Original Research Paper

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Surgery

A STUDY ON SURGICAL SITE INFECTION (SSI) IN CANCER PATIENTS IN A TERTIARY CARE HOSPITAL

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ABSTRACT **Background:** Surgical site infections (SSI) in cancer patients can significantly affect the surgical outcome. Appropriate antimicrobial prophylaxis is required for the prevention of SSI. **Aim:** To evaluate incidence, risk factors, causative agents of surgical site infection and their drug susceptibility pattern at the department of surgical oncology. **Materials and Methods:** This was a prospective study. The antibiotic susceptibility of the organism isolated from wound infection of all postoperative patients at the department of surgical oncology from July 2022 to November 2024 were analysed. The demographic details of patient, pathogens isolated, and their antimicrobial susceptibility were collected, entered in Microsoft excel, and statistical analysis were done as percentage of isolates and drug sensitivity profile. **Results:** A total of 906 patients were operated during this study period and 128 patients (14.1%) developed SSI. Common among female (14.8%), and the common age group was fourth and fifth decade. Perineum (44%) is the most common site of SSI. Among 128 patients with SSI, 79 (61.8%) were culture positive and 49 (38.2%) were culture negative. 63% were gram negative and 37% were gram positive. Escherichia coli is the most common organism isolated, followed by staphylococcus aureus and pseudomonas. Most of these organisms were resistant to basic antibiotics and sensitive to higher antibiotics like meropenam and piperacillin/tazobactam. Three cases of MRSA were identified and they were sensitive to linezolid and vancomycin. **Conclusion:** The SSI in cancer patients are predominantly due to gram negative organism like escherichia coli, pseudomonas and klebsiella, which are multi-drug resistant and sensitive to higher antibiotics only. Among gram positive organisms, staphlococcus aureus and enterococcus species, are commonly isolated, and treatment options are limited. The resistance pattern among the pathogens causing SSI is very alarming. Implementation of strict infection control practices to prevent SSI rather than treating with higher antibiotics is the best option

KEYWORDS : SSI – Surgical Site Infection, MRSA – Methicillin Resistant staphylococcus aureus.

INTRODUCTION

SSI are the third most common nosocomial infection and accounts for a quarter of all nosocomial infections. It is the index of health care of any hospital. It is responsible for prolonging the duration of hospital stay, and causing social and economic loss to the family. Host factors, surgery related factors and wound related factors are implicated in causing SSI. It can significantly affect the outcome of surgery, causing severe morbidity and mortality. Hence, early detection, treatment and prevention of surgical infection is important.

Aim

To evaluate incidence, risk factors, causative agents of surgical site infection and their drug susceptibility pattern at the department of surgical oncology.

METHODS

This study was conducted in the Department of Surgical Oncology, Thanjavur Medical College, Tamilnadu. This is a prospective study. All patients who underwent surgery at our department from july 2022 to November 2024 were included in the study. Regular assessment of the surgical wound was done. Wound culture and sensitivity was taken if there is any wound discharge. Antibiotic susceptibility profile of the organism isolated from wound discharge were analysed. Demographic details of patient, pathogens isolated from the wound, and their antimicrobial susceptibility profile were collected and statistical analysis were done as percentage of isolates and drug sensitivity profile.

RESULTS

Total cases operated during the study period was 906. The overall rate of Surgical Site Infection was 14.1%, 128 SSI reported out of 906 cases. Rate of SSI was slightly higher among female than male, 14.8% (83 SSI out of 560 cases in female compared to 13.01% (45 SSI out of 346 cases) in male. Common age group developing SSI was 4th and 5th decade, accounting for 45% of SSI.

Site Of Infection

Perineal wound (44%) has the highest rate of SSI followed by inguinal wound (19.2%), abdomen wound (18.9%), extremities (13.8%), scalp wound (10%), neck wound (7.8%) and oral cavity (4.2%)

Site	Total cases	No of SSI	Percentage
Perineum	34	15	44%
Inguinal region	57	11	19.2%
Abdomen	285	54	18.9%
Extremities	65	9	13.8%
Scalp	20	2	10%
Neck	346	27	7.8%
Oral cavity	238	10	4.2%

Total cases with wound discharge was 128. Of which, 38.2% was culture negative and 61.8% were culture positive (63% were gram negative organisms and 37% were gram positive organisms)

Organisms Isolated

Gram negative	Gram positive
• Escherichia coli - 19 • Pseudomonas - 12 • Klebsiella sp. - 10 • Citrobacter sp. - 5 • Proteus sp. - 4	• Staphylococcus aureus – 13 • Enterococcus sp. – 9 • Corynebacterium sp. - 7

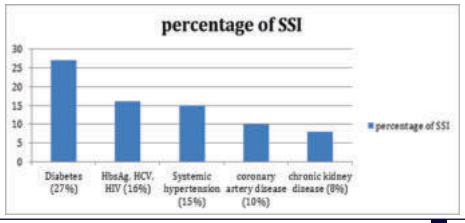
Antibiotic Susceptibility

The Gram negative organisms were resistant to aminopenicillin, co-trimoxazole, third generation cephalosporins, fluoroquinolone and sensitive to piperacillin/tazobactam and meropenam, except for acinetobacter species which was sensitive to third generation cephalosporins.

