

# Evaluation of Wound Complications in Elective Abdominal Surgery

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## ABSTRACT

**Introduction:** Postoperative wound complications in elective abdominal surgery are a matter of concern as they alter the end-result of the surgical treatment. Wound infection, wound dehiscence, sinus and fistula formation and incisional hernia are the challenges faced by surgeon. This study was conducted to find out the incidence of wound complications in elective abdominal surgeries.

**Material and Methods:** In this study 110 patients in the age group between 18–50 years, who underwent elective abdominal surgery between Jan. 2014 – Dec. 2015 in Department of Surgery, Muzaffarnagar Medical College and Hospital, Muzaffarnagar, were included. Patients were followed up for 6 months from time of surgery. Wound complications like discharge, dehiscence, sinus, fistula and incisional hernia were noted.

**Results:** Wound complication rate of 10.9% was found in the present study. Purulent discharge was the most common complication (9%) and E.coli was detected in (90%) of such cases. Wound dehiscence occurred in (6.3%) cases with wound infection. 4.5% cases developed incisional hernia later on, all of whom had wound infection in post-operative period. Mean age was higher and Hb levels were lower in patients who developed complications.

**Conclusion:** 10.9% cases had wound complications. Purulent discharge, wound dehiscence and incisional hernia were the commonest complications. Higher mean age and lower mean Hb levels had significant association with occurrence of complications. E.coli was the most commonly detected pathogen indicating that the source of infection was mostly endogenous. These findings suggest that wound complications do occur in elective abdominal surgeries.

**Keywords:** Wound Complications, Elective Abdominal Surgery

## INTRODUCTION

The goal of an operative procedure is an early and complication-free recovery. Post operative pain, nausea, vomiting are 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, but they do occur in elective procedures also, which is a matter of concern.<sup>1</sup> Wound infection, wound dehiscence and incisional hernia remain challenging problems. Preoperative antibiotic prophylaxis, effective and persistent skin antisepsis, avoidance of contamination and better surgical skills are most effective methods to reduce complications. Depending on operative conditions, wound infection rates vary from 2.8% to 40%.<sup>2,3</sup> Factors like site of surgery, size and depth of incision, antibiotic prophylaxis, instruments and suture material being used, wound closure technique, patient related factors like comorbidities and life style habits like smoking, have significant effect on occurrence of such events. Other factors responsible for complications to occur are anemia, hypoproteinemia, diabetes, jaundice, uremia, COPD, steroids use, obesity, advanced

malignancy and advanced age.<sup>4,5</sup> Incidentally, many patients in Western U.P. do not have very satisfactory nutritional status due to poverty and dietary habits. Wound infection is the most important single factor in the development of burst abdomen and incisional hernia.<sup>6</sup> Ancient surgeons recognized that foreign bodies and dead tissue must be removed from wounds.<sup>7</sup> Lister, Semmelweis, Ehrlich, Fleming and Foley realized that bacteria prevented healing and lead to sepsis and death, and their control by asepsis, antisepsis and anti-microbials heralded a new era in wound management.<sup>8</sup>

## MATERIAL AND METHODS

Present study was conducted in the Department of Surgery, Muzaffarnagar Medical College and Hospital, Muzaffarnagar between Jan. 2014 and Dec. 2015 after institutional ethical clearance and informed consent. It was done to find out post-operative wound complications and their associated factors among 110 patients undergoing elective abdominal surgeries. Patients fulfilling following criteria were included:-

**Inclusion criteria:** Age:>18years.-<50 years. Patients undergoing elective abdominal surgery.

**Exclusion criteria:** Age: <18years. - >50years. Patients undergoing emergency abdominal surgery. Patients affected with HIV, Hepatitis-B, Hepatitis-C, Diabetes mellitus.

For the study, demographic details of patients, results of investigations and details of surgical procedures were documented. Patients were followed up during postoperative period and at monthly interval for 6 months. Occurrence of complications like wound discharge, sinus, fistula, wound dehiscence and incisional hernia was noted. Pus was subjected to culture and sensitivity.

