International Journal of Medical and Health Research
ISSN: 2454-9142; Impact Factor: RJIF 5.54
Received: 12-05-2019; Accepted: 14-06-2019
www.medicalsciencejournal.com
Volume 5; Issue 8; August 2019; Page No. 88-91

Surgical site infections in caesarean section

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Abstract
Surgical site infection is one of the most common complication following caesarean section, with an incidence of 14- 46%
Objective: The present study helps to know the risk factors and the organisms causing surgical site injection at our hospital and then sensitivity to different antibiotics.
Materials and Methods: This was a retrospective case study of patients delivered by caesarean section in Government Victoria Hospital, Andhra Medical College, Visakhapatnam between July 2018 to June 2019 with a sample size of 100.
Observation and Results: Most of the patients belonged to 21-25 years (55%). Majority are from rural areas (71%), 57% were un booked. Most of them were primigravida (59%).
Anaemia is the most common medical risk factor (48%). Diabetes and prom> 8 hours were 27% each, repeat LSCS 14-15%. 85% were emergency caesarean sections.
Escherichia coli (E. coli) is the predominant organism and is resistant to cefuroxime. 63% of them required secondary suturing.
Conclusion: Surgical site infection is more prevalent among emergency caesarean sections and women who were un booked. With regular antenatal visits, modifiable factors like anaemia are corrected. E. coli was the predominate organism.

Keywords: caesarean section, culture and sensitivity, Escherischia coli, surgical site injection

1. Introduction

- Surgical site infections are among the most common hospital acquired infections. They make up to 14-16% of inpatient infections.
- It has physical and emotional burden on the mother and significant financial burden on the health care system.
- The increasing incidence of caesarean deliveries worldwide has contributed to greater wound morbidity.
- Knowledge of the organisms causing Surgical site infection and their antibiotic sensitivity and resistance patterns provide an insight into the current antibiotic prescription practices and the factors affecting these practices.

Objective

- The present study helps to know the risk factors and the organisms causing Surgical site infection in our hospital and their sensitivity to different antibiotics which help in formulating infection control practices.

Materials and Methods

- A retrospective case control study of patients delivered by caesarean section in Government Victoria hospital, Andhra Medical College, Visakhapatnam between July 2018 to June 2019 with a sample size of 100.
- The cases studied were the patients whose caesarean section was complicated by surgical site infection verses the patients delivered by caesarean section who had no surgical site infection.
- Diagnostic criteria were maternal fever accompanied by spontaneous parting of wound or purulent discharge from the wound with or without positive bacterial culture.
- Pus samples were collected from the wound site and sent for culture and sensitivity.
- Demographic information, potential risk factors, operative findings, are recorded.

Observations

Table 1a: Demographic distribution in study

Parameters	Number of cases	Percentage
Maternal age		
<20	5	5
21-25	55	55
26-30	33	33
>30	7	7

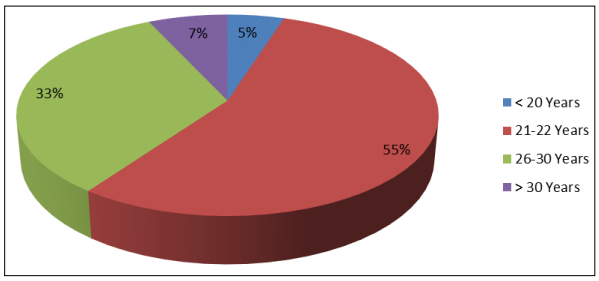

Fig 1a: Demographic Distribution in Study

Table 1b: Demographic distribution in study

Number of cases Gravidity	Percentage
Primi gravida 59	59
Gravida 2 29	29
Gravida 3 10	10
Gravida 3 2	2

Table 1c: Demographic distribution in study

Nativity	Number of cases	Percentage
Rural	71	71
Urban	29	29
Antenatal visit		
Booked	43	43
Un booked	57	57

