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Original Research Paper

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TO STUDY HOST FACTORS RESPONSIBLE FOR SURGICAL SITE INFECTIONS IN EMERGENCY NON TRAUMATIC ABDOMINAL OPERATIONS.

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ABSTRACT **Introduction:** Surgical site infections (SSIs) are defined as infections occurring up to 30 days after surgery. Important host factors include– diabetes mellitus, hypoxemia, hypothermia, leucopenia, nicotine, long term use of steroids or immunosuppressive agents, malnutrition, nares contaminated with Staphylococcus aureus and poor skin hygiene. **Aim:** To determine host factors responsible for surgical site infection in emergency non traumatic abdominal operations. **Methodology:** This was a hospital based observational study carried out in department of general surgery in a tertiary care hospital of north India. A total of 100 patients undergoing emergency non-traumatic abdominal operations were included. **Results:** A total of 17 patients had SSI and S. aureus was the most common organism causing SSI. Age, education and presence of co morbidities were significantly associated with SSI occurrence.

KEYWORDS : Non-traumatic abdomen, SSI, acute abdomen.

INTRODUCTION:

Surgical site infections (SSIs) are defined as infections occurring up to 30 days after surgery (or up to one year after surgery in patients receiving implants) and affecting either the incision or deep tissue at the operation site[1]. The centre for disease control and prevention emphasizes on good patient preparation, aseptic procedure, proper surgical technique and selective antimicrobial prophylaxis to decrease SSI. SSI continues to be a major problem associated to any operative procedure. The problem gets more complicated in case of emergency surgeries, where we have the least scope to prevent SSIs preoperatively due to urgency of surgical intervention.

Important host factors include – diabetes mellitus, hypoxemia, hypothermia, leucopenia, nicotine, long term use of steroids or immunosuppressive agents, malnutrition, nares contaminated with Staphylococcus aureus and poor skin hygiene. Perioperative / environmental factors are operative site shaving, breaks in operative sterile technique, early or delayed initiation of antimicrobial prophylaxis, inadequate intraoperative dosing of antimicrobial prophylaxis, infected or colonized surgical personnel, prolonged hypotension, poor operative room air quality, contaminated operating room instruments or environment and poor wound care postoperatively[2].

Wound infections usually appear between fifth and tenth post-operative day, but they may appear as early as first post-operative day or even years later. The first sign is usually fever, and post-operative fever requires inspection of the wound. The patient may complain of pain at the surgical site. The wound rarely appears severely inflamed, but edema may be obvious because the skin sutures appear tight[3].

The use of antibiotic prophylaxis before surgery has evolved greatly in the last twenty years. It is generally recommended in elective clean surgical procedures using a foreign body and in clean-contaminated procedures that a single dose of cephalosporin, such as cefazolin, be administered intravenously by anesthesia personnel in the operative suit just before incision. Additional doses are generally recommended only when the operation lasts for longer than two to three hours[4].

SSI is the most important cause of morbidity and mortality in the post-operative patients, but it is preventable in most of the cases if proper assessment and appropriate measures are taken by the surgeons, nursing staffs, patients and others in the perioperative period.

AIM:

To determine host factors responsible for surgical site infection in emergency non traumatic abdominal operations.

METHODOLOGY:

This was a hospital-based observational study conducted in Department of Surgery, Dr. RPGMC Kangra at Tanda. Patients undergoing emergency non-traumatic abdominal operations were selected. They were enrolled after obtaining written informed consent from the participants or their legally acceptable representatives.

All patients who fit into inclusion criteria of emergency non traumatic abdominal operation i.e., patients of acute generalized peritonitis, appendicitis and intestinal obstruction were included in the study.

After informed consent patient was subjected to emergency surgery. Operative findings including cause of peritonitis i.e., hollow viscus perforation or ruptured appendix and contents of peritoneal fluid whether serous/purulent/fecal and type of intestinal obstruction dynamic or adynamic, strangulated or gangrenous loops of intestinal obstruction were recorded.

Patient was observed for SSI as per CDC guidelines up to 30 days. In case of SSI, aerobic culture was done. Host factors responsible for SSI were recorded. Each patient was followed up to 30 days after discharge.

Observations:

A total of 100 patients undergoing emergency non-traumatic abdominal operations were included in this study at Department of Surgery, Dr RPGMC Kangra at Tanda. Results of the study are as follows:

In our study, the age of the patients ranged from 19 years to 60 years with a mean age of the patients was 39.65±14.28 years with male predominance of 60%. There were 38% patients who had comorbidities in form of diabetes (22%) followed by underweight (22%), hypertension (15%), obesity (8%), history of pulmonary TB (4%), and history of steroids intake (3%).

In our study, majority of the patients 62/100(62%) were operated after 48 hours of start of symptoms followed by 25%

between 24 - 48 hours, 11% between 12-24 hours and 2% of the patients within 12 hours of onset of symptoms. In our patients, the most common type of surgery was repair of duodenal ulcer perforation in 48% followed by appendicectomy in 33%, repair of ileal perforation in 7%, resection and anastomosis of small intestine for intestinal obstruction in 5% and adhesiolysis in 2% patients. In our study, SSI was present in 17 patients out 100 cases operated for non-traumatic abdominal surgical emergencies

SSI rate was significantly (32%) higher in the patients aged 60-69 years followed by 28% in the age group of 30-39 years.

SSI grade

SSI was determined using Southampton Wound scoring System. In our study, out of 17 patients with SSI, 6/17(35.3%) were of grade V followed by 5/17(29.4%) of grade IV, 4/17(23.5%) of grade III and 2/17(11.8%) of grade II patients.

