminogycosides amikacin 90% and gentamicin80%. Gram negative organisms Escherichia and Klebseilla sp were more sensitive to cephalosporins.

CONCLUSION

Proper assessment of risk factors that predispose to SSI and identifying the microorganisms and their sensitivity pattern is necessary to formulate the antibiotic policy so as to reduce the incidence of surgical site infections because they are associated with increased health care costs and maternal morbidity.

REFERENCES

1. Devi SL et al. Int J Reprod Contracept Obstet Gynecol, 2018 Jun; 7(6): 2486-2489.
2. Kurhade et al., J Bacteriol Parasitol, 2015; 6: 6.
3. Agboeze J, Onoh RC, Umeora OU, Ezeonu PO, Ukaegbe C, Onyebuchi AK, et al. Microbiological pattern of postcesarean wound infection at Federal Teaching Hospital, Abakaliki. Afr J Med Health Sci., 2013; 12: 99-102.
4. Bitew Kifilie A, Dagnew M, Tegenie B, Yeshitela B, Howe R, and Abate E. Bacterial Profile, Antibacterial Resistance Pattern, and Associated Factors from Women Attending Postnatal Health Service at University of Gondar Teaching Hospital, Northwest Ethiopia. International Journal of Microbiology, Article ID 3165391, 2018; 10.
5. Chhetry M, Subedi S, Banerjee B. Risk factors for post caesarean surgical site infection at a tertiary

care center in Eastern Nepal. JCMS Nepal, 2017; 13(3): 314-7.
6. L. Charrier, P. Serafini, A. Ribatti, A. Castella, G. Rabacchi, C.M. Zo. Post-partum surgical wound infections: incidence after caesarean section in an Italian hospital. J prev med hyg, 2009; 50: 159-163.
7. Vijaya K et al., Sch. J. App. Med. Sci., December 2015; 3(9D): 3412-3417.
8. J. K Bizimana, J.Ndoli, C.Bayingana, I.Baluhe, G.J.Gilson and E.Habimana. Prevalence and Risk Factors for Post Cesarean Delivery Surgical Site Infection in a Teaching Hospital Setting in Rural Rwanda: A Prospective Cross Sectional Study. Int.J.Curr.Microbiol.App.Sci., 2016; 5(6): 631-641.
9. Kanwalpreet Kaur, Loveena Oberoi, Pushpa Devi. Bacteriological profile of surgical site infections. IAIM, 2017; 4(12): 77-83.
10. Abdel Jali MH, Abu Hammour K, Alsous M, Awad W, Hadadden R, Bakri F & Fram K. Surgical site infections following caesarean operations at a Jordanian teaching hospital: Frequency and implicated factors. SCIenTIFIC REPOrTS, 7: 1221.
11. Dahiya, et al.Priyanka Dahiya, Vinita Gupta, Seema Pundir, Dolly Chawla. Study of incidence and risk factors for surgical site infection after cesarean section at first referral unit. International Journal of ContemporaryMedical Research, 2016; 3(4): 1102-1104.
12. Khadijah Olatayo Hassan *et al.*: Post Caesarean Section Wound Infection and Microbiological Pattern at the University of Port Harcourt Teaching Hospital, Southern Nigeria. Research in Obstetrics and Gynecology, 2018; 6(1): 1-8. DOI: 10.5923/j.rog.20180601.01.