

A Study of Post-Operative Wound Infections in Sree Balaji Medical College and Hospital

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ABSTRACT

Background: Postoperative wound infections become a challenge in certain patients and may cause excessive comorbidity, mortality and costs. The aim of this study was to determine the incidence of postoperative wound infections in emergency abdominal surgeries in patients admitted to Sree Balaji Medical College and Hospital, Chennai.

Method: In this study 120 patients were included who underwent emergency abdominal surgeries. Data concerning type of wound, various surgical procedures, length of surgery, age distribution, sex incidence, preoperative preparation, antibiotic prophylaxis, co morbid conditions, common microorganisms, antibiotic sensitivity, and timing of presentation of SSI were obtained and interpreted, statistically.

Results: This study showed that abdomen injury (80%), aging (20%) and duration of surgery (>3.5h), prolonged anesthesia provoked the chances of SSI. There was no correlation of gender with SSI development. Burst abdomen, abscess with suppuration, enterocutaneous fistula and incisional hernia were most common complications associated with post-operative patients. The study also inferred that the proper diabetic management would reduce SSI risk.

Conclusion: The present study revealed that the need of strategic goal for effective post-operative wound management based important factors such as host, environmental, and microorganism characteristics before doing any surgery. The antibiotics usage warrants for their resistance and the hospitals should establish an antibiotic policy for surgery patients.

Key words: Wound infections, Abdominal surgeries, Antibiotic prophylaxis, Abdomen injury, Anesthesia

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INTRODUCTION

Wound infection is a common postoperative complication which causes significant postoperative morbidity and mortality and prolongs hospital stay. Infection was accepted as an inevitable sequelae of surgery a century ago. The infection rate which was about 75-80% has now dropped to less than 10%. Yet today infections accompanying surgical procedures contribute significantly to morbidity and mortality. Although the total elimination of wound infection is not possible, a reduction in the infection rate to a minimal level could have significant benefits in terms of both

patient comfort and medical resources used. Clear understanding of pathogens and their pathogenicity, advances in the field of asepsis, the advent of antibiotics and reliable suture materials have furnished the surgical artillery in combating infection. Hence a constant awareness of the ever-present threat of infection must be a way of life for the entire surgical fraternity [1-29].

To determine incidence of postoperative wound infections in emergency abdominal surgeries and to identify the risk factors for appropriate wound management. To identify the common wound causing agents in post-operative abdominal surgery in SBMCH. To study the role of prophylactic antibiotics in reducing surgical site infection.

MATERIALS AND METHODS

This prospective study was carried out in the Surgical Units-I and II of Sree Balaji Hospital,

Chrompet, Chennai on 120 patients who underwent emergency abdominal surgeries between July 2014 to November 2015. Patients undergoing emergency abdominal surgeries received post-operative antibiotic therapy also parentally. In this study, pus / wound swab was sent for SSI confirmation and for SSI- patients, 5ml sample was taken in a sterile container for further process. The relevant information was processed in a specially designed proforma along with their biodata, clinical features, the possible risk factors, diagnosis, complications which included wound infections, the organisms which were isolated with their antibiograms, hospital stay and the outcome. The statistical analysis was carried using SPSS, version 10.0 on computer.

Inclusion criteria

- ✓ Age between 25-60 years.
- ✓ Patients of either sex.
- ✓ Patients undergoing contaminated and dirty surgery as emergency.
- ✓ Comorbidities: Anemia, type 2 diabetes mellitus, Smoking.

Exclusion criteria

- ✓ Age less than 25 years.
- ✓ HbsAg/HIV positive individuals.
- ✓ Patients operated on elective basis.

RESULTS AND DISCUSSION

The prevalence of emergency abdominal wounds in post-operative patients were analysed in the present study. Of the 120 studies patients, 104 (86.6%) had healed wounds and only, 16 patients (13.4%) developed post-operative SSI. The study also showed that contaminated wound was the more prevalence in patients (69.16%) than the dirty wounds (30.83%) and the dirty wounds were more prone for further infections (Table 1 and Figure 1).

Type of surgery

The study also revealed that the type of surgery was the major factors that contributed for occurrence of wounds. In this study, severe risk for SSI was associated with penetrating trauma abdomen followed by bowel perforation and obstructed ventral hernia (Table 2 and Figure 2) and concordance with previous results [30].

Duration of surgery

The duration of surgery was also a significant factor for wound occurrence. The present study revealed that proportional relationship with the higher duration and risk for SSI wounds. Prologed surgeries (>3h) had definite risk for wounds (Table 3 and Figure 3) and the result was similar for the study of Simon et al. [31].

