



## COMPARATIVE ANALYSIS OF DAMAGE CONTROL SURGERY VS. EXTENSIVE SURGERY, IN MANAGEMENT OF ILEAL PERFORATION: RESULTS OF A TERTIARY HOSPITAL

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### ABSTRACT

**Background:** Intestinal perforation is most serious complication mainly in developing country like in India. Perforation of terminal ileum is important cause for obscure peritonitis and many patients present in a severe toxic state because of delay in diagnosis, late presentation to hospital and scarcity of medical facility in rural area.

**Methods:** A retrospective study was conducted to assess the outcome in ileal perforation, 60 patients were included from the Study period August 2017 to May 2019. All the patients were underwent laparotomy. The patients were then divided into two groups according to the surgical technique adopted at the initial laparotomy: Damage control surgery vs. Extensive surgery. Clinical data, intraoperative findings, complications and mortality were evaluated and compared for each group.

**Results:** 60 patients presented with intestinal perforations in which multiple perforation in 8 (33.3%) patients. 52 underwent damage control surgery and 8 had Extensive surgery. Morbidity and Mortality rate were high in extensive surgery group which was 25%. There was significant difference in between two groups.

**Conclusions:** Patients who underwent limited surgery (stoma formation) having lesser complication with less morbidity and mortality rate with better postoperative outcome in compare to extensive surgery.

**KEYWORDS :** ileal perforation, Extensive surgery, damage control.

### INTRODUCTION :

Intestinal perforation serious complication mainly in developing country like India. Perforation of terminal ileum is important cause for obscure peritonitis and many patients present in a severe toxic state because of delay in diagnosis, late presentation to hospital and scarcity of medical facility in rural area [1]. Typhoid perforation is the commonest cause of ileal perforation in our country[2] and second most common causes for terminal ileal perforations is tuberculosis and apart from these other causes of intestinal perforation are malignancy, radiation/ischemic enteritis, crohn's disease, trauma[3]. The clinical presentation in ileal perforation is nonspecific. Patients complain of abdominal pain along with other symptoms like fever, vomiting and abdominal distension with nonpassage of flatus and stool. Diagnosis is mainly clinical, supported by radiological findings of free gas under the diaphragm and ultrasound showing free fluid in the peritoneal cavity and distended loops of intestine and sometime need CT scan of whole abdomen in high risk group like old age patients with family history of malignancy. Laboratory investigations are not helpful in all the cases [4].

A typhoid ileal perforation is the commonest cause of perforation peritonitis in the developing countries [5]. Typhoid fever is common in our country primarily because of poor sanitation and uncontrolled waste disposal system and unhygienic food and water supply. The most lethal complications of typhoid fever are ileal perforation and intestinal haemorrhage both arising from necrosis of Peyer's patches in the terminal ileum. Typhoid ulcers can occur anywhere from stomach to rectum but terminal ileum is mostly involved due to increased number of Peyer's patches in the terminal ileum [5,6]. Typhoid fever is a disease of long duration that includes bacteraemia phase with fever and chills during the first week, Widespread reticuloendothelial involvement with rash, abdominal pain and prostration in the second week, and ulceration of Peyer's patches with intestinal bleeding and perforation during the third week. There are multiple longitudinal ulcers on anti-mesenteric border, situated within 45 cm of the ileocecal valve in majority of the patients[7,8]. Surgical treatment for the multiple ileal perforation is quite variable which includes primary closure of perforation, segmental resection and anastomosis and exteriorisation of bowel loop[9,10]. The best survival rates after ileal perforation in the typhoid fever are to be found in patients undergoing operations within 24 hours of the incidence of perforation with better health facility. The overall survival of patients undergoing surgery for perforation is 70–75% but is as high as 97% in the best services[11]. Primary intestinal tuberculosis (without pulmonary involvement) is one of the commonest forms of extra pulmonary tuberculosis. The infection is usually caused by ingestion of un-pasteurized or contaminated milk that leads to a primary infection of the intestine in

the absence of the pulmonary disease. Intestinal tuberculosis commonly affects the ileocecal region because of the following reasons: 1) the terminal ileum is an area of physiological stasis 2) it has abundant typhoid tissue and 3) high absorptive capacity. Thus, after the initial infection occurs in the Peyer's patches, mucosal oedema and sloughing occurs, leading to the formation of typical tubercular ulcers that lie transversely to the long axis of the ileum. The incidence of perforation in patients with the intestinal tuberculosis varies from 1–11% out of them multiple perforations occur in 40.0% of patients and are associated with poor prognosis[12]. The morbidity and mortality remain high in patients with multiple ileal perforation which less common state but now a day the incidence of multiple ileal perforation has been increased and survival of patients depend of multiple factors.

