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A CLINICAL STUDY OF POST OPERATIVE SURGICAL SITE INFECTION IN PATIENTS OF EMERGENCY LAPAROTOMY

General Surgery

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KEYWORDS

INTRODUCTION

The post-operative wound complications can be defined as any negative outcome as perceived either by the surgeon or by the patient. Surgical site infections and wound dehiscence are well known postoperative complications in abdominal surgery.

In general, complications can be divided into intraoperative and postoperative complications. Major postoperative complications including post-operative pain, nausea, vomiting is common, but some patients develop short and long-term complications like fever, wound infection, wound dehiscence, anastomosis disruption, adhesive bowel obstruction, incisional hernia, etc. Such complications are more frequently seen after emergency surgeries, and may occur in elective procedures also.

More recent studies, however, have disregarded the significance of surgical technique, and others have identified systemic factors such as high age, gender, lifestyle, and coexisting morbidity as playing a significant role in the pathogenesis of these complications. Factors like site of surgery, size and depth of incision, antibiotic prophylaxis, instruments and suture material employed and life style habits like smoking, have significant effect on occurrence of such events.

MATERIAL AND METHODS

This was a hospital based, single centre longitudinal, retrospective and prospective observational study conducted in Department of General Surgery in a teaching public health hospital over a period of 24 months (01/01/2021 to 31/12/2022). Total 50 cases considered for study. Ethical clearance was obtained from ethical committee of our institution before starting the study, including all patients who were operated for emergency laparotomy, both male and female patients who gave informed consent. As such there was no exclusion criteria but, the patients who do not give consent.

Surgical site infection was diagnosed based on the criteria of Centres for Disease Control and Prevention (CDCP) definition of surgical site infection. Wound class was considered as clean, clean- contaminated, contaminated, and dirty according to national research council classification criteria.

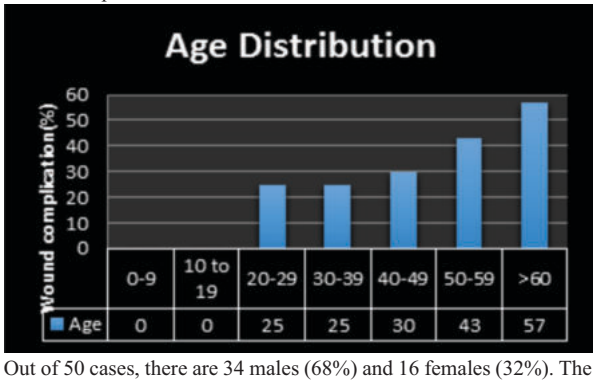
The data of patients who underwent elective or emergency laparotomy was noted on a proforma. A detailed history and clinical examination was conducted. Basic investigations like random blood sugar, complete blood count, urinalysis, serum urea/creatinine, serum electrolytes, chest radiograph, electrocardiograph, hepatitis B and HIV profile and blood grouping and cross matching were done. Abdominal radiographs and ultrasonography was also done where required. Patients who presented with acute abdomen and needed immediate surgery, after resuscitation with IV fluids and supportive treatment, Foley's catheterization and nasogastric intubation, underwent emergency laparotomy. Collection of pus for culture was done maintaining all aseptic precautions and was sent to microbiology laboratory.

Under general/spinal anaesthesia the operative field was prepared with povidone iodine and all the patients were opened through a midline abdominal incision. After surgery patients were observed for any postoperative complication and mortality with predisposing factors. Persistent postoperative fever (>48 hours), post-operative nausea and vomiting and respiratory tract infections were monitored regularly.

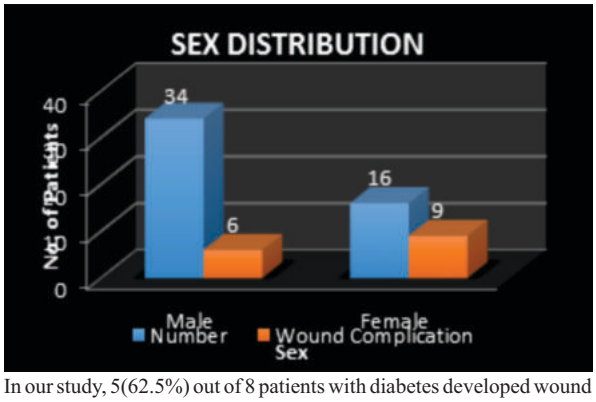
Patients were evaluated for both local and systemic complication. Examination of the wound related complication was started from the second postoperative day and patients having postoperative pyrexia and serosanguinous/serous/pus discharge coming from main wound site were included in this complication. They were further followed up for sequelae like wound gapping and burst abdomen.

OBSERVATION AND RESULTS

In our study, 50% of patients with age more than 50 years had developed wound complication. Patients with age <50 years had wound complication rate of 22%.



