



1. MBBS, FCPS, CMT
Assistant Professor
Department of Obstetrics and
Gynaecology
Allama Iqbal Medical College,
Lahore.
2. MBBS, FCPS, CMT
Associate Professor Surgery
Sahiwal Medical College/ DHQ-
Teaching Hospital, Sahiwal
3. MBBS, FCPS, CMT
Assistant Professor of Surgery
Khawaja Safdar Medical College
Sialkot.
4. MBBS, FCPS, FRCS
Professor of Surgery
Khawaja Safdar Medical College
Sialkot.
5. MBBS, IMM
PGR
Department of Surgery
Allama Iqbal Medical College,
Lahore.
6. MBBS
PGR
Department of Surgery
Sahiwal Medical College, Sahiwal.
7. MBBS
PGR
Allama Iqbal Medical College,
Lahore.
8. MBBS
PGR
Allama Iqbal Medical College,
Lahore.

Correspondence Address:

Dr. Zareen Amjad
House No.406-E, Street No.2 Peer
Colony, Walton Road, Lahore.
hmamjad2010@gmail.com

Article received on:

08/05/2018

Accepted for publication:

15/08/2018

Received after proof reading:

00/00/2018

INTRODUCTION

Infection has always been a feature of life and has been documented even before 4000-5000 years.¹ Infection used to be present in all the eras of human life and still is the most common post-operative complication and causes substantial morbidity, mortality and increases expenses for treatment. Egyptians had some concepts of infection as they had prevented putrefaction, proved by their skills of mummification. The Hippocratic teachings described the use of wine and vinegar as antimicrobial successfully, to irrigate the infected and open wounds before secondary closure. A belief common to all these ancient civilizations was that if pus developed in

WOUND INFECTION; WOUND INFECTION IN EMERGENCY CESAREAN SECTION TWO-YEAR EXPERIENCE AT (LGH) LAHORE GENERAL HOSPITAL LAHORE

Zareen Amjad¹, Zahid Sattar², M Lateef³, Zafar Ali Chaudhary⁴, Ramzan Rasheed⁵, Shahzad Afzal⁶
Shahid Rafique⁷, Rafay Saeed⁸

ABSTRACT... Objectives: To determine the frequency of surgical site infection in emergency cesarean section and to detect the most common causative organism. **Study Design:** Prospective Study. **Place & Duration:** Department of Gynae unit-1 Lahore General Hospital Lahore two year study extending from 20-03-2010 to 19-03-2012. **Methodology:** 600 patients undergoing emergency cesarean section were included in the study. The outcome of interest was frequency of wound infection, which was classified as being superficial, deep or organ/space. Data was collected on a specially designed Performa. Demographic details, signs and symptoms at presentation, details of wound infection and results of culture/sensitivity testing were noted. **Results:** A total of 600 patients were included. Wound infection was noted in 150 patients (25%), of which 78 (52%) were superficial, 48 (32%) were deep and 28 (16%) were organ/space infection. Out of 150 wound infection, organisms were isolated in 102 (68%) patients. Staphylococcus Aureus was the most common organism detected in the specimens of 60 (40%) patients followed by E. coli in 30(20%) patients. **Conclusions:** The study revealed that incidence of wound infection was higher in emergency cesarean section as compared to developed countries. The routine reporting of wound infection rates stratified by most common organism and potential risk factors associated with increased risk of infection is highly recommended.

Key words: Emergency Cesarean Section Surgical Site Infection, E.Coli, Staphylococcus Aureus, Organ space infection.

