

“IMPORTANCE OF SOUTHAMPTON WOUND GRADING SYSTEM IN PREDICTING OUTCOME IN SURGICAL SITE INFECTIONS IN KRISHNA HOSPITAL, KARAD”

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INTRODUCTION

Post-operative wound infection is defined as surgical site infection from 0-30 days after surgery, or infection at surgical site till 1 year in cases of implants like mesh, vascular grafts and prosthesis.

Bacterial colonization of the skin, alimentary and genital tract are the principal contributing factors leading to SSIs. The SSIs appear when the bacterial inoculum exceeds the immune system's ability to control it.

Most commonly isolated organism is *Staphylococcus aureus*.

Exogenous sources like breaches in sterile techniques and operating room equipment may contribute.

SSIs may be classified as:-

1. Superficial/incisional if limited to the skin and subcutaneous tissue
2. Deep incisional when involving the fascia and muscle
3. Organ space when involving the a body cavity

Although majority SSI are uncomplicated, others may be more challenging and severe, often requiring extensive surgical debridement, multiple reoperations and can be life threatening. The location and the extent of the infection, along with the patient's condition guide the management approach.

MATERIAL AND METHODS

INCLUSION CRITERIA-

1. Age limit: All age groups
2. All patients presenting within the following categories
 - clean wound
 - clean contaminated wound
 - contaminated wound

EXCLUSION CRITERIA

1. Patients operated outside of Krishna hospital.
2. Pregnant patients
3. Dirty wound
4. Traumatic cases were not included.

STUDY DESIGN: Prospective observational study

- All these operated patients were followed up regularly during the post op period and those who developed post op wound infections were studied in detail, clinical photographs taken and the progress of wound healing documented.
- Severity of post op wound infection was graded according to Southampton wound grading system.

METHOD OF COLLECTION OF DATA:

- 120 patients with surgical site infection admitted in Krishna hospital were recruited into the study based on the inclusion and exclusion criteria mentioned above.
- A detailed history of the patient was taken.
- Routine investigations were done pre operatively.
- Surgical management of the pathology was done.
- All these patients were prepared for operative procedures, either elective or emergency operations.
- All these patients were regrouped in 4 categories depending on nature of surgery ie
 - clean wound
 - clean contaminated wound
 - contaminated wound
 - dirty wound
- The above data was tabulated in accordance with parameters including age, sex, comorbidities, nutritional status, occupation, and personal habits such as smoking.

SAMPLE SIZE

- 120 patients with inclusion criteria were studied from DECEMBER 2020 to JUNE 2022 (18Months)
 - $n = (p_1q_1 + p_2q_2) \times (z_1 - a/2 + z_1 - b)^2 / (p_1 - p_2)^2$
 - $n = (2145.80 + 688.64)(7.84) / (23.74)^2$
 - $n = 39.42 = 40$
- Where n = sample size
 $p_1 = 31.18$ according to prevalence established in a previous study
 $q_1 = (1 - p_1) = 68.82$
 $p_2 = 7.44$ according to prevalence established in a previous study
 $q_2 = (1 - p_2) = 92.56$
 $(z_1 - a/2 + z_1 - b)^2 = \text{constant with value of } 7.84$

SOUTHAMPTON WOUND GRADING SYSTEM (Bailey and love 25th edition)

Grade	Appearance	
0	Normal healing	
I	Normal healing with mild bruising or erythema	
	Ia	Some bruising
	Ib	Considerable bruising
	Ic	Mild erythema
II	Erythema plus other signs of inflammation	
	IIa	At one point
	IIb	Around sutures
	IIc	Along wound
	IIId	Around wound
III	Clear or serosanguinous discharge	
	IIIa	At one point only (≤ 2 cm)
	IIIb	Along wound (>2 cm)
	IIIc	Large volume
	IIIId	Prolonged (> 3 days)

IV	Pus	
	Iva	At one point only ($\leq 2\text{cm}$)
	IVb	Along wound ($>2\text{ cm}$)
V	Deep or severe wound infection with or without tissue breakdown; hematoma requiring aspiration	

RESULTS:

In present study based on our inclusion criteria, total 120 operated patients were taken for analysis who underwent surgery (105 elective surgeries and 15 emergency surgeries).

Maximum patients undergoing surgery were in the age group of 41-50 years. (43.33%) followed by 30-40 years (30%), 51-60 years (15%) and lastly 61-70 years (11.66%).

Majority of the patients undergoing surgery were males (85%) as compared to only 15% females. Of the 120 patients, 102 were males, while 18 were females.

105 out of 120 cases were elective surgeries as opposed to 15 being emergency cases.

Post-operative wound infection (SSI) was found in 16 patients out of 120 patients with an overall post-operative wound infection rate of 13.33%

Rate of wound infection in elective cases was 9.5% compared to 40% in emergency surgery wounds.

Post-operative wound infection was less in male patients [13 out of 102males (12.7%)] as compared to females [3 out of 18females (16.6%)].

Difference in wound infection rates between the three subgroups by nature of surgery was significant, being greater in Contaminated surgery cases with 40% followed by Clean + Contaminated surgery cases with the rate of 21.73% and least in clean surgery cases with the rate of 8.04% post-operative wound infection.

Significant association was observed between the grade of the surgical wound according to the Southampton System and frequency of SSI. With increasing grades of the wounds, frequency of post-op wound infection decreased from grade I to grade V.

In our study due to severity of cases, longer post-operative stay in hospital was the most important factor contributing to morbidity, being maximum in grade V (30.6 days) compared to grades IV (24.2), III (14.2), II (10.5) and I (10). Also, average hospital stay was more in contaminated surgery (21.3days) as compared to clean surgery (10.5 days).

