

# EMERGENCY INCISIONAL HERNIA REPAIR IN TERMS OF MORTALITY, MORBIDITY AND SURGICAL OUTCOMES.

Ayush Raj<sup>a</sup>, Ankit Raj<sup>a</sup>, Sakshi Singh<sup>a</sup>, Yasir Tajdar<sup>a,\*</sup>, Vibhuti Bhushan<sup>b</sup>, Pawan Kumar Jha<sup>a</sup>, Mohal Kumar<sup>b</sup>

<sup>a</sup>Department of General Surgery, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India.

<sup>b</sup>Department of Surgery, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India.

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## Abstract

### Background:

Emergency hernia repair is technically very challenging and involves very high risk of post operative infectious complications in case of incarcerated incisional hernias in association with bowel obstruction which is due to its edematous, inflammatory, and friable tissues. The study's prime objective was to prospectively assess the wound-related morbidity in using permanent prosthetic mesh in an emergency laparotomy of an incarcerated incisional hernia with a corresponding intestinal obstruction. We also go over a novel method of leaving the mesh exposed for formation of granulation tissue.

### Methods:

Emergency laparotomy was performed on sixty patients with incarcerated incisional hernias associated with intestinal obstructions to place permanent prosthetic mesh. In fifty three patients hernia was repaired and the wound was sutured, but in seven individuals, it was left open to granulate.

### Results:

9 patients had superficial surgical site infections, 3 had deep wound infection, and 2 patients suffered from cellulitis which was seen in the group of patients where wound was closed primarily. These patients underwent both wound debridement and antibiotics were administered. 2 patient required the removal of the mesh placed. In the group of patients who had their surgical wounds left exposed, there were no infections. On the 7<sup>th</sup> postoperative day, a patient in this group passed away from septicemia.

### Conclusion:

In obstructed incisional hernia patient who was treated in emergency with permanent prosthetic mesh the wound infection was quite high on a contaminated field.

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## 1. INTRODUCTION

In all the abdominal surgeries incisional hernias complication is up to 20%. [1] it is technically very difficult to prevent post operative infectious complications in patients operated on incarcerated in-

cisional hernia associated with bowel obstruction, because of edematous, inflamed and friable tissues with occasional need for concurrent bowel resection [2]. A huge number of literature states the use of prosthetic mesh in clean operative fields. In contrast utilization of prosthetic mesh in settings has been seldom described [3]. There is a believe that permanent prosthetic materials such as mesh for incisional hernia repair should not be

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\* Corresponding author.

Email address: dryasirtajdar@gmail.com (Yasir Tajdar)

used in the setting of gross contamination, which includes emergency presentation of incarcerated incisional hernia with associated bowel obstruction as a subset which may or may not require resection, as the risk of infection is as high as (10- 36) % [4]. Post hernia repair the recurrence rate of incisional hernia is high between (10 - 50) %. There is a sharp decrease in the recurrence rate if prosthesis is used which is between 3% - 18% [5-7]. Use of mesh as a prosthesis has the risk of local complications such as wound infection. Even after knowing the risk of complication after usage of prosthetic mesh in incarcerated obstructed incisional hernia sometimes it becomes obligatory to place prosthetic mesh because of the size of the wound or weak abdominal musculature or anatomy. So its an open question whether to use non-absorbable mesh with obstructed or gangrenous bowel in potentially or truly infected operating fields [3].

Haskins IN et al [8] concluded in his study that placement of mesh can be safely performed in patients with obstructed incisional hernia without an increase in 30-day wound complication, mesh-related morbidity, or mortality. Ceresoli M et al [9] stated that there is increase in mortality and morbidity in emergency surgery for complicated hernias in elderly patients. Rate of complication and mortality is also affected by comorbidity associated with the patient. Alkhatib H et al [10] stated transversus abdominis release (TAR) was associated with increased wound morbidity requiring procedural interventions and reoperations. De Simone B et al [11] showed that the use of biological prosthetic mesh in contaminated surgical field in emergency laparotomy is safe with good surgical outcomes in patients at high risk to present wound infection and hernia recurrence. Proper surgical techniques for the repair of incisional hernia prevents recurrence rate and helps to decrease wound complications. This study's prime objective was to evaluate post operative wound-related morbidity after using non absorbable prosthetic mesh in urgent repair of an incarcerated incisional hernia in association with intestinal obstruction.