Age distribution and wound occurrence

The patient's age was also one of the major risk factors for the occurrence of the wounds. The study revealed that the elder patients were more prone to wound occurrence than the younger ones (Table 4 and Figure 4) and these results were concordance with Yunzhou, et al. [32].

Gender

In this study, we found that the sex is not the major factor for risk contribution on surgery wounds. Our study revealed that there is same risk ration for both the male and female and all of the studied patients had more or less same incidence of SSI (Table 5 and Figure 5). Similarly, Alkaaki et al. [33] also reported.

Pre-operative preparation (hair removal)

The study revealed that the hair removal prior to the surgery (before a hour) had reduced the wounding risk. There was a least correlation of SSI wounds and preoperative hair removal (Table 6 and Figure 6).

Antibiotic prophylaxis

Prophylactic antibiotic therapy was given for all cases taken into this study. However, there was no significant influence of timing of administering the drug in the incidence of wound infection (Table 7 and Figure 7) [34].

Comorbid conditions

Usually, comorbidities increase the risk of wounds for abdominal surgery patients (Table. 8 and Figure. 8). There was increased incidence of post-operative wound infection in patients with anemia, and diabetes mellitus and this result was concordance with the view of previous study by Derek et al. [35]. This study also showed that patients with comorbid conditions like Smoking, DM and anemia had higher incidence than those without. Several studies have shown a higher incidence of wound infection amongst smokers than in non-smokers. It was proposed that smoking has a detrimental effect on the tissue oxygenation, there by impairing the reparative

Figure 1: Type of wounds commonly found in post-operative abdominal patients.

Sl. No	Type of wound	Total cases	Infected cases	Percentage (%) infected
1	Contaminated	83	5	0.06
2	Dirty	37	11	29.72

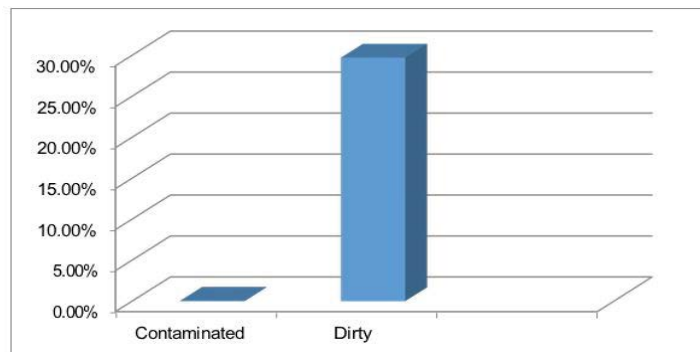


Figure 1: Type of Wound found in the post-operative abdominal surgery patients.

Table 2: Association of type of wounds and classes of surgery.

Sl. No	Surgical procedure (for)	Total cases	Infected case(s)	Percentage infected (%)
1	Appendicular pathology	64	2	0.03
2	Duodenal perforation	12	1	0.08
3	Penetrating injury abdomen	5	4	80
4	Blunt injury abdomen	6	1	0.16
5	Large bowel obstruction	10	1	10
6	Strangulated ventral hernia	12	2	0.16
7	Obstructed ventral hernia	4	2	50
8	Gastric perforation	3	1	33.33
9	Ileal perforation	4	2	50

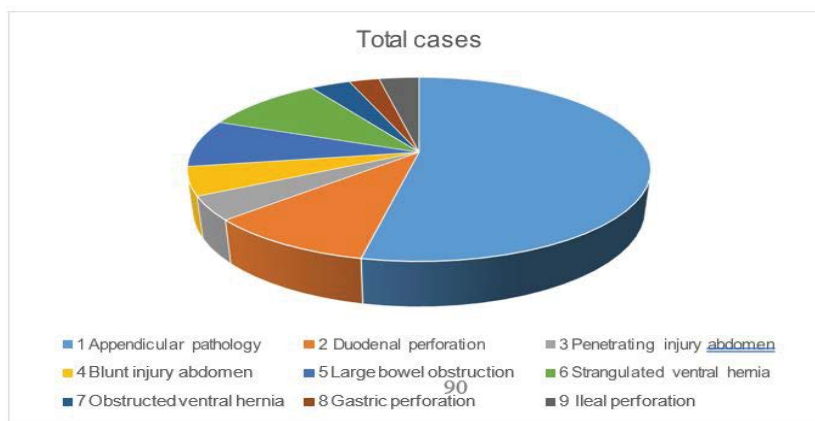


Figure 2: Association of type of wounds and classes of surgery.

Table 3: Duration of surgery and risk for wounds.

