Original Article

To Study the Microbiology of Surgical Site Infections (SSIs) Complicating Abdominal Surgeries at DHQ Teaching Hospital D.I.Khan and the Drug Sensitivity against Them

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ABSTRACT

Objective: To collect data of pathogens responsible for surgical site infection in elective abdominal surgeries and the drugs effective against them.

Place and Duration of Study: Department of Surgery, District Head-quarters Teaching Hospital, Dera Ismail Khan from 1st January 2005 to 31st December 2009.

Materials and Methods: Retrospective study on all cases of surgical site infections in elective abdominal surgeries over five years. Pus and swabs from infected wounds were sent to find the pathogens responsible for these infections and the drugs highly sensitive against them.

Results: 175 cases of abdominal surgeries with surgical site infection were collected over duration of five years. Their culture sensitivity reports showed positive result in 160 cases and negative result in 15 cases.

Organism most commonly responsible for abdominal wound infection in our study was Klebsiella Pneumonae. It was found in 53 patients (33.12%) followed by Pseudomonas aeriginosa in 43 patients (26.8%) and E coli in 40 patients (25%). Other micro-organisms were Staph-aurous (6.8%), Enterobactor (3.75%), Streptococcus (3.12%) and Clostridia (1.25%).

Sensitivity report of these microbes showed that Sulzone (cefoperazone plus sulbactum) is the most effective antibiotic.i.e. In 90 patients (56.25%), followed by Amikacin in 40 patients (25%) and Ciprofloxacin in 15 patients (9.3%). Other drugs showing higher sensitivity against these pathogens were Fosfomycin in 10 cases (6.25%) and Imipenum in 5 cases (3.125%).

Conclusion: The study gives us clues to the type of pathogens that we would expect in our surgical site infection wounds of abdominal surgery, and the antibiotics which can be empirically used against these infections.

Keywords: Microbes, Culture &Sensitivity, Surgical Site Infection, Abdominal Surgery.

INTRODUCTION

Nosocomial infections are one of the leading causes of morbidity and mortality in the surgical patients of the hospital. Surgical wound infection takes one of the major fractions of these nosocomial infections[1,2]. . Approximately 60%of patients admitted to the hospital in surgical unit undergo surgery at some stage during their stay[3]. The US Centers for Disease Control and Prevention estimates that out of these operated cases about 500,000 SSIs occur annually only in United States [3].

Several techniques are used to reduce the chance of infection in surgical wound[4] like, Theater environment

1. Keeping the temperature of the operation theater between 68-73 F.
2. Humidity between 30%to 60%.
3. Air movement from clean to less clean area.
4. Vigilance for break in aseptic techniques by operation room team
5. Maintain normo-thermia during operation[5].
6. Use surveillance of wound infection with review of preventive measures[5].
7. Bath before surgery, clean clothes, clean operation theater environments, scrub suits, caps/hoods, masks, gloves, gown,
8. Sterilized and clean post operative environment. Good Surgical Techniques
9. Warming patients for at least 30 min before surgery[5].
10. Use of prophylactic antibiotics.
11. Good surgical techniques with minimum tissue trauma, blood loss and ideal haemostatic control.
12. Minimum use of drains.
13. Removing devitalized tissue.
14. Gentle handling of tissue.
15. Eradicating dead space.

16. Avoiding inadvertent entries into a viscus.
17. Removing hair by clipping [6].
18. Limit sutures and ligatures.
19. Using monofilament sutures[6].
20. Using closed suction rather than open drainage, No drainage if possible.
21. Exercise meticulous skin closure.
22. Administer high intraoperative and post operative inspired oxygen.

Even with all these precaution measures still the surgical site wounds get infected in elective abdominal surgeries.

These wounds have to be re-opened; pus and swabs are sent for culture of pathogens and their sensitivity reports. These wounds are then treated both locally and systemically.

MATERIALS AND METHODS

All cases of surgical site infections, in elective abdominal surgeries admitted in Surgical Department of District Teaching hospital Dara Ismail Khan over five years were collected. These operations were done for different abdominal conditions. The results of this data were evaluated for the type of pathogen/pathogens and drug highly sensitive against them[7].

175 cases of surgical site infection in elective abdominal surgeries were collected from patients data of five years i.e. From1st January 2005 to 31st December 2009.

The inclusion criteria for these cases was,

- All patients of surgical site infection after elective abdominal surgeries during 1st January 2005 to 31st December 2009.

The exclusion criteria were,

1. Skin diseases.
2. Diabetes mellitus.
3. Immuno-compromised disease or therapies.
4. Presence of other infections.
5. Inadequate antibiotic prophylaxis.
6. Emergency procedures.
7. Unexpected contamination.

All these cases had three standard doses of Prophylactic antibiotics i.e. one gram of third generation cephalosporin(ceftriaxone) at the induction of anesthesia, the second dose twelve hours after the first dose and the third dose after twenty four hours the first dose[8].

175 patients developed surgical site infection in the post operative period[9]. The infected wound was opened and pus/ wound swab was taken and sent for culture and sensitivity.

Culture and sensitivity was done using the standard techniques (both aerobically and an-aerobically).

Infected wound was treated locally using antiseptics like povidone iodine and systemically according to the culture and sensitivity results[10].

RESULTS

175 patients were included in the study that developed surgical site infection after elective abdominal surgery during 1st January 2005 to 31st December 2009.

Out of these 175 patients culture result were positive in 160 patients (91 percent) and negative in fifteen patients (9%) (11).

