Research Paper

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# Bacteriological profile of surgical site infections (SSIS) and its Antimicrobial susceptibility pattern at tertiary care hospital

Medical Science

**KEYWORDS :** SSI, Pseudomonas sp., MRSA, multiple mechanisms like ESBL, Ampc.

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| **Dr.Hitesh R Ahir** | Tutor, Dept. of Microbiology, GMERS Medical College Valsad |
| **Dr.Roopika A Berry** | 4th year resident, Dept. of Microbiology, BJ Medical College Ahmedabad |
| **Dr.Piyush H Patel** | Tutor, Dept. of Microbiology,BJ Medical College Ahmedabad |
| **Dr.Kanu J Patel** | Asso.Professor , Dept. of Microbiology, BJ Medical College Ahmedabad |

## ABSTRACT

*Background & Objective; SSIs previously called Post-operative wound infection result from bacterial contamination during or after a surgical procedure. SSIs are the second most common Hospital Acquired Infections (HAIs) after Urinary Tract Infections (UTIs).This study is carried out to know bacteriological profile and its antimicrobial susceptibility in surgical site infections.*

*Methods; The study included post operative wound swabs from 2872 in patients having sign & symptoms of SSIs as per CDC guidelines from various surgical wards (General surgery, Orthopedics, Neurosurgery, Obstetrics & Gynaecology ) during June 2011 to November 2011.The swabs were processed for Gram stain, ZN stain & culture on nutrient agar, Blood agar, Chocolate agar, MacConkey agar using standard procedures .Antibiotic susceptibility of isolates was tested using the modified Kirby Bauer disc diffusion method as per CLSI 2011 guidelines*

*Result: Most common isolates from SSI were Pseudomonas sp. (32%) followed by E.coli (23%), Klebsilla sp. (19%), Acinetobacter sp. (11%), Staphylococcus aureus (6%), Out of them 8% were MRSA and 32% of isolates were resistant to antibiotic by multiple mechanism like ESBL, Ampc.*

*Conclusion: In spite of the use of prophylactic antibiotics, SSIs are still a real risk of surgery & represent a substantial burden of disease for both patients & health care services terms of morbidity, mortality & economic cost. So, healthcare professionals should consider the factors having an effect on infection potential before, during & after surgery.*

**Introduction;**

A surgical site infection is an infection that occurs after surgery in the part of the body where the surgery took place[1]. Surgical site infections have been shown to compose up to 20% of all of healthcare-associated infections. At least 5% of patients undergoing a surgical procedure develop a surgical site infection.[2] Surgical site infections can sometimes be superficial infections involving the skin only. Other surgical site infections are more serious and can involve tissues under the skin, organs, or implanted material.[1] SSI is complication of surgical procedures resulting in increased morbidity, mortality and cost[2]. The risk of developing a surgical site infection depends upon the balance between factors determining the number of bacteria contaminating the site and the factors determining the resistance of the site against infection[3,4]. According to CDC wound is classified in four classes.

**CDC-SSI Wound Classification** [5]

Class 1 = Clean

Class 2 = Clean contaminated

Class 3 = Contaminated

Class 4 = Dirty infected

**Objective:** The present study aimed at evaluating the bacteriological profile of patients with SSIs with reference to the antimicrobial susceptibility of the isolates.

**Materials and Methods:**

- The study included post operative wound swabs from 2872 in patients having sign & symptoms of SSIs as per CDC guidelines from various surgical wards (General surgery, Orthopedics, Neurosurgery, Obstetrics & Gynaecology ) from June 2011 to November 2011.
- Wound infection was diagnosed if any one of the following criteria were fulfilled:

1) serous or non-purulent discharge
2) pus discharge from the wound
3) serous or non-purulent discharge from the wound with signs of inflammation(oedema, raised local temp, fever >38˚C,tenderness) & wound deliberately opened up by the surgeon due to localised collection.

- The swabs were processed for Gram stain, ZN stain & culture on nutrient agar, Blood agar, Chocolate agar, MacConkey agar using standard procedures
- Antibiotic susceptibility of isolates was tested using the modified Kirby Bauer disc diffusion method as per CLSI 2011 guidelines [6].