Table 1: Distribution of patients as per grade of SSI

SSI Grade	Frequency	Percentage
Grade I	0	0
Grade II	2	11.8
Grade III	4	23.5
Grade IV	5	29.4
Grade V	6	35.3

In our study, rate of SSI in illiterate, primary, higher secondary, senior secondary, and graduation and above was 44.4%, 14.7%, 14.4%, 8%, and 0%. We also observed that rate of SSI was association with lower level of education (P=0.008).

Table 2: Association of SSI with different host factors

		SSI Present	SSI Absent	P value
Age group	20-29	2 (19%)	9 (81%)	0.039
	30-39	6 (28%)	16 (72%)	
	40-49	1 (5%)	22 (95%)	
	50-59	1 (5%)	21 (95%)	
	60-69	7 (32%)	15 (68%)	
Education	Illiterate	8 (44.4%)	10 (53.6%)	0.008
	Primary	5 (14.7%)	29 (85.3%)	
	Higher secondary	2 (14.4%)	12 (85.6%)	
	Senior secondary	2 (8%)	23 (92%)	
	Graduation or above	0	9 (100%)	
Co morbidity	Present	15(39%)	23(61%)	<0.001
	Absent	2(32%)	60(96%)	

In relation to co-morbidity, it was observed that 38 patients had co-morbid disorders associated with the main surgical disease and 62 patients had no co-morbid disorder. Among the patients with co-morbid disorders 15 (39 %) developed surgical site infection (SSI), whereas, in the patients without any co-morbidity only 2(32%) developed SSI. The difference of rate of infection between these two groups was very obvious. It was clear that associated co-morbid disorders played a vital role as a host related risk factor for SSI. Moreover, the difference was statistically highly significant (p value<0.001).

DISCUSSION:

In the current study, SSI was found 19% below 30 years of age, 28% in 30-39 age group, 5% each in 40-49 of age group and 50-59 years of age group and 32% above 60 years of age. There was significant difference in different age groups. However, Save et al in a similar study also did not find any co-relation of SSI with age[5].

In our study, majority of the patients (34%) had primary level of education followed by 25% with senior secondary education. Eighteen percent of the patients were illiterate and only 9% were graduate or above. In our study, rate of SSI in illiterate, primary, higher secondary, senior secondary, and graduation and above was 44.4%, 14.7%, 14.4%, 8%, and 0% respectively. We observed that rate of SSI was associated with lower level of education (P=0.008). Our findings are in accordance with a study conducted by Khan et al in Pakistan where majority had no formal education (40%), 21.6% were matriculate, 9.2% had higher education, 8% were graduates, and 1% had post-graduation[6]. They also reported that out of 123 SSI patients, 37% had no formal education, 23.6% were matriculate, 31.6% had higher education, 27.3% were graduates, and 0% had post-graduation. They also reported a significant increase in rate of SSI with low level of education (P=0.02).

We analyzed the co relation of associated comorbidities with SSI and observed that SSI was in 39% of patient who had associated comorbid condition as compared to 32% SSI in those patients who did not have associated comorbid conditions. The high rate of SSI in patients with associated comorbidities was of statistically significant (p< 0.05). In a study by Mekhla and Borle, 12 study subjects had diabetes, and 30 had anemia and hypoalbuminea[7]. The SSI rate for these subjects was 66.6%, 73.3%, and 80%, respectively. These conditions were found to be significantly associated with development of SSI. Wagh et al reported that that 87 (43.5%) patients had comorbid disorders associated with the main surgical disease and 113 (56.5%) patients had no comorbid disorder[8]. In their study, among the patients with co- morbid disorders 38 (43.7%) developed surgical site infection. Whereas, in the patients without any comorbidity only 15 (13.3%) developed SSI. It was clear that associated comorbid disorders played a vital role as a host related risk factor for SSI.

CONCLUSION:

It can be concluded from our observations that low level of education and presence of comorbidities increases the risk of SSI.

REFERENCES

1. Owens CD, Stoessel K. Surgical site infections: epidemiology, microbiology and prevention. J Hosp Infect. 2008;70 Suppl 2:3-10
2. Tang CS, Wan GH. Air quality monitoring of the post-operative recovery room and locations surrounding operating theaters in a medical center in Taiwan. PLoS One. 2013;8:e61093.
3. Doharty, G.M, Way L.W. Current Surgical Diagnosis, 12th ed. Mcgraw Hill, USA; 2006.pp.106-107.
4. Amol Wagh, Gajjam Shrinivas. Risk Factors Responsible to Surgical Site Infections Following Emergency non – Traumatic Exploratory Laparotomy. New Indian J Surg. 2019;10:11-7
5. Save M, Khadilkar R, Shah P, Shiva R. A study of incidence and factors determining the occurrence of surgical site infection in abdominal surgeries. Int Surg J. 2020;7:520-5
6. Khan M, Khalil J, Rooh-ul-Muqim, Zarin M, Touseef Ul Hassan, Ahmed N, et al. Rate and risk factors for surgical site infection at a tertiary care facili
7. Mekhla, Borle FR. Determinants of superficial surgical site infections in abdominal surgeries at a Rural Teaching Hospital in Central India: A prospective study. J Family Med Prim Care. 2019;8:2258-63.
8. Wagh A, Shrinivas G. Risk Factors Responsible to Surgical Site Infections Following Emergency non – Traumatic Exploratory Laparotomy. New Indian J Surg. 2019;10:11-7