Article Citation: Amjad Z, Sattar Z, Lateef M, Chaudhary ZA, Rasheed R, Afzal S, Rafique S, Saeed R. Wound infection; wound infection in emergency cesarean section two-year experience at (LGH) Lahore General Hospital Lahore. Professional Med J 2018; 25(9):1311-1316. DOI:10.29309/TPMJ/18.4996

an infected wound it has to be drained.²

Sepsis in modern surgery continues to be a significant problem for healthcare practitioners across the globe. Most wounds became infected until the revolutionary work of two pioneer scientists, Semmelweis and Lister. This work paved the pathway for antisepsis, asepsis and development of safe surgery.³

In 1847, A famous Gynecologist Semmelweis proposed that surgeon's hands could be a transmitting source of puerperal sepsis to the postoperative patients.^{2,5} He said that there was a dramatic reduction in puerperal fever if the hands

are rinsed in chlorinated lime.^{2,3}

Infection has always been a grave complication of trauma and surgery.³ It is a common cause of hospital acquired infections with an incidence of 5-16%. It is the most common complication of wounds in emergency caesarean section with an incidence of 14-22% in Pakistan.^{4,5}

Wound infections in emergency caesarean section are classified into three categories

- Superficial wound infection
- Deep wound infection.
- Organ / space infection

Approximately two-third of all wound infections in emergency caesarean section are confined to the superficial wound while the rest are associated with deep wound.^{6,7}

Patients presenting in tertiary care hospital are usually malnourished, maltreated by traditional birth attendants at some local clinics, poor hygienically, large in number and subsequently having increased propensity for sepsis.

The magnitude of wound infection varies considerably in different parts of the world. Rate of wound infection in USA has been reported to be 2.6 percent¹⁰, while a report from an African country Tanzania shows this figure to be 19.4 percent.¹¹ In Pakistan, an infection rate of 22.7% is observed in emergency caesarean section.⁷

In most of the developing countries including Pakistan, Information about the incidence of wound infection in emergency caesarean section and the adherence to standard guidelines for prevention of wound infection are lacking. There are very few studies about incidence of wound infection in caesarean section in Pakistan; therefore pathogens commonly associated with wound infections and frequency of occurrence¹ in emergency caesarean section is quite pertinent to be studied from different aspects.^{8,9}

MATERIAL AND METHODS

This prospective two year study was conducted at department of Gynae unit-1 Lahore General

Hospital Lahore, extending from 20-03-2010 to 19-03-2012. Six hundred patients undergoing emergency cesarean section were included in the study. The inclusion criteria was all female of child bearing age, undergoing emergency cesarean section. The patients with diabetes mellitus, immunocompromized status and jaundice were excluded from the study.

After selecting the cases according to inclusion criteria from labor room, all patients underwent a detailed history and physical examination regarding abdominal sign and symptoms and systemic review. Routine Investigations like (CBC, CUE, LFT, RFT, S/E, BSL, plain X-ray abdomen erect and supine) were done. Ultrasound/ CT Scan abdomen/pelvis) were done where indicated. Initial resuscitation was done to correct dehydration, electrolyte imbalance and acidosis. Prophylactic antibiotics were given to every patient preoperatively. Informed consent was taken for operation and to gather information for the study.

Based on history, physical examination and investigations, cases were diagnosed and selected for emergency cesarean section. All patients underwent emergency cesarean section. Intraperitoneal drain of appropriate size was placed. Rectus sheath was closed with vicryl no. 1 and skin was closed with prolene 2/0. Surgical site infections involving the skin and subcutaneous tissue was considered as superficial surgical site infection while the infection that involves incision deep to the subcutaneous tissue, including the muscles of the anterior abdominal wall and rectus sheath was considered as deep surgical site infection. Similarly the infections that involve the organ or space inside the abdominal cavity other than the superficial or deep incision was considered as organ or space surgical site infection. Patients were closely observed for any sign and symptoms of fever, wound pain, tenderness, redness, increased temperature and any purulent discharge from incision or drain. Patient having features of deep/organ or space surgical site infection underwent ultrasound examination for any collection. Stitches of the infected wound were immediately opened as

soon as appearance of any sign and symptoms of wound infection. Pus from the infected wound was sent for culture and sensitivity to determine the most common causative organism. Patients were discharged after 6 to 7 days depending on the postoperative recovery. Proper instructions were given to the patients regarding daily dressing and general hygiene of the body. Stitches of the healthy wound were removed on 10th post operative day. Follow up was done on days 14, 21 and 28. Each patient was assessed for wound pain, fever, wound discharge, healing and dehiscence. Each patient's data were collected on a special designed proforma.