Sl no	Duration	Total cases	Infected cases	Percentage (%)
1	1 – 2 hours	35	1	0.02
2	2 – 3 hours	45	6	13.33
3	> 3hours	40	9	22.5

processes of wound healing and the neutrophil defense against surgical pathogens. Anaemia itself is not an established factor for postoperative wound infection. However, a higher incidence of postoperative wound infection was noted with

initial low haemoglobin levels. Others postulated this in 1993. Diabetes mellitus is also a proven risk factor as it hampers the vasculature leading to reduced blood flow and oxygenation to the tissues. Study conducted by Masood Ahmed in

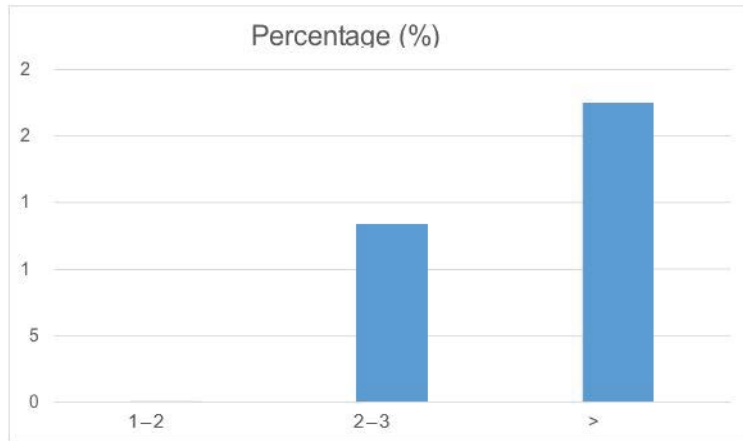


Figure 3: Duration of surgery and risk for wounds.

Table 4: Age distribution and wounds occurrence.

Sl no	Age group (in years)	Total cases	Infected cases	Percentage (%)
1	25 - 35	25	1	0.04
2	36-50	40	4	10
3	51 - 60	55	11	20

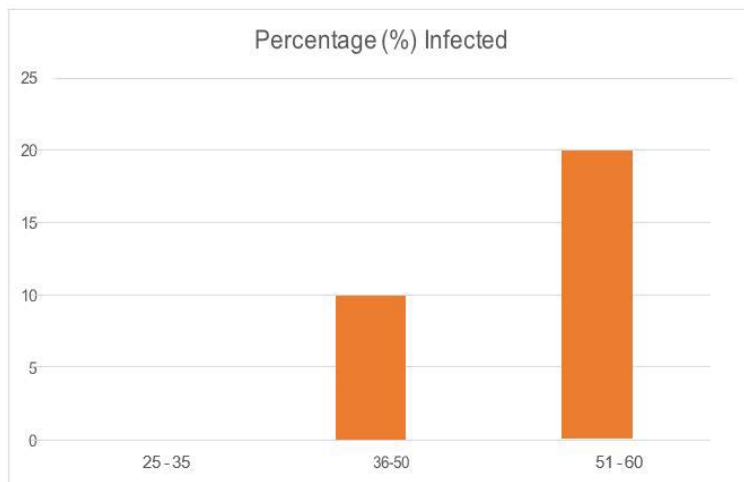


Figure 4: Age distribution and wounds occurrence.

Table 5: Incidence of wounds on abdominal surgery and gender of the patients.

S. no	Gender	Total cases	Infected cases	Percentage (%)
1	Male	74	9	12.16
2	Female	46	7	15.21

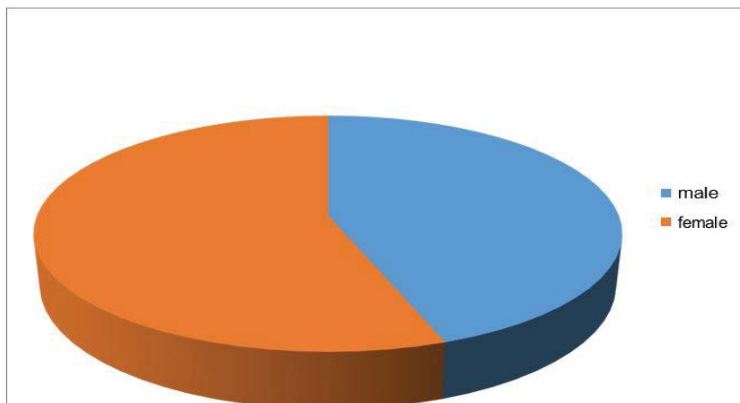


Figure 5: Incidence of wounds on abdominal surgery and gender of the patients.

Table 6: Preoperative hair removal and wound occurrence.