**Result:** From received 1872 various clinical samples 1765(61%) samples were found to be positive for bacterial growth.

Most common isolates from SSI were *Pseudomonas sp.* followed by *E.coli* and *Klebsilla sp.* Which were shown in table no.1. Out of isolates 8% were MRSA and 32% of isolates were resistant to antibiotic by multiple mechanisms like ESBL, Ampc.

**Table no.1 Frequency of Isolation of Organisms from SSIs**

| Organism | Frequency (%) |
|---|---|
| Pseudomonas sp. | 32 |
| E.coli | 23 |
| Klebsiella sp. | 19 |
| Acinetobacter sp. | 11 |
| Sthaph.aureus | 6 |
| Other | 9 |

- The Pseudomonas isolates showed maximum sensitivity to Beta lactam/beta lactam inhibitor combination, higher fluoroquinolones & all were uniformly sensitive to Imipenem, Meropenem shown in Fig.1.The ESBL producing Enterobacteriaceae showed maximum sensitivity to BL/BLI combinations & higher fluoroquinolones.
- The MDROs were resistant to all antibiotics with sensitivity for Imipenem, Tigecycline& Polymyxin.
- The MRSA isolates were sensitive to Linezolid, teicoplanin, higher fluoroquinolones & chloramphenicol. All MRSA isolates were sensitive to Vancomycin shown in Fig.2

**Fig.2 Resistance pattern of isolates**

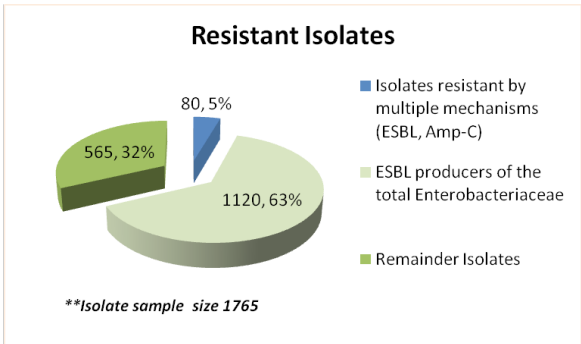
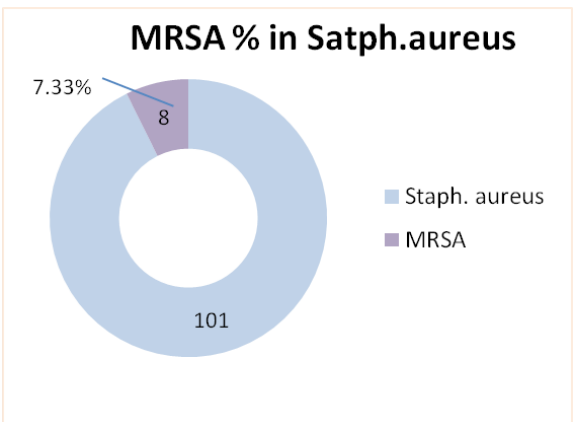



**Fig.2 MRAS % in *Staphylococcus aureus***




SSIs are the most common nosocomial infections in surgical patients and it is Second most common nosocomial infections. They prolong hospital stay by average of 7.4 days [5].

Source of SSI Pathogens are endogenous flora of the patient, operating theater environment,Hospital personnel (MDs/RNs/staff),Seeding of the operative site from distant focus of infection (prosthetic device, implants)understanding of these patterns becomes important in deciding prophylaxis. Risk of Infection in a nonsurgical infection, the virulence of the pathogen, bacterial dose, and impaired host resistance are all equivalent to one another. However, in a surgical infection, the bacterial dose and impaired host resistance play the major roles in infection, while virulence is less of a factor. An estimated 40%–60% of SSIs are preventable, overuse, underuse, improper timing, and misuse of antibiotics occurs in 25%–50% of operations ,right antibiotic, on time, for proper duration & dosed appropriately can prevent the incidence of SSIs & the emergence of resistant pathogens.

**Conclusion:**

In spite of the use of prophylactic antibiotics, SSIs are still a real risk of surgery & represent a substantial burden of disease for both patients & health care services terms of morbidity, mortality & economic cost. So, healthcare professionals should consider the factors having an effect on infection potential before, during & after surgery.

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