Out of 160 culture positive patients 53 patients had Klebsiella pneumoniae infection (33.12%), 43 patients had Pseudomonas aeruginosa infection (26.8%), 40 patients had E coli infection (25%), 11 patients had Staphylococcus aureus infection(6.8%). Five of which were Methicillin resistant. 6 patients had Enterococcus infection (3.75%), 5 cases had Streptococcus infection (3.12%) and two cases had Candida albicans infection (1.25%).

The drug sensitivity report showed that Sulzone (cefoperazone plus sulbactum) is highly effective antibiotic in largest percentage of cases i.e. in 90 patients (56.25%), followed by Amikacin which is effective in 40 patients (25%), Ciprofloxacin in 15 patients (9.3%). Other drugs showing highest sensitivity were Fosfomycin in 10 cases (6.25%) and Imipenum in 5 cases (3.125%).

Table No 1: Culture and Sensitivity Results

Total No. of patients	Culture Results	Patients	percentage
175	Positive	160	91%
175	Negative	15	9%

Culture and Sensitivity Result

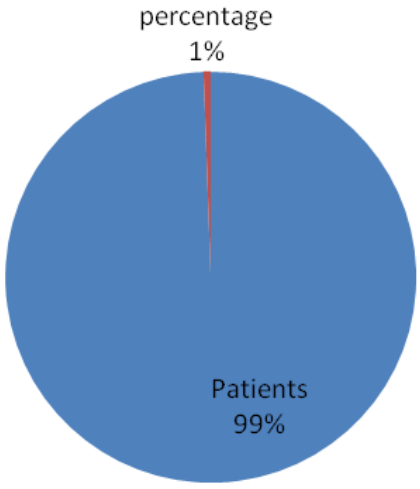


Table No 2: Type of Pathogens Involved

Type of pathogens	Patients	Percentage
Klebsiella pneumoniae	53	33.12%
Pseudodmonas aeruginosa	43	26.8%
E. coli	40	25%
Staphylococcus aureus	11	6.8%
Enterococcus	6	3.75%
Streptococcus	5	3.12%
Candida albicans	2	1.25%

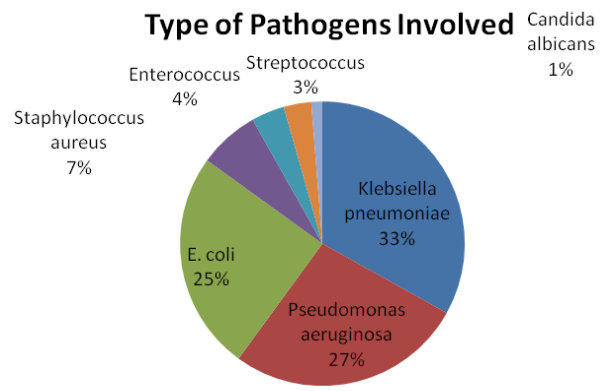
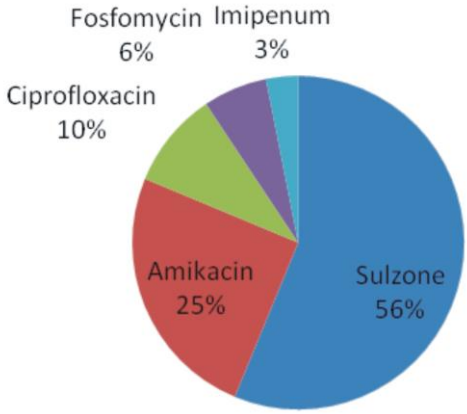


Table No 3: Sensitivity of Drugs

Name of drug most sensitive	Patients	Percentage
Sulzone	90	56.25%
Amikacin	40	25%
Ciprofloxacin	15	9.3%
Fosfomycin	10	6.25%
Imipenum	5	3.125%

Sensitivity of Drug



DISCUSSION

As we know that infection is still the leading cause of morbidity and mortality in the surgical department. Nosocromial infections are those infections that originate or occur in a hospital or hospital like setting[8].

Common site of nosocomial infection is surgical site infection[12].

Clean operation theater environment, good surgical techniques and use of antibiotics has significantly reduced the incidence[13].

Still a lot of patients develop surgical site infection as we see in our study[14]. Different microbes are responsible for infection of surgical site wound in different institutions. Similarly the pathogens of wounds at different regions of body are different[15]. Our study showed that Klebsiella pneumoniae is the most commonly found pathogen at the surgical site in elective surgeries (33.12%) followed by Pseudomonas aeruginosa (26.8%) and E coli (25%).

In a study done by F.De Lalla in1999 Strephtococcus aurius was the most common pathogen found in the surgical site wound. (16,17). A similar study done in 2008 by F Vyhnanek reported E Coli as the most common microbe in the surgical wound(18,19). While another study by B Schnuriger at al in 2010 on surgical site infections showed E coli as the most frequently found pathogen[20].

The result of our sensitivity report shows that Sulzone (cefoperazone plus sulbactum) was the most effective antibiotic in SSI of abdominal wounds (56.25%) followed by Amikacin (25%) and Ciprofloxacin (9.3%) while other studies conducted by AG Knapp at al found Daptomycin to be highly effective against surgical site infection[21]. Another study by D Lohsiriwat at al found amoxicillin /clavulanate to be 100% effective in prevention of surgical site infection[22]. For the empirical treatment of nosocromial abdominal infections JM Tellado recommends Carbapenems as highly effective against gram negative pathogens[23, 24].

CONCLUSIONS

Our study shows that gram pathogens are mainly responsible for surgical site infections in elective abdominal surgeries. Sulzone (cefoperazone plus sulbactum) was highly effective against these pathogens.

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