Sl no	Timing of hair removal	Total cases	Infected cases	Percentage infected (%)
1	1 hour before surgery	55	2	0.03
2	1- 3 hours before surgery	39	4	10.25
3	3 – 6 hours before surgery	26	10	38.46

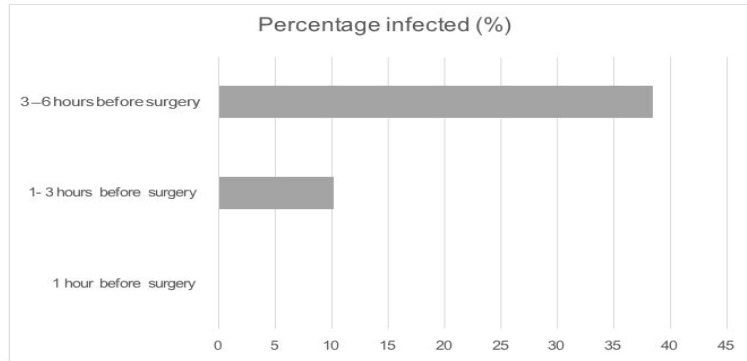


Figure 6: Preoperative hair removal and wound occurrence.

Table 7: Antibiotic prophylaxis and wound occurrence in abdominal surgery patients.

Sl no	Antibiotic prophylaxis	Total cases	Infected cases	Percentage (%)
1	1 hour before surgery	43	6	13.95
2	1 – 2 hours before surgery	51	6	11.76
3	2 to 4 hours before surgery	26	4	15.38

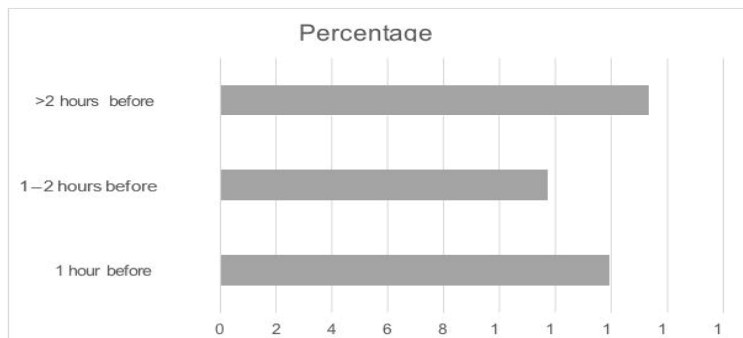


Figure 7: Antibiotic Prophylaxis and wound occurrence in abdominal surgery patients.

Table 8: Comorbidities and risk of wounds in abdominal surgery patients.

Sl no	Comorbidity	Total cases	Infected cases	% infected
1	Anemia (Hb<8 gm%)	49	7	14.28
2	Diabetes mellitus	36	6	16.66
3	Smoking	35	3	0.08

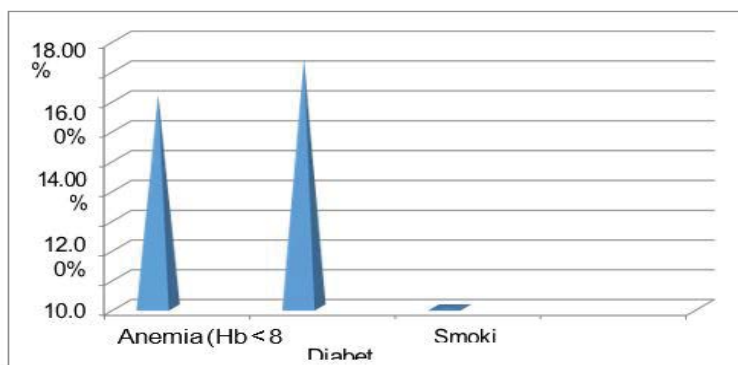


Figure 8: Comorbidities and risk of wounds in abdominal surgery patients.

Karachi proves the finding in this study (Table 8 and Figure 8).

Bacteriological surveillance

Microbial occurrence is one of the major risk factors for SSI occurrence in any type of surgery. Our results also revealed that the bacterial infections increased the risk of wound occurrence like previous study [36]. Our study also revealed that the gram-positive bacteria increase the wound risk than the gram-negative ones (Table 9 and Figure 9).

Antibiotic sensitivity

The patient' antibiotic sensitivity was the major risk factor for wound occurrence on abdominal surgery (Table 10). In this study most of the organisms were sensitive to Ciprofloxacin, Amikacin, and gentamycin in descending order of frequency.

Time of presentation of surgical site infection

In this study nearly 50% of the patients who developed SSI manifested with fever (>99.6-degree Fahrenheit) or pain in the wound at the time of presentation of SSI (Table 11).