## STATISTICAL ANALYSIS

Data thus collected were analysed descriptively using mean and percentages.

## RESULTS

### Patient profile

**Age:** Age of patients was from 18years – 46years with a mean age of 34.64. Maximum no. of patients were in age group 41 – 50 years (n=35,31.8%) and minimum no. of patients were in age group ≤ 20 (n=8, 7.3%).

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S. No.	Investigation	Mean	SD	Minimum	Maximum
1.	Hematological				
	(a) Hb	12.21	1.50	9	15
	(b) TLC (000/cumm)	7.58	1.87	4.50	13.0
2.	Biochemical				
	(a) RBS (mg/dl)	113.0	20.7	75	161
	(b) S.urea	37.0	11.5	15	60
	(c) S.Creatinine	1.09	0.38	0.40	1.90

Table-1: Laboratory results

S. No.	Procedure	No. of cases	Percentage (%)
1.	Appendicectomy (interval)	4	3.6
2.	CBD exploration	10	9.1
3.	Cholecystectomy	24	21.8
4.	Hernioplasty	14	12.7
5.	Laparotomy	18	16.4
6.	Nephrolithotomy	5	4.5
7.	Pyelolithotomy	16	14.5
8.	Supra-pubic cystolithotomy	9	8.2
9.	Others	10	9.1

Table-2: Distribution of patients according to procedure

**Gender:** There were n=46, 41.8% Male and n=64, 58.2% Female patients. Male – Female ratio was 1:1.4.

Wound discharge n=12, 10.8% was the commonest complication. It was purulent n=10, 9.1% in majority of such cases and was serous in n= 2, 1.8% cases. Partial wound dehiscence occurred in n= 7, 6.3% cases, all were infected wounds. Infection was treated with antibiotics according to sensitivity results and wounds gradually healed. No case of Burst Abdomen occurred. Incisional hernia was detected in n=5,4.5% cases during the follow-up period.

Mean age of patients who had complications was significantly higher( 40.4 ± 6.4) than those who did not have them. Mean Hb levels of patients with wound complications were significantly lower(10.9±1.2gm% than in patients without complications. There was higher number of complications following laparotomy n=3, cholecystectomy n=4, CBD exploration n=2 than following hernia n=2, appendicectomy n=1. All patients who developed incisional hernia had partial wound dehiscence and infection in post-operative period (table1-3).

## DISCUSSION

Post-operative wound complications alter the outcome of surgery, hence they are of great importance to a surgeon. They complicate the post-operative course of a significant proportion of abdominal surgical patients, are associated with excessive health-care costs, increased morbidity and mortality, and may require further hospital admissions, IV anti-biotics and even surgical re-intervention.<sup>10</sup> Despite great progress made during recent times in the perioperative care, abdominal surgeries are sometimes marked by wound complications ranging from 2.8% - 40% depending on various factors.<sup>2,3</sup>

Unlike emergency surgeries, elective surgeries have much more scope for flexibility. However, due to multiple factors involved in wound complications, it is difficult to control each and every variable. Hence there is possibility of wound complications in spite of best care taken.