Out of 50 cases, there are 34 males (68%) and 16 females (32%). The incidences of wound complication are more in females 43% as compared to male 18%.



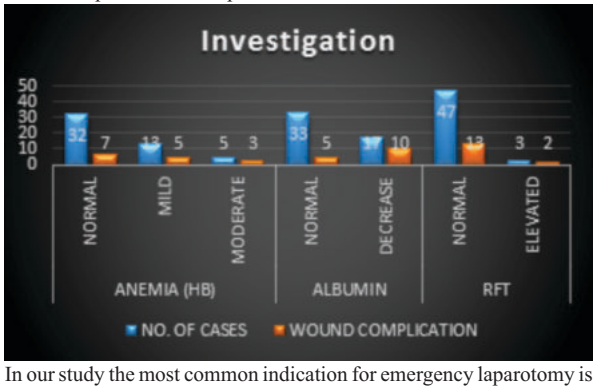
In our study, 5(62.5%) out of 8 patients with diabetes developed wound complication as compared to 10(23.8%) out of 42 non-diabetic patients. There were 6 hypertensive patients in our study from which 3(50%) patients developed wound complication compared to 12(27.3%) in non- hypertensive patients. 5(50%) out of 10 patients with obesity developed wound complication as compared to 10 (25%) in non-obese. 6 (85.7%) out of 7 malnourished patients developed wound complication. 4(33.3%) out of 12 patients with history of previous surgery developed wound complication as compared to patients with no previous surgery i.e. 11(28.9%).

Table - 1: Comorbidity And Wound Complication

ASSOCIATED CONDITION		NO. OF CASES	WC(%)
DIABETES	YES	8	5(62.5)
	NO	42	10(23.8)

HYPERTENSION	YES	6	3(50)
	NO	44	12(27.3)
OBESITY	YES	10	5(50)
	NO	40	10(25)
MALNUTRITION	YES	7	6(85.7)
	NO	43	9(20.9)
H/O SURGERY	YES	12	4(33.3)
	NO	38	11(28.9)

In our study, 8 (44.4%) out of 18 Patient with anaemia had wound complication as compared to 7 (21.8%) non-anaemic patients. There were 10 (58.8%) out of 17 Patients with hypoproteinemia developed wound complication and 2(66.6%) patient with altered renal function had developed wound complication.



In our study the most common indication for emergency laparotomy is hollow viscus perforation with wound complication of 9(39.1%) out of 23 patients followed by small bowel obstruction with wound complication 4(40%) out of 10 patients, then appendicular perforation with wound complication rate 1(33.3), strangulated hernia and others.

Table - 2: Diagnosis And Wound Complication

Diagnosis	No. Of Cases	Wound Complication(%)
Hollow Viscus Perforation	23	9(39.1)
Small Bowel Obstruction	10	4(40)
Appendicular Perforation	3	1(33.3)
Strangulated Hernia	5	1(20)
Blunt Abd. Truma	2	0(0)
Assaulted Stab Injury	4	0(0)
Intussusception	2	0(0)
Congenital Hypertrophic Pyloric Stenosis	1	0(0)
Total	50	15(30)

None of the cases with clean surgery gets wound complication, whereas wound complication with clean contaminated surgery is 3(16.6%) and contaminated surgery has 12(41.3%) of wound complication.

Table - 3: Class Of Sugery And Wound Complication

Class Of Surgery	Emergency Laparotomy	
	No. Of Cases	WC (%)
Clean	3	0(0)
Clean- Contaminated	18	3(16.6)
Contaminated	29	12(41.3)
Total	50	15(30)

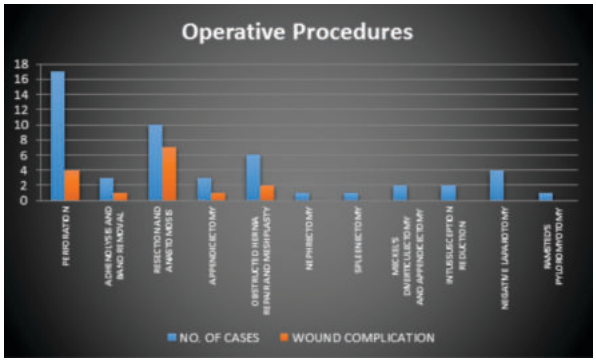
As most of laparotomies are done through midline incision, so wound complications is 14(32.5)

Paramedian incision having wound complication 1(50%) out of 2 cases.

Most common operative procedure done was perforation closure, 17 case out which 4 patients (23.5%) develop wound complication, and in resection and anastomosis, 7(70%) patients out of 10 develop wound complication.