RESULTS

The total number of patients included in the study was 600. The mean age of the patients was 30.48 ± 11.55 years [range 15-56]. There were 280 (46.6%) patients of age range of 15-25 years, 206 (34%) patients of age range of 25-30 years, 114 (19%) patients of age range of 31-35 years.

Out of the 600 cases, 150 (25%) patients had wound infection while 450 (75%) did not have infection (Figure-1). Regarding symptomatology, out of these 150 patient 135 (90%) patients had purulent discharge and 15 (10%) did not. 108(72%) had Pain. Similarly 94 (63%) patients presented with fever and 56 (37%) were afebrile at the time of presentation (Table-I).

Wound infection was seen in 150 (25%) out of the 600 cases. (Figure-1) Of these 150 patients, 78 (52%) were superficial, 48 (32%) were deep and 28 (16%) were organ/space infection (Figure-2). Of these 150 patients, 102 (68%) were present during the hospital stay, 30 (20%) were seen on 2nd week follow up, 12 (8%) on 3rd week follow up and 6 (4%) on 4th week follow up (Table-II). Among those diagnosed during the hospital stay, 60 (58.8%) were superficial, 30 (29.4%) were deep and 12 (11.8%) were organ/space infection (Figure-3). Among wound infections diagnosed at the 2nd week of discharge, 12 (40%) were superficial, 12 (40%) were deep and 6 (20%) were organ/space infection. Of the four patients diagnosed with wound infection at 3rd week follow up, 6 (50%) were superficial and the other 6 (50%)

was deep and no organ/space SSI was detected in third week. There was only 6 (100%) patient with wound infection in 4th week follow up who was diagnosed as having organ/ space SSI.

Ultrasonographs of all the 72 patients suspected with deep and organ / space SSI was done. 30 (41.6%) reports were normal. 18 (25%) reports showed anterior wall abscesses that confirmed deep SSI in those cases. 12 (16.7 %) had pelvic collection and 6 (8.5%) had pelvic collection extending into left paracolic gutter and 6 (8.5%) had interloop abscess with pelvic collection. Culture and sensitivity was done in 150 (25%) patients. Staphylococcus Aureus was the most common organism detected in the specimens of 60 (40%) patients. In 48 (32%) patients, no growth was observed. The culture and sensitivity of 30 (20%) patients confirmed the presence of E. Coli. In 12 (8%) patients, Pseudomonas Aerugenosa was detected in 12 (8%) (Table-III).

On follow up, 78 (52%) patients presented with fever, and 72 (48%) did not. 108 (72%) patients presented with pain and 42 (28%) did not. Only 12 (8%) patients developed dehiscence and 138 (92%) did not. 126 (84%) patients had purulent discharge from wound site and 24 (16%) did not.

Presenting Complaints	Yes		No	
	No.	%	No.	%
Purulent Discharge	135	90%	15	10%
Pain	108	72%	20	13%
Fever	94	63%	56	37%

Table-I. Distribution of patients by presenting complaints for wound infection (n= 150)

Type of SSI	No.	Percentage
Hospital stay	102	68%
2 nd week	30	20%
3 rd week	12	8%
4 th week	6	4%

Table-II. Distribution of patients by type of wound Infection on follow up visit (n=150)

Organism	No.	Percentage
Staph Aureus	60	40%
No growth	48	32%
E. Coli	30	20%
Pseudomonas Aerugenosa	12	8%

Table-III. Distribution of patients by organism on culture and sensitivity (n=150)

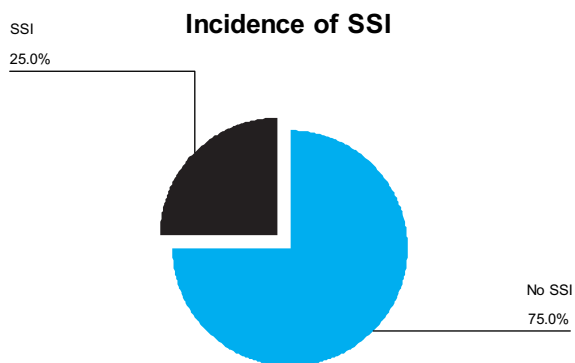


Figure-1. Distribution of patients by wound infection (n=600)

