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ORIGINAL ARTICLE
A STUDY ON SURGICAL SITE INFECTIONS

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ABSTRACT

AIM: The study was performed with the aim to find out the incidence of post-operative wound infection among the elective and emergency cases in rural area hospital of poor socio economic status in Rajah Muthiah Medical College and Hospital from August 2012 to August 2014 with the objectives to identify the risk factors and most common causative micro-organism and to study the preventive aspects.

Keywords: : Wound infection, surgical site infections, common micro organisms and antibiotic prophylaxis.

1. INTRODUCTION

Wound infections are the commonest hospital-acquired infections in surgical patients.[1] They result in increased antibiotic usage, increased costs and prolonged hospitalisation. Appropriate antibiotic prophylaxis can reduce the risk of postoperative wound infections, but additional antibiotic use also increases the selective pressure favouring the emergence of antimicrobial resistance. Judicious use of antibiotics in the hospital environment is therefore essential.

A clean surgical case does not always require a prophylactic course of antibiotic. A classification system which ranks procedures according to their potential risk for infectious complications has greatly facilitated the study of surgical antibiotic prophylaxis and their use postoperatively. This system ranks procedures as:

- clean
- clean-contaminated
- contaminated.
- Dirty

This has become a widely accepted standard. (Table 1)

HOST FACTORS[9][10][12]

- Age
- Gender
- Severity of disease
- ASA physical status classification
- Immuno-compromising disease

- Diabetes mellitus – SCIP[11]
- Estimated prognosis
- Nutritional status
- Serum albumin
- Weight
- Presence of other infections
- Duration of preoperative stay

SURGICAL FACTORS[12]

- Emergency vs elective procedure
- Hair removal technique - SCIP
- Surgeon
- Site of surgery
- Increased O₂ tension
- Surgical skin prep - SCIP
- Perioperative antibiotics
- Normothermia
- Duration of surgery
- Drains
- Packs & Drapes

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- Glove puncture
- Primary or secondary closure
- Operating room environment
- Iatrogenic

Pre-operative characteristics that may influence the risk of SSI

- Duration of surgical scrub
- Skin antisepsis
- Preoperative shaving
- Preoperative skin prep.
- Duration of operation
- Antimicrobial prophylaxis
- Operating room ventilation

Inadequate sterilization of instruments

Appropriate Antibiotics Prophylaxis[7][8]

- Shortest duration of antibiotic prophylaxis with equivalent efficacy[3][5]
- Dosing at correct time interval
- Narrowest spectrum with equivalent efficacy
- Use of an antibiotic with good safety profile

Choice of antibiotic [14]

The choice of the antibiotic for prophylaxis is based on several factors. Beta-lactams and penicillin are the commonest type of antibiotics used in prophylaxis. Most importantly, the antibiotic should be active against the bacteria most likely to cause an infection. Most postoperative infections are due to the patient's own bacterial flora. Sometimes it may also be due to nosocomial infection. Broad spectrum antibiotics can be used for prophylaxis .

Commonly used surgical prophylactic antibiotics include:

- intravenous 'first generation' cephalosporin's– cephazolin or 'third generation' cephalosporin's – cefotaxim is commonly used.
- intravenous Gentamicin
- intravenous penicillin + beta lactamase inhibitor - amoxiclav

Parenteral 'third generation' cephalosporins such as cefotaxim have improved anaerobic and aerobic gram-negative cover compared to first generation cephalosporins.

2.MATERIALS AND METHODS

This study is done in patients of our unit in department of General

Surgery at Rajah Muthiah Medical College And Hospital between August 2012 and August 2014.100 patients who are clinically diagnosed as the surgical site infections are randomly selected

Inclusion Criteria:

- a) Males and females
- b) Age 12 years and above undergoing clean elective procedure and developing surgical site infections.
- c) Emergency surgeries / Elective surgeries.

Exclusion Criteria:

- a)Age 11years and below
- b) patients operated under local anesthesia
- c) patients who have undergone skin grafting
- d) patients who underwent amputation of infected extremities

Procedure:

- A total of 100 patients were randomized into two group.
- Group A consists of patients of clean wounds.
- Group B consists of cases clean contaminated wounds
- Group C contains of contaminated wounds
- Group D contains of dirty wounds
- Necessary aseptic precautions were followed preop, intraop and postoperatively.
- Post operative wound care was given with aseptic precautions.
- Patients were followed up postoperatively for a period of 30 days.
- A data sheet was prepared to facilitate collection of data. It included information on the routine parameters like name age, sex etc. as well as the clinical diagnosis and investigations. The investigations taken into account were hemoglobin percentage and blood sugar level. The data sheet also includes a note on the surgery done post operative period ect. The data sheet was maintained for all cases.

Table 1:Incidence of surgical site infection

Type of procedure	Risk of SSI
Clean	2
Clean contaminated	18
Contaminated	25
Dirty	55

Table 2:Spectrum of bacterial isolates from patients with SSI (n = 17)

Type of Bacteria Isolated	Number of Isolates	Percentage
Escherichia coli	6	35.29%
Pseudomonas aeruginosa	2	11.76%
Proteus mirabilis	2	11.76%
Staphylococcus aureus	3	17.65%
Streptococcus species	1	5.88%
Klebseiela species	3	17.65%
Total	17	

3.RESULT

Of the 100 cases operated 2 cases in group A and 18 cases in group B and 25 cases in group C and 55 cases in group D developed SSI. The most common organisms were Escherichia coli (35.3%), Pseudomonas aeruginosa (11.8%), Proteus mirabilis (11.8%) and Staphylococcus aureus (17.6%) Streptococcus (5.9) (Table 2)

Definition: Hospital Infection

- A hospital acquired infection also called a nosocomial infection
- First appears between 48 hours & 4 days after a patient is admitted to a hospital or other healthcare facility

4.CONCLUSION:

The merit of this study was to start the active surveillance of surgical site infections based on standard definitions and methods to be maintained by cooperation of infection control practitioners and surgical team. Identification of risk factors for surgical site infections to encourage the development of recommendations for prevention of SSI in order to achieve the setting goal to reduce the SSI.

- Risk factors are contributed by the patient, the environment, and the treatment
- Skin flora is a prominent cause of surgical site infections
- Antibiotic prophylaxis is commonplace and often beneficial.
- The operating room environment has a role in surgical site infections
- Postoperative care impacts the rate of surgical site infections
- Because SSIs may be the most preventable of nosocomial infections, health care facilities should make a special effort to reduce the risk of development of these surgical complications.
- The development of more effective infection control strategies should be established and surgeons should be more concerned about SSI control.
- %). It has been noted in this study that the rate of Gram positive infections, notably that of Staphylococcus aureus are significantly lower than published reports. The explanation for this could be the greater proportion: gastrointestinal procedures done in our hospital. Another feature of the spectrum of isolates in this study is the very high rate of infection with staph & Klebsiella.

- The organism was the second most frequent isolate (17.6%). Articles pertaining to the frequency of this organism in SSI could not be obtained. The general pattern of the isolated organisms in this study is seen to correlate well with the categories of surgery being performed in our department.

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