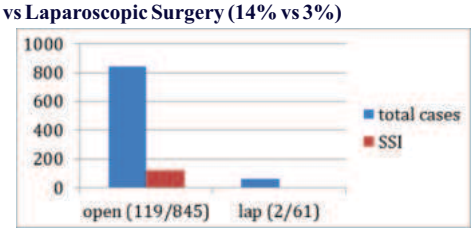
The gram positive organisms were resistant to ampicillin, third generation cephalosporins, cotrimoxazole, gentamicin and sensitive to fluroquinolone, erythromicin, vancomycin, linezolid.

Three cases of MRSA were identified and they were sensitive to linezolid and vancomycin

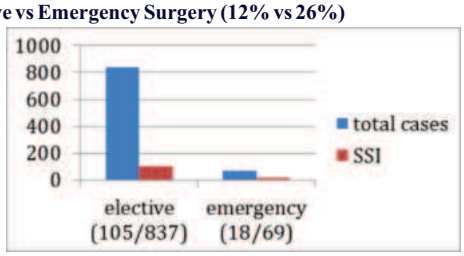
Comorbid Conditions



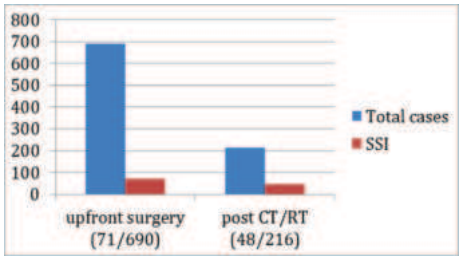
Open vs Laparoscopic Surgery (14% vs 3%)



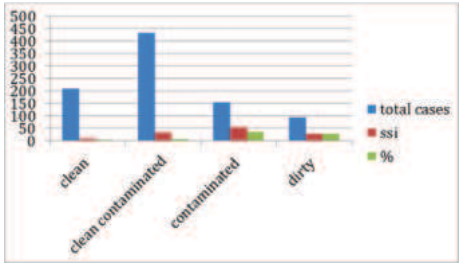
Elective vs Emergency Surgery (12% vs 26%)



Upfront Surgery vs Post Neoadjuvant CRT (10.2% vs 22.2%)



Type of Wound



- Hb < 10 (67%)
- Total count – < 4000 (5%) and >11000 (10%)
- BMI – normal (79%), underweight(17%), overweight (4%)

Risk Factors For SSI

The risk factors for SSI in our study are age >50 years, presence of comorbid conditions like diabetes, Post neoadjuvant chemotherapy or radiotherapy, Emergency surgery, Open surgeries, presence of anemia and, contaminated and dirty surgery

DISCUSSION

Definition Of Surgical Site Infection (SSI)

According to CDC – centers for Disease Control and Prevention SSI is defined as Infection related to an operative procedure, ocurring at or near the surgical incision within 30 days of the procedure or within 90 days if prosthetic material is implanted during surgery.

Criteria For SSI

Should fullfill all these 3 criterias

Criteria 1--

Date of event within 30 days or 90 days following the operative procedure.

Criteria 2 –

- Involves only skin and subcutaneous tissue of incision (SUPERFICIAL SSI)
- Involves deep soft tissues of incision (DEEP SSI)
- Involves any part of the body deeper than the fascial / muscle layers that is opened or manipulated during the surgery (ORGAN / SPACE SSI)

Criteria 3 – (atleast 1)

1. Purulent drainage from surgical site
2. Organisms identified by culture
3. Surgical site that is reopened in the setting of at least 1 clinical sign of infection (pain, swelling, erythema, warmth) and is culture positive or not cultured.
4. Diagnosis of SSI by a physician.
5. An abscess or other evidence of infection detected on gross examination, or imaging

CONCLUSION

The SSI in cancer patients are predominantly due to gram negative organism like escherichia coli, pseudomonas and klebsiella, which are multi-drug resistant and sensitive to higher antibiotics only. Among gram positive organisms, staphlococcus aureus and enterococcus species, are commonly isolated, and treatment options are limited. The resistance pattern among the pathogens causing SSI is very alarming. Implementation of strict infection control practices to prevent SSI rather than treating with higher antibiotics is the best option.

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Compliance with Ethical Standards

Conflict of Interest: Authors would like to declare there is no funding from institution or commercial company with regard to this study.

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