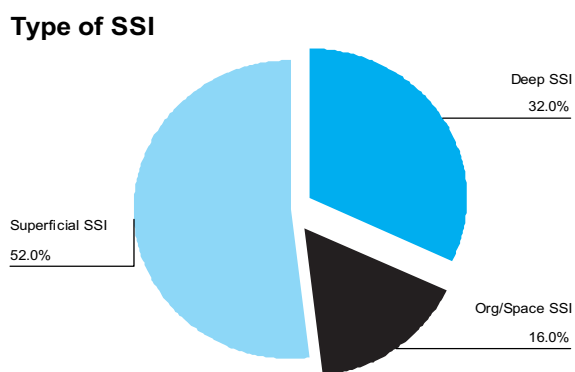


Figure-2. Distribution of patients by type of SSI (n=150)

DISCUSSIONS

In this series, we studied a total 600 patients undergoing emergency cesarean section. This is one of the few series described in literature from Pakistan and Asia, regarding the frequency of wound infection in emergency cesarean section. Before this, Anila Ansar, et al.^{1,3,5,8} described a series of five hundred patients but they also included patients undergoing elective procedures. Their study size was comparable than that of ours but, they included both elective as well as emergency procedure.^{7,8,9}

The different frequency of wound infection has been reported infection undergoing cesarean section reported is 18.8% in a teaching hospital of Pennag Malaysia.¹³ All the patients in study underwent cesarean section but only one third of the patients were operated upon in emergency. However, they included rate of surgical site infection after cesarean section with additional risk factor like raised BMI, obesity, increased blood loss, prolonged hospital stay and breech baby presentation. Longer postoperative hospital stay also results in prolonged exposure to the potentially infective hospital environment.^{10,11,12} This factor was noted in patients who had wound infection and were readmitted. Length of hospitalization and duration of stay was not significant in our study. In comparing the rates of wound infection from different countries as Jido TA et al from Nigeria reported 9.1% and from Brazil in a study by Wanger MB et al 8.7%.^{7,8,9,10}

The above discussion suggest that the actual range of rate of wound infection lies between 5% and 25% depending mainly on the mode of surgical procedure whether emergency or elective, the associated risk factors and condition of the operative settings. Although the rate of 25%, which we found in our study, is higher as compared with results from developed countries, it is similar to other less developed countries and better compared with African countries. By comparison, our results are not discouraging; keeping in mind the relatively compromised operation theatre conditions in Pakistan. The other causes may include Sub-standard health services, lack of education, poverty and ignorance. The results of our study are consistent with other studies in Pakistan.^{9,10,11}

A large proportion (68%) of the total wound infection were diagnosed during hospital stay. This reaffirms the conclusion of other studies¹² that in hospital surveillance is important in achieving more accurate wound infection rates.

Culture and sensitivity test was done in all of the one fifty (100%) infected cases. No growth was obtained in a large number (32%) of culture and sensitivity reports. This makes it difficult to draw

firm conclusions. The most common organism isolated was Staph Aureus (40%) which is also consistent with another study by Kaye KS, et al.^{4,5,6} E. Coli was the second most common organism found (20%) which was expected in the abdominal surgeries. Eight percent of the detected organisms were Pseudomonas Aeruginosa. But again, firm conclusion cannot be established due to use of prophylactic and empirical indoor antibiotic therapy in all cases.

It was observed in our study that most common presentation of wound infection during hospital or follow up was purulent discharge from wound 135(90%) followed by pain 108 (72%). Wound discharge was present in majority of the cases of superficial and deep wound infection. Only organ / space wound infection was lack of this finding which was diagnosed on USG of abdomen and pelvis. Dehiscence was seen only in 6 (8%).

CONCLUSION

Wound infection rate was found to be quite high in comparison to developed countries. Better surveillance systems should be developed. Moreover hospital guidelines regarding antibiotic policy in surgical wards & strict implementation of hand hygiene by health care personnel's should be done. Regular antibiogram of emergency operation theatre & surgical ward settings should be done. Studies for a longer period and among different surgical departments are required. These could provide a better estimate of incidence of Wound infection and most common organism.