Present study was undertaken to find out post-op complications

in elective abdominal surgeries and to find out factors responsible for them. A total 110 patients were included in this study. Patients <18 years and >50 years, immunocompromised patients, patients having diseases such as HIV infection, Hepatitis-B, Hepatitis-C and Diabetes mellitus were excluded from this study to rule out there confounding role in development of complications.<sup>11-13</sup> Distribution of patients in age groups 21-30 years, 31-40 years and 41-50 years was ≥30%. Majority of patients (58.2%) were female. Hb levels ≤10gm% were seen in 20 patients, however severe anemia (Hb<8gm%) was not observed. Cholecystectomy and laparotomy were the most common operations done (n=24, 21.8%, n=18, 16.4%). Despite ensuring good patient characteristics and best possible peri-operative care, wound complications were observed in 12(10.9%) cases. Wound discharge was most common complication found in 12 case and 10 cases were found to be positive for infective pathogens. Rate of surgical site infection in this study was 9.1% (10/110), which is in accordance with 13.7% rate reported from other centers in India. However, they are much higher than the bench mark set by Cruse and Ford<sup>14</sup> who reported 1-2% infection rate in elective surgeries in Canada. Various studies have reported infection rates ranging from 5% to 19%. Ahmed et al (2007)<sup>15</sup> reported overall infection rate of 11% while clean contaminated cases had 19.4% infection rate. Sahu et al (2011)<sup>16</sup> reported overall infection rate of 5%, while Satyanarayana et al (2011)<sup>17</sup> reported a 7.6% infection rate in elective surgeries. Saxena et al (2013)<sup>18</sup> observed an infection rate of 14.33%. Our observation is 9.1% infection rate.

Sahu et al<sup>16</sup> reported E.coli in 50% of infected wounds. Studies by Classen et al (1992)<sup>19</sup> and Giacometti et al (2000)<sup>20</sup> reported monomicrobial and polymicrobial wound infections respectively. In our study, E.coli was found to be the infective pathogen in 90% cases suggesting endogenous source. S. aureus was found in minority cases (10%). We found monomicrobial infections in this study.

In present study, n=7, 6.3% patients developed partial wound dehiscence along with infection. n=5, 4.5%, such cases developed incisional hernia later on. These observations are in consonance with observations of Willson and Clark (2003)<sup>6</sup>, Ashraf et al (2009)<sup>21</sup> and Murtaza et al (2010)<sup>1</sup> who concluded that the wound infection is the most important single factor in the development of incisional hernia. Studies on wound dehiscence reported similar rates at Indian centers and include those by Srivastava et al (2004)<sup>22</sup> reporting 9% rate, Parmar et al (2009)<sup>23</sup> – 5.6% rate and Rana et al (2013)<sup>24</sup> - 9%rate.

Higher age of patient, lower Hb levels and type of procedure had significant influence on occurrence of wound complications. A number of researchers have also found similar association<sup>3-5,10,11</sup>. Findings in present study suggest that even in a well controlled

S. No.	Outcome	No. of cases	Percentage %
1.	Wound discharge Purulent Purulent Serous	12 Day 3 - 3 cases, Day 5 - 7 cases, Day 8 - 2 cases.	10.8
	Culture positive	10	9.1
	i. E.coli	9	90
	ii. S.aureus	1	10
2.	Wound dehiscence - Partial  Burst abdomen	7 Day 5 – 2 cases, Day 9 – 4 cases, Day 12– 1 cases. 0	6.3  0
	Culture positive	7	100
	Culture negative	0	0
3.	Sinus formation	2	1.8
4.	Incisional hernia	5	4.5

**Table-3:** Findings in post-operative and follow up period

environment, wound complications do occur in elective abdominal surgeries. Prior knowledge of risk factors helps in predicting, and reducing to certain extent, the incidence of such complications by careful case selection, improving Hb levels before surgery, adequate prophylaxis and following better surgical practices.

## CONCLUSION

Results of the present study showed a wound complication rate of 10.9%, in the form of wound discharge. Purulent discharge was most common (9.1%) with 90% such cases showing E.coli as causative pathogen. Wound dehiscence occurred in 6.3% cases, all such cases had infection of the wound and 71.43% of these cases resulted in incisional hernia. Incisional hernia had an occurrence rate of 4.5%. Mean age of patients was higher (40.4±6.44years) and mean Hb level was lower (10.9±1.2gm%) in patients who developed wound complications. More patients developed complications who had laparotomy, cholecystectomy and CBD exploration. These findings suggest that wound complications do occur in elective abdominal surgeries. These can be reduced to a certain extent by careful case selection, improving Hb levels prior to surgery, using adequate prophylaxis and better surgical practices.

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