

# A Prospective Study of 60 Cases of Emergency Exploratory Laparotomy with Incidence of Postoperative Wound Dehiscence, Its Etiology and Management.

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## ABSTRACT

**Background:** Surgical site infection and wound dehiscence are the most common postoperative complications of emergency abdominal surgery in class 3 contaminated /class4 dirty of wound classification. Greatly increasing the mortality as well as morbidity of patients, in addition to prolonging hospital stay. Factors affecting the SSI are emergency surgery, age, sex, anaemia, nutrition, co-morbidities. **Methods:** This is a 6 months prospective study carried on 60 patients of more than 18 years age operated in department of surgery, Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh after permission with institutional ethical committee. **Results:** Incidence rates of SSI were 53.3% and of wound dehiscence 43.3% with male to female ratio 4:1 and most common age group being 41-50 years followed by 31-40 years. Most common associated illness was respiratory diseases, anaemia and malnutrition. SSI and wound dehiscence were mainly occurred 5th to 7th post-operative day presented as erythema, pain and pus discharge. Wound swab for culture & sensitivity were sent and debridement done. Staphylococcus and Klebsiella were commonly causative bacteria and SSI best controlled by injection gentamycin, meropenem, piperacillin+tazobactam and colistin. After control of infection wound were allowed to heal (1) conservatively with dressing and abdominal binder or (2) with delayed suturing. **Conclusion:** Although incidence of postoperative wound dehiscence in emergency exploratory laparotomy was high as 43.3% but this can be decreased by proper planned preoperative patient preparation, adequate antibiotic prophylaxis and better surgical expertise.

**Keywords:** Antibiotics, Delayed suturing, Emergency Exploratory Laparotomy, Surgical site infection (SSI), Wound dehiscence

## INTRODUCTION

Wound dehiscence is one among the most dreaded complication faced by surgeon. Following surgery most surgical wounds heal naturally, but surgical site infection and wound dehiscence are well known postoperative complications. The USA Centre for disease control (CDC) states that only infection occurring within 30 days of surgery (or within 1 year in case of implants) should be classified as Surgical Site Infection (SSI).<sup>[1]</sup> It is irrespective of whether micro-organism can be cultured. SSI is classified into 3 groups superficial, deep and organ/space SSI. A common classification of surgical wounds is by their potential for infection:

- Clean wounds are those related to elective operations performed under sterile conditions with access through non-infected or non-contaminated skin.

There is no breach of the gastrointestinal, genitourinary, biliary or respiratory tract.

- Clean-contaminated wounds are those in which emergency /urgent surgery is undertaken that would otherwise be described as clean. There is elective opening of gastrointestinal, biliary, genitourinary or respiratory tract with minimal spillage.
- Contaminated surgery is that in which non-purulent inflammation is encountered. There may be gross spillage from the gastrointestinal tract, or entry into the biliary or genitourinary tract in the presence of infected bile or urine. Open fractures, penetrating injuries less than 4 hours old and bite injuries are contaminated wounds.
- Dirty wounds occur when an operation is carried out in the presence of pus such as abscess, with preoperative perforation of respiratory, gastrointestinal, biliary and genitourinary tract, or when there is penetrating trauma over 4 hours old.

Infection is one of the most common complications of wound healing. Signs of cellulitis are erythema and discharge, which may become purulent.

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Staphylococci and streptococci are the usual organism but gut flora may be involved or opportunistic infection in immunocompromised patients.

Vertical abdominal wounds (midline incision) are liable to stretch due to the tension from abdominal distension, trunk movements and coughing. The powerful forces of coughing, vomiting and distension. Linked with inadequate incorporation of the layers of the rectus sheath can give rise to wound dehiscence (burst abdomen).<sup>[2]</sup> The burst may be heralded by a pink discharge of serous peritoneal fluid, indicating disruption of the deeper layers, before skin gives way.

The rates in contaminated surgeries vary from 11.4% to 66.66% and in dirty surgeries from 7.1% to 80%.<sup>[3]</sup> Emergency laparotomy for Contaminated class 2/ dirty class 3 of wound classification (perforation peritonitis, intestinal obstruction and appendicular pathology) resulted in additional exposure of surgical site to endogenous microflora and had high rates of infection (10-20%). A wound infection is leading and troublesome cause of wound dehiscence. Wound dehiscence is separation of fascial layers before cutaneous healing. It may be partial or complete disruption of wound closure with or without protrusion and evisceration of abdominal contents. The severity of these complications embraces mild cases needing local wound debridement to serious cases require reoperations. These complications requires repeated pus culture & sensitivities, prolonged antibiotic therapy, prolong hospital stay period, and finally substantial increase of cost of health care.<sup>[4]</sup>

## MATERIALS AND METHODS

The study was conducted in the postgraduate Department of Surgery in collaboration with department of Microbiology of Rohilkhand Medical College and Hospital, Bareilly, Uttar Pradesh, India, after formal approval from institutional ethical committee. This study is of prospective study in duration of January 2018 to June 2018

### Inclusion Criteria

- All patients admitted in the department of surgery for emergency abdominal surgeries in >18 years of age.