Strategies for the reduction of weight to prevent this morbidity in patients must aim to control mother's weight during pregnancy and reduce intraoperative blood loss. Patients should be made aware of the risk of Wound infection, particularly where there is a high risk or known patient risk factors. This will allow patients to make better informed decisions about whether to proceed with surgery in maternal request cesarean.

In addition, efforts should be made to reduce length of hospital stay after cesarean section and to improve poor nutritional status, personal hygiene, anemia and handling by the local

health workers/dai were important variables to be addressed. Overall strategies that reduce cesarean section rate will lower this morbidity and its sequelae.

LIMITATIONS

This study has some limitations. This was not a double blind study. NNIS risk category and American Society of Anesthesiologists classification were not included, while these criteria were used in most of the international studies. Antibiotic prophylaxis and treatment were considered together during analysis which may have altered results of culture and sensitivity reports.

A descriptive chart review may result in collecting inaccurately charted information from the medical record. Some charts had more thorough charting than others. Misinterpretation of meaning in the written documentation is also a possible source of error.

Extraneous variables such as environmental conditions and socioeconomic status cannot be controlled, may not even be identified, and may affect the results. Despite these limitations, this study provides valuable information regarding the post-cesarean wound infection as well as most common causative agent in wound infection

Copyright© 15 Aug, 2018.

REFERENCES

1. Gottrup F, Melling A, Hollander DA. **An overview of surgical site infection: Etiology, incidence and risk factors.** EWMA Journal. 2005; 5:11-5.
2. Leaper DJ, van Goor H, Reilly J, Petrosillo N, Geiss HK, Torres AJ, Berger A: **Surgical site infection-a European perspective of incidence and economic burden.** Int Wound J 2004, 1(4):247-273.
3. Leaper DJ. Wound infection. **In Russel R, William NS, Bulstrode CJ: editors. Short practice of surgery.** 24th ed. London: Arnold. 2004; 118-9.
4. Hutchinson N. **Asepsis, antisepsis and skin preparation.** Int J Surg. 2002; 58:190-2.
5. Burke JP. **Infection control: A problem for patient safety.** N Engl J Med. 2003; 348:651-656.

6. Shakeel S, Batool A, Mustafa N. **Peritoneal non-closure at caesarean section-a study of short term post operative morbidity.** Pak Armed Forces Med J. 2008; 53:267-70.
7. Ward VP, Charlett A, Fagan J, Crawshaw SC. **Enhanced surgical site infection surveillance following caesarean section: experience of a multicentre collaborative post-discharge system.** J Hosp Infect. 2008; 70:166-173.
8. Ledger WJ, Blaser MJ. **Are we using too many antibiotics during pregnancy?** BJOG 2013; 120:1450-1452.
9. Chen YY, Chou YC, Chou P. **Impact of nosocomial infection on cost of illness and length of stay in intensive care units.** Infect Control Hosp Epidemiol 2005; 26: 281-287.
10. Owens SM, Brozanski BS, Meyn LA, Wiesenfeld HC. **Antimicrobial prophylaxis for cesarean delivery before skin incision.** Obstet Gynecol 2009; 114:573-579.
11. Anaya DA, Dellinger EP. **The obese surgical patient: A susceptible host for infection.** Surg Infect. 2006; 7:473-480.
12. Baaqeel H, Baaqeel R. **Timing of administration of prophylactic antibiotics for caesarean section: A systematic review and meta-analysis.** BJOG 2013; 120:661-669.


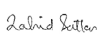

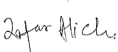


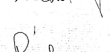
“

*Tough times don't last.
Tough people do.*

– Unknown –

”

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Zareen Amjad	Main Author	
2	Zahid Sattar	Supporting expert	
3	M Lateef	Co author	
4	Zafar Ali Chaudhary	Supervising expert	
5	Ramzan Rasheed	Formatting help	
6	Shahzad Afzal	Formatting help	
7	Shahid Rafique	Formatting help	
8	Rafay Saeed	Formatting help	