Most of them are emergency caesarean sections 85%

Table 1d: Circumstances of Surgery

No. of Cases	Percentage
Emergency LSCS 85	85%
Elective LSCS 15	15%

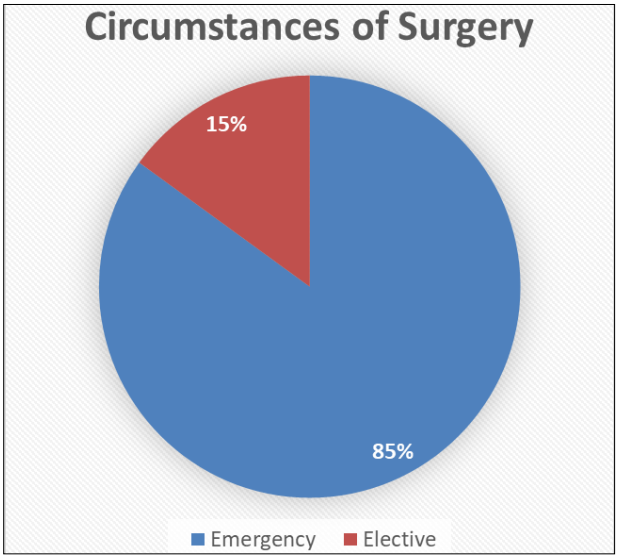

Fig 2

Table 2: Risk Factors

Medical risk factors	No of cases	Percentage
Anemia	48	48
Diabetes	27	27
Hypertensive disorders	20	20
Hypothyroidism	5	5
Obstetric risk factors		
PROM > 8 hours	27	27
Failed Induction	20	20
Prev.LSCS	15	15

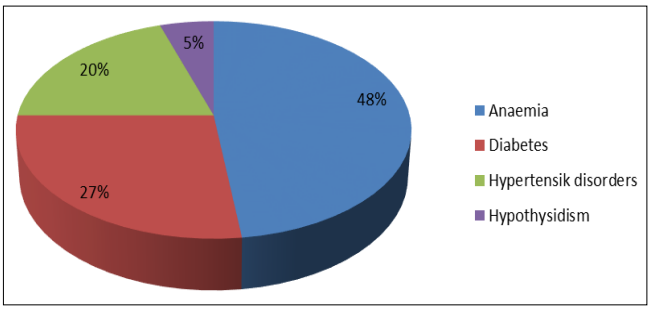

Fig 3: Risk factors

Table 3: Organisms isolated from the pus

Organisms isolated	No of cases	percentage
E.coli	52	52
Staphylococcus.haemolyticus	9	9
E.aerogenes	6	6
Sterile culture	33	33

Chia coli is most common organism isolated in pus

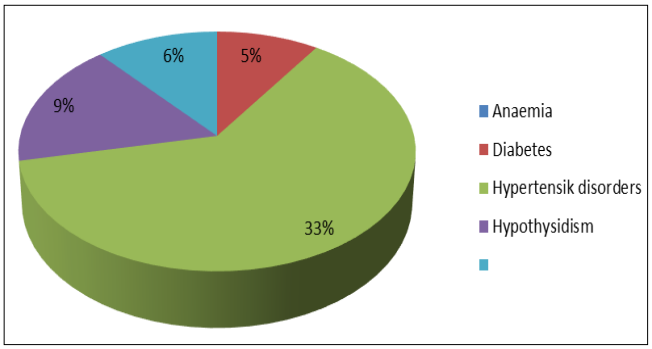

Fig 4: Organisms Isolated from the Pus

Table 4: Antibiotic sensitivity pattern of the E.coli

Antimicrobial Agents	Interpretation
Cefuroxime	Resistant
Ciprofloxacin	Susceptible
Levofloxacin	Susceptible 5%
Nitrofurantoin	Susceptible 25%
Cefotaxime	Susceptible 30%
Trimeth/sulfame	Susceptible 40%
Amox/kclavula	Susceptible 98%
Gentamycin	Susceptible 100%
Amikacin	Susceptible 100%
Pipera/Tazobac	Susceptible 100%
Cefepime	Susceptible 100%
Imipenem	Susceptible 100%
Meropenem	Susceptible 100%
Cefperazone/Sulbac	Susceptible 100%