## AIMS

1. To study surgical profile of Emergency her-  
nia repair
2. To find out outcomes in terms of mortality,  
morbidity in cases of emergency hernia repair
3. To compare outcomes related to mesh re-  
pair, non-mesh repair and other forms of treat-  
ment given in these cases.

## 2. MATERIAL AND METHODS

This study was a prospective study carried over a period of 1 year on 60 patients admitted in IGIMS, Patna presenting with incarcerated inci-  
sional hernia with associated bowel obstruction. Such patients were studied in detail clinically and investigated under the following parameters-

- 1) Age
- 2) Sex
- 3) Duration of symptoms,
- 4) Past medical history- presence of coexisting  
diseases such as cardiopulmonary disease, hyper-  
tension, diabetes.
- 5) Contents of the hernial sac
- 6) Operative technique and details
- 7) Postoperative mesh related morbidity in  
terms of wound related outcome and mortality

Inclusion criteria: All patients presenting with incarcerated incisional hernia with associated bowel obstruction.

Exclusion criteria:

- Patients presenting with lump other than in-  
cisional hernia,
- Pregnant females,
- Patients presenting with gangrenous bowel in  
intraoperative finding,
- Patients with associated ascites,
- Patients who were Covid positive,
- Patients who were Hepatitis B, Hepatitis C  
or HIV positive.

Two groups were made based on the way wound healed. In one group, the lesion was closed pri-  
marily in layers following primary hernia surgery by a ninety gram prolene mesh which was placed over the anterior rectus sheath (normal onlay pro-  
cedure). In other group, the wound was left open after placement of mesh over the primarily re-  
paired defect by onlay technique. Daily dressings

were applied to the wound up to complete neoeptithilization, or secondary intention healing. All patients were given a triple dose of kefzole, augmentin, and ceftriaxone as prophylactic antibiotics. Antibiotics were administered for 5 days in strangulation patients where intestinal resection was done.

SPSS version 17 was utilised to analyse the data. Patient demographics were displayed as mean ( $\pm$ SD) for continuous variables and percentages for discrete variables.

### 3. RESULTS

Sample size selected was sixty patients who had undergone emergency surgery for an incarcerated incisional hernia with a bowel obstruction associated with it where permanent prosthetic mesh were used. Wound was left open in six patient after repair of hernia for wound to granulate and in fifty four patients wound was closed after mesh hernioplasty. The patient characteristics are displayed in two groups in Table 1.

The average duration of the operation was 160 minutes (SD: 34). 19 individuals (31.66%) had minor hernias (< 5 cm). Out of 60 patients, 10 individuals had many problems, and 7 patients had a single issue. 16 patients (26.66%) had moderate hernias (5-10 cm defect). 5 of these 7 patients had numerous flaws in addition to a single abnormality. 7 individuals (11.66%) had significant hernias (more than 10 cm defect). The male: female ratio in this study was 1:5.

Three patients had single defect, and 2 patients had several defects whereas twenty four patients data were missing. The average duration of stay for all patient in the hospital was 4.6 days (SD: 2.3 days). In comparison to the patients whose wounds were mostly closed (mean  $4.2 \pm 2.1$  days), the group of patients whose wounds were left open stayed longer (mean  $5.4 \pm 2.2$  days). However, difference in the length of hospital stays between the two groups were negligible (p value 0.846). After the patient was discharged from the hospital wound was being inspected and managed at regular intervals in OPD as the patient was asked

to come for follow up at regular interval. The average follow-up time was 3.8 months.