Most commonly, complications were present in the grade IV and grade V of Southampton grading system. Grade I to II mostly showed fever as the complications whereas there were 2 and 4 cases of burst abdomen in the post operative surgical site infection in the grade IV and Grade V. One death was reported in the grade V Southampton wound grading system.

DISCUSSION

- In present study, total 120 patients were included, which were fulfilling the inclusion criteria. Out of 120 participants, 105 were selected for elective surgery whereas 15 patients underwent emergency surgery.
- The majority of the patients included in the study were in the 41-50 age group category with total 52 patients (43.33%) followed by 36 patients in 30-40 years age group category (30%), 18 patients i.e 15% in 51-60 years and 11.66% i.e 14 patients in 61-70 years age group category.
- In Shaileen Tiwari et al (1), total 3275 operated patients were eligible for analysis, of which 2701 patients had undergone elective surgery whereas 574 had emergency surgeries done.
- In study by Kedar Gorad et al (2), total 140 patients were included, of which 105 underwent elective surgeries whereas 35 had emergency surgeries done.
- Of the total 120 cases, 16 patients had surgical site infection (13.33%), whereas 104 patients (86.66%) did not have any infection. Thus the post operative infection rate was calculated to be 13.33% in the study population

- In Shaileen Tiwari (1) study, SSI was found in 395 patients out of 3275 i.e. 12.06%. It was also found that in surgical site infection was present in 258 patients out 2701 elective surgery cases and in emergency cases it was 137 out of 574 cases.
- Study by Kedar Gorad (2) also observed that out of 140 patients, 14 patients had SSIs with post operative infection rate of 10%. It was found in 9 patients out of 105 elective surgery patients whereas it was present in 5 patients out of 35 who underwent emergency surgery.
- According to the gender distribution, SSIs was slightly lower in males compared to females. With 13 patients out of 102 males had surgical site infection (12.7%) whereas it was present in 3 patients out of 18 females that is 16.6%.
- Shaileen Tiwari (1) study showed that the wound infection rate was more in male patients, that is, 288 out of 2295 (12.55%) compared to 107 female patients out of 980(10.91%).
- In Kedar Gorad (2) study also, SSI was more in males compared to females. 11 out of 112 male (12.55%) were found to have surgical site infection compared to 3 patients out of 28 (10.92%).
- Total 120 surgeries were performed in the study. These were differentiated as clean, clean + contaminated and contaminated. Majority, i.e. 87, were clean surgeries, in which 7 had SSI(8.04%). 23 surgeries were clean + contaminated surgeries where 5 patients were infected (21.73%). Even though minimum cases were of contaminated nature, maximum SSI was found here. With 10 contaminated surgeries, 4 patients (40%) had SSI.
- In Kedar Gorad study (2) also, 31.18% (maximum) SSI was found in contaminated cases (87 patients out of 279 patients). Whereas in clean + contaminated cases the rate was 16.89% with 152 cases out of 900 and in clean surgeries with rate of 7.44% rate, 156 patients out of 2096 were found to have SSI.
- SSIs were also graded according to the Southampton system and showed that out of 16 SSI cases, 6 cases (37.5%) were in Grade I, 4 (25%) were in Grade II, 3 (18.75%) were in Grade III whereas 2 (12.5%) and 1 (6.25%) were in Grade IV and Grade V respectively. It concluded that severity rate of post-op wound infection was increased from grade I to grade V which was found to be similar in clean to contaminated nature of surgery.
- In Shaileen Tiwari study, SSI patients were maximum in grade I (47%) followed by grade II (25.57%), III (10.63%), IV (9.11%) and V (7.34%). It concluded that severity rate of post-operative wound infection was increased from grade I to grade V.
- Hospital stay was analysed. Grade V showed maximum duration of hospital stay with 30.6 days. Grade IV showed 24.2 days. In Grade III average duration of hospital stay was 14.2 days. Grade II had 11 days and Grade I had the least duration of stay of only 10 days.
- Shaileen Tiwari study (1) found that morbidity of Post-operative wound infected patients in terms of average hospital stay was more in grade V (21.72 days) as compare to grade IV (20.48), III (16.21), II (11.56) and I (11.36 days).
- Kedar Gorad study (2) observed that due to severity of the cases, longer post-operative stay was present which was one of the most important contributing factors towards morbidity. It was the most in grade V (30.6 days) as compared to grade IV (24.2), III (14.2), II (10.5) and I (10). It was also noted that the average stay in hospital was more in contaminated nature of surgery (21.33days) as compared to clean nature of surgery (10.5 days).
- Post operative complications were also most commonly seen in those cases which were in Grade IV, V according to Southampton wound grading system. One death was reported in Grade V whereas fever and burst abdomen was noted in grade IV. There was decrease in post operative complications from Grade III to least in Grade I.
- In Shaileen Tiwari study, Complications were more common in grade V and grade IV as compare to grade I of Southampton wound grading system like fever, burst abdomen and death. Mortality was present in only one patient of SSIs, mostly due to associated condition like septicaemia, renal failure, respiratory failure.

- In Kedar Gorad study as well, the number and severity of complications were in sync with the grading; most in grade V and the least in grade I. Complications like fever, peritonitis and burst abdomen were encountered. There was no mortality.

CONCLUSIONS

With increasing grades of wound, the rate of post-op wound infection also increased.

It was found in the present study that there is significant association between nature of surgery and Southampton wound grading system.

It was concluded that there is increase in post operative complications, morbidity and mortality from Grade I to Grade V.

The same conclusion was drawn in the type of surgery, where infection rate was higher in contaminated cases compared to clean cases.

Thereby it can be concluded that the Southampton Wound Grading system can play very important role in evaluation and management of the surgical site infections and can help in improving overall surgical outcome.

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INTRODUCTION BIBLIOGRAPHY

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