Table 5: Antibiotic sensitivity pattern of the Enterobacter aerogenes

Antibiotic sensitivity	E.aerogenes
Cefuroxime	Resistant
Ciprofloxacin	Resistant
Levofloxacin	Susceptible 60%
Nitrofurantoin	Susceptible100%
Cefotaxime	Susceptible 40%
Trimeth oprime/sulfame thoxazole	Susceptible 80%
Amoxicilin/Kclavulanate	Susceptible 20%
Gentamycin	Susceptible 100%
Amikacin	Susceptible 100%
Pipera colin/Tazobactum	Susceptible 100%
Cefepime	Susceptible 100%
Imipenem	Susceptible 100%
Meropenem	Susceptible 100%
Cefperazone/Sulbactm	Susceptible 100%

Table 6: Antibiotic sensitivity pattern of the Staphylococcus haemolyticus

Ant microbial agents	Interpretation
Erythromycin	Susceptible
Clindamycin	Susceptible
Oxacillin	Susceptible
Penicillin	Resistant
Trimeth/Sulfameth T/S	Resistant
Deptomycin	Susceptible
Linezolid	Susceptible
Doxycycline	Susceptible
Tetracycline	Susceptible
Vamcomycin	Susceptible
Rifamin	Susceptible
Ciprofloxacin	Resistant
Levofloxacin	Resistant
Gentamycin	Susceptible
Nitrofurantoin	Susceptible

Obesrvation and Results

- Most of the patients belonged to the age group of 21-25 years, contributing to 55% of the cases.
- Majority of the women are from rural areas (71%).
- 57% of the cases were un booked.
- Most of them belong to primigravida 59%
- Anaemia is most common medical risk factor in the patients.
- Diabetes and PROM> 8 hours are 27% each.
- Repeat LSCS in 15%.
- Escherichia coli (E.coli) is the Most common Organism (52%) and is found to be 100% susceptible to Piperacillin / Tazobactum, Cefepime, Imipenem, Meropenem, Cefperazone/ Sulbactum, Gentamycin, Amikacin. It is resistant to Cefuroxime.
- Sterile culture in 33, most probably due to prophylactic antibiotic given at the Start of Caesarean Section.

Discussion

- Surgical site infection is the second most common infectious complication after urinary tract infection following caesarean delivery.
- It is a surgical complication with a high morbidity rate, but it is associated with predictable and preventable risk factors.
- Majority of the patients in our study group are from rural areas 71% and 29% from urban areas hence antenatal care services should be strengthened in rural area.
- Majority of the cases were un booked which indicates the requirement of antenatal care that provides opportunities for health education, prior detection and correction of maternal problems.
- In present study 48% of the patients had Anaemia.
- Patients with Anaemia were seen to be more prone to surgical site infection.
- Anaemia diminishes resistance to infection and is frequently associated with puerperal sepsis.
- Poor control of glucose during surgery and in the perioperative period increases the risk of infection.
- 15% of the cases in our study had a repeat Caesarean section.
- PROM is seen in 27% of cases. PROM associated with the largest bacterial inoculum and liquor gets infected and infection supervenes.
- An obstetric related risk factor of both intrinsic and extrinsic origin is length of time that the membranes are ruptured prior to caesarean section.
- Following membrane rupture, the amniotic fluid is no longer sterile and may act as a transport medium by which bacteria come into contact with the uterine and skin incisions.
- The increased incidence of surgical site infection in cases with intact membranes may be due to multiple vaginal examinations in cases with failed induction
- The most common pathogenic organisms causing Surgical site infection in present study were found to be Escherichia coli strains which were found to be resistant to cefuroxime.
- Majority of the Surgical site infection, 63% required secondary suturing while in 37% of the cases, the wound healed with daily aseptic dressings and secondary intention.

Conclusion

- Surgical site infection is more prevalent among emergency procedures and women who were un booked.
- It is important for antenatal women to have regular antenatal visits so that modifiable risk factors like anaemia are corrected before term.
- E. coli was predominant organism of wound infection.
- Proper assessment of risk factors that predispose to Surgical site infection is critical for the development of strategies for reducing the incidence of Surgical site infection and for identifying high risk patients requiring intensive postoperative surveillance.

There is no Conflict of Interest among the authors.

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