Wound infection was classified as any prescription of antibiotics and/or skin opening with or without debridement. No infection was seen in the group of patients where the wound was left open post surgery. 19 out of 53 patients (35.84%) in the other group with primary skin closure experienced surgical wound problems. On the basis of the requirement for concomitant bowel resection, this group was further segmented. Sixteen patients in this group needed concomitant bowel resection, compared to 37 who did not. Thirteen patients (24.52%) who did not have concurrent bowel resection experienced wound problems. Eight of these patients required wound debridement due to a superficial SSIs.

### 4. DISCUSSION

The component required for hernia repair in contaminated case is removal of contamination and restoration of the abdominal wall. These procedures are challenging and quiet often end in complications that frustrates both the surgeon and the patient [1]. According to the Altemeier classification, colonoscopies are considered polluted and infected (class 3-4) procedures. Mesh has been highly discouraged in possibly contaminated processes as a result [7].

Morris et al. [8] advised that mesh should not be used if gut is found to be open during hernia repair. The cause for abandoning the randomised control trial by Korenkov et al. [9] was because of higher discomfort and more severe wound infections after mesh repair, underscoring the danger of utilising mesh in hernia repair. Temudom et al. [10] in a series of fifty difficult prosthetic large ventral hernia repairs noted that the mesh had to be removed in 2 patients who had concurrent bowel surgery. Intestinal resection was always given priority and delaying the repair of hernia for the second sitting of surgery [9, 10].

In this study, the overall infection rate was 28.3%, which is greater than the earlier research works. Kelly et al. [3] in a series of urgent and elective incisional hernia procedures showed in-

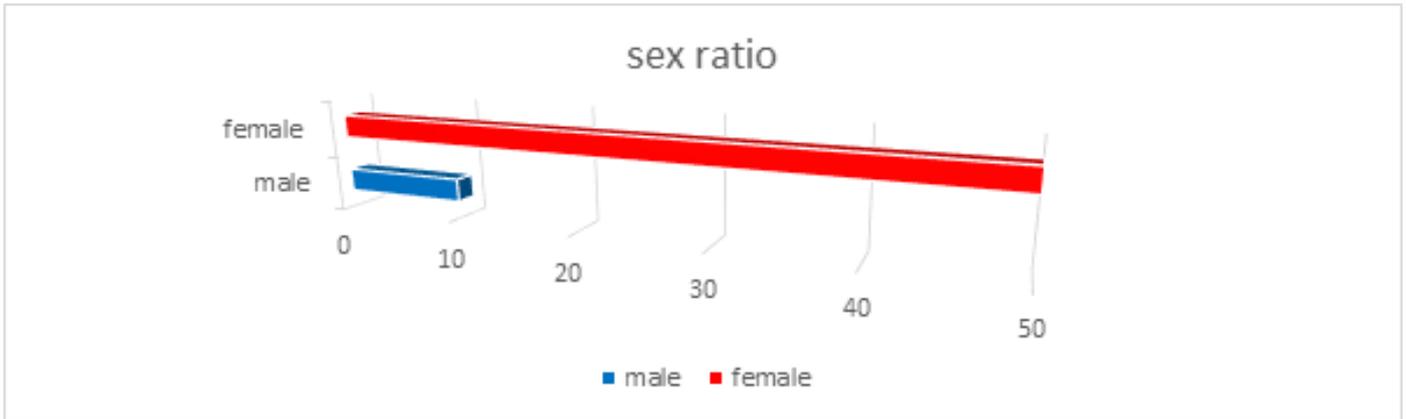


Figure 1: The patient characteristics

Table 1: Patient related factors in both groups

Factors	Groups	Wound closed		Wound left open	
		Bowel resection	No bowel resection	Bowel resection	No bowel resection
Age	Mean	52.6 ± 17	53.4 ± 14.5	62 ± 5.7	55.6 ± 11
Gender	Female	11	35	2	2
	Male	5	2	0	3
Body mass index	<30	8	13	0	2
	>30	7	25	3	1
Diabetes mellitus	Yes	2	12	1	0
Recurrent hernia	Yes	6	10	2	1
Hospital stays	Mean	6.3 ± 2.5	3 ± 2.5	8 ± 2.4	5.2 ± 1.9
Wound infection	Yes	6	13	0	0
Recurrence	Yes	0	4	0	0