### Exclusion Criteria

- Patients below <18 years of age.
- Critically ill patients, not fit for surgery.
- Patients were expired in their immediate post operative period.

**Table 3: Perforation peritonitis [class 4(dirty)] was main indication of emergency laparotomy in 45 patients (75%).**

Diagnosis	Procedure	Total No. Of Cases	Percentage%
Perforation Peritonitis	Exploratory Laparotomy & Perforation Repair	45	75%
Intestinal Obstruction	Exploratory Laparotomy & Resection -Anastomosis	07	12%
Appendicular Pathology	Exploratory Laparotomy & Appendicectomy	02	3%
Obstructed Abdominal(Ventral) Hernia	Exploratory Laparotomy & Hernioplasty	06	10%

## Evaluation of Wound

The wounds of patients were evaluated using the ASEPSIS grading scale till patient discharged. ASEPSIS is an acronym for "Additional treatment; Serous discharge; Erythema; Purulent exudates; Separation of deep tissues; Isolation of bacteria; Stay as inpatient prolonged over 14 days.

Wound characteristic	Proportion of wound affected					
	0	<20	20-39	40-59	60-79	>80
Serous exudates	0	1	2	3	4	5
Erythema	0	1	2	3	4	5
Purulent exudate	0	2	4	6	8	10
Separation of deep tissues	0	2	4	6	8	10
Points are scored for daily wound inspection						
Criterion	Points					
Additional treatment						
Antibiotics	10					
Drainage of pus under local anesthesia	5					
Debridement of wound (general anesthesia)	10					
Serous discharge*	Daily 0-5					
Erythema*	Daily 0-5					
Purulent exudate*	Daily 0-5					
Separation of deep tissue *	Daily 0-5					
Isolation of bacteria	10					
Stay as inpatient prolonged over 14 days	5					

\*Given score only on 5 of 7 days. Highest weekly score used. Category of infection. Total score 0-10: Satisfactory healing, 11-20: Disturbance of healing, 20-30: Minor wound infection, 31-40: Moderate wound infection, >40: Severe wound infection (adapted from Wilson AP et al., Lancet 19861)

## RESULTS

**Table 1: This shows that most affected age group was 31-40 years contributing 32%, followed by 41-50 years 23%. But table 4 shows that out 19 patients of 31-40 age group 13 discharged without complication and 6 develop SSI. 9 patients out of 14 of age group 41-50 had SSI most affected group.**

Age Group (Years)	No. Of Cases	Percentage %
18-30	12	20
31-40	19	32
41-50	14	23
51-60	08	13
61-70	07	12
Total	60	100

**Table 2: This shows males were outnumbered females with 4:1 ratio.**

Sex Distribution	No. Of Cases	Percentage %
Male	48	80
Female	12	20
Total	60	100

**Table 4:** This shows 28 patients out of 60 (47%) were discharged with uneventful postoperative period in 10-14 days stay. 32 out of 60 (53%) patients developed SSI. 25 out 32 patients with SSI further had wound dehiscence partial and complete both type, superficial and deep group, none developed evisceration type. 17 patients of wound dehiscence had delayed suturing under general/regional/local anaesthesia.

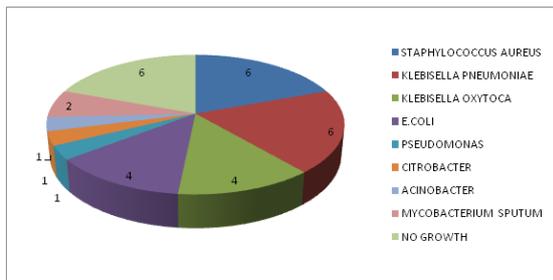
Age Group	Uneventful Post Operative Period	Surgical Site Infection	Wound Dehiscence	Conservative Treatment	Secondary Suturing
18-30	06	06	03	04	02
31-40	13	06	05	03	03
41-50	05	09	07	04	05
51-60	02	07	06	02	05
61-70	02	04	04	02	02
Total	28	32	25	15	17

**Table 5:** This shows that respiratory diseases mainly associated illness, patients were diagnosed case of active pulmonary tuberculosis, pleural effusion and chronic obstructive airway disease. Antitubercular (ATT) treatment as per chest & T.B. specialist's advice was added. Anaemia treated with Blood Transfusions as per requirement.