Adhesiolysis for small bowel obstruction have 1(33.3%) out of 3 patients developed wound complication and then appendicectomy have 1(33.3%) out of 3 had wound complication,

Obstructed hernia repair with meshplasty have 2(33.3%) out of 6 patients developed wound complication.



Rate of wound complication was 3(12%) out of 25 when operation was completed within 3hours as compared to 4(36%) out of 11 in those when operation 3-4 hours and 57 %(8 out of 14) when operation took more than 4 hours. Wound complication increase in direct relation with duration of surgery. Operation with more than 4 hour's duration have 57% rate of wound complication.

Post-operative ICU stay due to pulmonary complication have higher incidence of wound complication i.e. 11(68.7%) out of 16 cases.

E. coli is the most common organism 50% and. Other organism which are isolated from the wound are pseudomonas(7.2%) and klebsiella (14.4).

Most common wound complication is wound infection i.e. 12(24%), which later may lead to wound dehiscence and burst abdomen. Then wound dehiscence 7(14%) which is more in emergency case 6(12%) compared to elective case i.e. 1(2%). Burst abdomen is seen only in emergency cases 2(4%), and incisional hernia is 2(4%).

Patients discharged within 10 days were having less (10%) wound complication. Patients discharged in 11-15 days were having more wound complication (17.24%). Whereas patients discharged after 15 days had highest wound complication i.e 81.81%.

14 out of 15 wound complication cases had their infection limited to skin and subcutaneous tissue of which 4 expired.

7 patients developed wound dehiscence, two expired and three were closed secondarily and two got healed with dressing. Out of total 50 cases, 6 patients expired leading to 12% mortality rate.

The cause of death in above 6 patients include- aspiration pneumonitis with ARDS, Hypoxic respiratory failure due to ARDS, pulmonary embolism, septic shock.

DISCUSSION

Patients in the age group of 50-60 years and above 60 years found to have highest incidence of abdominal wound complication. Mean age of the patients affected was 46.7 years.

Incidence of wound complication is more in female as compared to male.

Comorbid conditions like obesity, malnutrition, diabetes, and hypertension are all associated with increased rate of wound complication. In emergency cases, these factors affect even more because there is no scope to build up patient before operating them as in case with elective laparotomy. Patients with previous history of surgery have higher incidence of wound complication.

Incidence of abdominal wound complication is more common in patients with peritonitis due to hollow viscous perforation and in intestinal obstruction than in any other cases.

Overall wound complication rate of 30% in laparotomy cases in this institution is little higher than average of 2.8%-40% in intra-abdominal procedure.78, 79

Contaminated surgeries are associated with very high rates of wound complication as compared to clean and clean-contaminated surgeries. Moreover, emergency surgeries are generally more contaminated than elective ones and leading to higher rate of wound complication in them.

Patients operated with midline incision carried higher risk for wound complication than those operated with paramedian incisions.

Surgical procedures which included resection and anastomosis carried higher incidence of wound complication followed by adhesiolysis and perforation closure.

As the duration of surgery increases, rate of post-operative wound complication increases. Major emergency operations are associated with high rates of wound complication because of longer duration, more tissue dissection, more blood loss, toxic effects of anesthesia and other factors.

Incidence of abdominal wound complications is more common in patients with pulmonary complications, anemia, hypoproteinemia, uncontrolled diabetes, altered renal function and electrolytes E. coli is the most common organism causing post-operative infection in this institute followed by klebsiella.

Mean day of presentation of wound complication was day 9 and it ranges from 5th day to 14th day.

Post-operative stay of patients is increased because of wound complication in emergency surgeries.

Wound infection and partial wound dehiscence were managed by conservatively by antibiotics and daily dressing (healing by secondary intention) and secondary suturing. Complete wound dehiscence was managed by tension suturing.

Prophylactic antibiotics with gram positive and gram negative bacilli coverage are necessary in laparotomies and help to reduce rate of wound infection in both emergency and elective cases. Mortality rate is 12% with patients who develop wound complication.

CONCLUSION

In this study, wound complications observed were wound infection, wound dehiscence, burst abdomen and incisional hernia. Incidence of wound complications are more seen in old age patients and female. Emergency laparotomy have higher incidence of wound complication. Patients with comorbid condition like diabetes, hypertension, obesity and malnutrition have higher incidence of wound complications. Incidence of wound complications are higher in patient with anaemia, hypoproteinemia and altered renal function.

Patients with wound complications have longer duration of post-operative hospital stay are associated with increased morbidity and mortality, may require further hospital admission, and even surgical re-intervention. Laparotomies with longer duration of surgery have more chances of wound complication. Most common organism associated with wound complication is E. coli and others are klebsiella and pseudomonas.In this study, patients with wound infection are treated conservatively with antibiotics and daily dressing, and later secondary closure was done.

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