fection rate of 21%. According to Alaedeen et al. [1] and Ahmed et al. [12] had infection rate of 21% and 4%, respectively. The unusual patient population in this study is to be blamed for the greater infection rate than normal. We conducted our study only on a subset of incisional hernia repair cases that had to undergo emergency surgery due to a bowel obstruction and had a higher risk of post-operative complications [2]. The end result of these cases were not satisfactory. 10% infection rates were seen by Davies et colleagues [2] in patients requiring urgent surgery for all abdominal hernias. The subset of patients included in

our analysis was not the subject of any of the investigations previously mentioned. Most of these studies have chosen contaminated cases as the majority of their subjects.

Onlay, sublay (retromuscular or extrafascial), or underlay (intraperitoneal or subfascial) are various techniques for mesh placement that have been studied in light of the high infection rates. It has been suggested that the Rives-Stoppa approach that is retro muscular has low infection rates, ranging between 2% - 17% [13]. However, the majority of these studies weren't solely concerned with doing urgent hernia repairs on pris-

oners. The longer mean duration of operation time (131 minutes primary, 141 minutes mesh, and 231 minutes Stoppa) in a study by Veillette et al [14] further demonstrates how time-consuming this treatment is.

Majority of patients presenting with incarcerated obstructed incisional hernias were hemodynamically unstable. Therefore, Stoppa approach being time consuming becomes uncertain in treating such individuals. Additionally, the requirement for concomitant bowel resection affects the infection rate. For patients who also required concomitant bowel resection, infection rate was 37.5%, and for those who do not, it is 35.13% [15]. An obstructed bowel loop is an important risk factor for wound infection because it is hypothesised that the high wound infection rate in patients without intestinal resection is attributable to bacterial translocation. However, with a significant defect and potentially polluted field in the operating room, the option is to utilise absorbable mesh for temporary closure and perform a permanent repair as a second planned procedure due to the high infection rates.

Seven participants in this study had their wounds left exposed to heal by secondary intention with granulation tissue. It was decided because of the dangerously polluted operating room, which made inserting prosthetic mesh a risky option. Depending on the size of the deformity, the wounds needed 4-5 months to heal after surgery with secondary intention. Once granulation took place, these patients were instructed to carry on with their regular activities and perform once or twice daily self-wound care using sterilized gauze. Patients were observed at IGIMS surgery OPD once a month until the incision had fully healed. No patient presented with discharging sinus as the complication of surgery so far.

## 5. CONCLUSION.

Due to the selected sample size it is difficult to reach to a particular conclusion so that it becomes justifiable for applying the knowledge on other patients. As per our research, mesh repair of incarcerated obstructed incisional hernias has

a significant prevalence of wound infection. The patients undergoing intestinal surgeries are more prone for surgical site infection. The use of mesh should be avoided in contaminated cases of incisional hernia and we should look out for other options to close the defect such as herniorrhaphy.

## 6. PUBLISHER DETAILS

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## Author biography

**Ayush Raj** Senior Resident, Department of General Surgery, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India.

**Ankit Raj** Senior Resident, Department of General Surgery, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India

**Sakshi Singh** Senior Resident, Department of General Surgery, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India

**Yasir Tajdar** Senior Resident, Department of General Surgery, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India

**Vibhuti Bhushan** Professor, Department of Surgery, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India.

**Pawan Kumar Jha** Professor & HOD, Department of General Surgery, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India

**Mohal Kumar** Junior Resident, Department of Surgery, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India