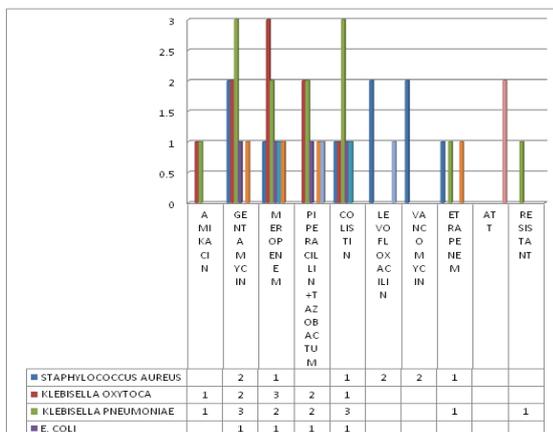
Co-Morbidities	No Of Cases
Respiratory Diseases	12
Anaemia & Malnutrition	8
Abdominal T.B.	2
Universal Precaution	5
Typhoid Disease	5

**Table 6:** 31+5=36 patients discharged within 20days of stay period, 18 patients had prolonged stay to 30 days. 5 patients stayed to 40 days, due to persistent SSI. 1 patient stayed for 45 days, SSI and wound dehiscence at midline and ileostomy closure site.

Stay Period In Days	No. (Cases)
1-10	05
11-20	31
21-30	18
31-40	05
>40	01
Total	60



**Figure 1: Bacteria Cultured**



**Figure 2: Antibiotic Sensitivity**

[Figure 1 & Figure 2] shows Staphylococcus aureus and Klebsiella pneumoniae were found common causative organism in culture & sensitive to injection gentamycin, injection meropenem, injection piperacillin+ tazobactam and injection colistin.



**Figure 3: Erythema & SSSI**



**Figure 4: Infected wound & Deep SSI**



Figure 5: Complete, Infected Deep wound



Figure 8: Healing by secondary intention



Figure 6: Delayed sutured wound after control of SSI



Figure 7: Partial, SSSI

## DISCUSSION

Postoperative wound dehiscence is a multifactorial problem in which local and systemic factors involved. Emergency surgery for higher class 3/4 of wounds (perforation peritonitis), SSI, midline incision (length), suturing material, patient's nutritional status, anaemia, immunity (universal precaution), associated respiratory diseases were considerable factors in this study.

This study showed maximum incidence of wound dehiscence in the age group of 41-50 years as shown in study done by Wolff and Maingot.<sup>[5,15]</sup> Abdominal wound dehiscence was more commonly in patients operated for perforation peritonitis similar to study done in patients having operation with higher wound class at Western, Reserve university Cleveland veterans Affairs Medical centre USA.<sup>[6]</sup> 45 patients out of 60 (75%) had emergency laparotomy for perforation peritonitis,<sup>[7]</sup> for intestinal obstruction, 6 for obstructed ventral hernia, and 2 for appendicular pathology. Peptic perforation was leading one followed by ileal perforation cause of laparotomy of contaminated and dirty wounds and these findings were consistent with study done by Rajender Singh jhobta<sup>[7]</sup> where they found duodenum as commonest site of gastrointestinal perforation followed by typhoid, tubercular and trauma.<sup>32</sup> (53%) patients developed SSI clinically presented as erythema, pus discharge and pain at 5-7th postoperative day. Wound swab for culture & sensitivity sent, minor debridement for removal of slough and decreasing bacterial load done under local anaesthesia. Antibiotics according to bacteria cultured and its sensitivity started. Injection gentamycin, inj. amikacin, inj. Meropenem, inj. Piperacillin+tazobactam and inj. Colistin were more effective

against culture positive Staphylococcus aureus, Klebsiella pneumonia, Klebsiella oxytoca, E.coli, pseudomonas. 25/32 of SSI converted to wound dehiscence, 15/32 treated conservatively with dressing and healed with secondary intention while 17/32 underwent delayed suturing.

Knowly et al., shows staphylococcus aureus is predominant microorganism isolated in 45.6%. In our study staphylococcus aureus and Klebsiella pneumoniae isolated equally 19% each individually.<sup>[8]</sup>

Normally patients in our institution discharged in 10-14th postoperative period, in our study 31 patients discharged 11-20th day, 18 in 21-30th day, 5 in 31-40th day and 1 patient at 45th day because of SSI and wound dehiscence.

## CONCLUSION

In spite of (1) proper planned preoperative preparation and resuscitation in short time as with i/v fluids, i/v antibiotics on empirical basis, anti-inflammatory drugs, vasopressor drugs if required, and appropriate treatment of anaemia by blood transfusion, nebulisation and control of diabetes (2) followed by per-operative paint & draping in aseptic norms, (3) appropriate length of midline incision, (4) thorough peritoneal lavage, (5) definite surgical treatment e.g. repair of perforation, resection & anastomosis, and appendectomy, (6) abdominal wound closure with proline suture, (7) maintaining haemostasis (8) skin suturing with staples/ethilon, Surgical site infection and wound dehiscence have high incidence {53.3% & 43.3% respectively} in postoperative higher wound class 3/4 in emergency setup

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