Complications

Of the 16 patients who developed SSI, 12 developed complications namely Abscess with suppuration, Burst Abdomen enterocutaneous fistula and incisional hernia (Table 12 and Figure 10) and the remaining 25 % of the patients, the wound healed by secondary intention.

CONCLUSION

In summary, the present study showed that the early diagnosis and strategic therapy would reduce the post-operative wounds. The study showed that the age of the patients, surgery

Table 9: Bacteriological surveillance.

Sl. No	Name of organism	Infected case	% of cases infected
1	<i>Staphylococcus aureus</i>	6	37.5
2	<i>Staphylococcus epidermidis</i>	2	12.5
3	<i>Beta haemolytic streptococci</i>	3	18.75
4	<i>Escherichia coli</i>	2	12.5
5	<i>Proteus mirabilis</i>	1	6.25
6	<i>Pseudomonas aeruginosa</i>	1	6.25
7	<i>Klebsiella</i>	1	6.25

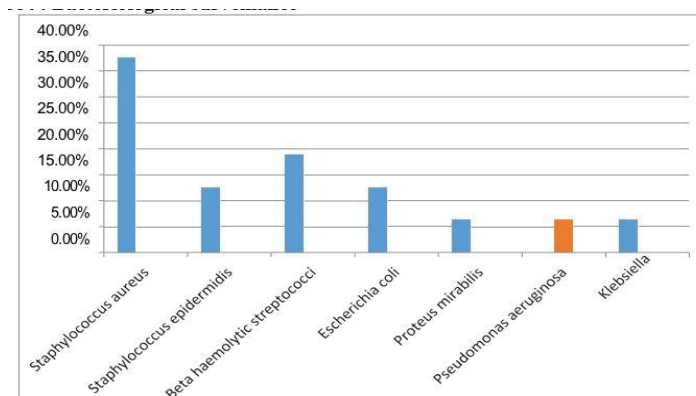


Figure 9: Bacteriological surveillance.

Table 10: Antibiotic Sensitivity and wound occurrence in abdominal surgery patients.

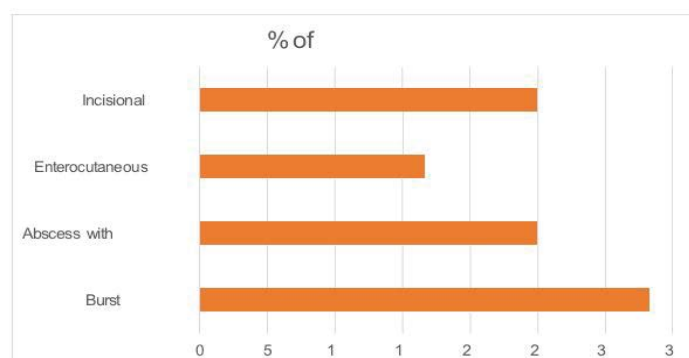
Name of organism	Ciprofloxacin	Amoxycillin+ clavulanate	Amikacin	Gentamycin	cephalexin	cefotaxime	norfloxacin	cefixime	ampicillin
<i>Staphylococcus aureus</i>	+++	++					+	+	
<i>Beta haemolytic streptococci</i>	++	++			+++		+		+
<i>Staphylococcus epidermidis</i>	++	+			++				++
<i>Proteus</i>	+		+++	+		+			
<i>Escherichia coli</i>	+		++	+			+		
<i>Klebsiella</i>	+		++	+					
<i>Pseudomonas</i>	+		++	+		+	+	+	

Table 11: Time of presentation of SSI in abdominal surgery patients.

Time of Presentation of SSI	Number	Percentage
Before first dressing with fever>99.6oF or pain in the wound	7	43.75
Abscess, cellulitis, or discharge noted at 1st week postoperatively	4	25
Abscess, cellulitis, or discharge noted at 2nd week postoperatively	3	18.75
Abscess, cellulitis, or discharge noted at 3rd week postoperatively	2	12.5
Abscess, cellulitis, or discharge noted at 4th week postoperatively	–	–

Table 12: Complications and occurrence of wounds.

SI no	Complication	No. of cases	%
1	Burst Abdomen	4	33.33
2	Abscess with suppuration	3	25
3	Enterocutaneous fistula	2	16.67
4	Incisional hernia	3	25

**Figure 10: Complications and occurrence of wounds.**

duration, comorbidities such as diabetes and optimal anti biotic regime were important players. If anaerobes are isolated in necrotizing fasciitis an early and aggressive second look is necessary. At the same time, however, the basis of timely therapy is a high level of suspicion with no diagnostic tool being superior to clinical judgment.

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