**Aims and Objectives:** The aims and objectives of this study are.

- To study the difference in survival rates in early and late presentation with intestinal perforation at the hospital ,intraoperative timing and surgical procedure whether extensive or limited (damage control) surgery.

### Methods of Collection of Data:

**Study design:** Retrospective Study.

**Study period:** August 2017 to May 2019.

**Place of study:** Pacific institute of medical sciences, umarda, udaipur

**Sample size:** 60 patients

**Inclusion criteria:** All patients above 12 years undergoing surgery for intestinal perforation and given written consent to participate in this study.

**Exclusion criteria:** Peritonitis due to appendicular perforation, duodenal ulcer perforation and idiopathic intra-abdominal abscess were not included.

### METHOD:

The present study was a retrospective study of 60 cases of ileal perforation from Aug 2017- May 2019. All cases were admitted in Casualty as acute abdomen cases with features of peritonitis. Thorough history was taken and detailed clinical examination was done as per proforma. Observations were made regarding the symptoms, duration of illness, and presentation of patients after the acute episode. The investigations carried out were complete blood count, ESR, renal function tests, electrolytes, chest and abdominal X-

rays, and abdominal ultrasound. Widal test was done pre-operatively only in cases with high suspicion of enteric fever. All patients were resuscitated and electrolyte abnormalities were corrected prior to surgery. Observations were made regarding symptoms, signs, duration of illness and presentation of patients to the hospital after acute episode. Exploratory laparotomy was done and per operative findings regarding site, size and number of perforations were recorded. Peritoneal soiling was quantitatively measured and findings of ileal perforation like perforation along the anti-mesenteric border, gross terminal ileitis and hypertrophied Peyer's patches were noted. Operative procedures were loop ileostomy, or resection of diseased segment and double barrel ileostomy. Thorough peritoneal toileting done and drain placed. Postoperatively patients were started on intravenous fluids, antibiotics, analgesics, oral fluids were started after return of bowel sounds, drainage tubes were removed according to amount of drainage and their timings were recorded. Post-operative complications like wound infection, wound dehiscence, residual abscess, faecal fistula and deaths were documented.

## RESULTS:

There were 60 patients of Ileal Perforation admitted between November 2017 and July 2018 included in this study. Patients have been grouped into time of presentation in the hospital i.e., early against late and number of perforations they are having i.e., single against multiple. There were both males and females. Their age ranged from 15 years to 70 years with a mean of 32 years. There were 45 (75%) males and 15 (25%) females, thus the male: female ratio was 3:1.

Most common cause of perforation was typhoid which was 41.6% and second most common were tubercular which was 25% and remaining were due to obstruction 11.6% and nonspecific 21.6%.

### 1. Aetiology and perforation:

Aetiology	No of patients	Percentage
Typhoid	25	41.6
Tubercular	15	25.0
Obstruction	07	11.6
Non specific	13	21.6

### Sex and Age Incidence:

The age ranged from 15 to 70 years. Perforation commonly occurred in the third to fifth decades of life with 60% of patients between the ages of 25 and 45 year. The distributions of age and sex in all cases shown in Table:

### 2. Age and Sex Incidence in Ileal Perforations:

Age	Male	Female	Total	Percentage
15-25	5	2	7	12%
25-35	14	3	17	28%
35-45	12	7	19	32%
45-55	9	3	12	20%
>55	5	-	5	08%
<b>Total</b>	<b>45</b>	<b>15</b>	<b>60</b>	<b>100%</b>

### 3. Symptoms of patients who presented with Ileal Perforation:

Symptoms	No of patients	Percentage
Abdominal pain	52	86.6%
Fever	40	66.6%
Abdominal distension	50	83.3%
Vomiting	8	13.3%
Constipation	-	-
Nonpassage of flatus and stool	58	96.6%

Most of patients presented with sign and symptom of peritonitis in which 86.6% of patients presented with abdominal pain, 66.6% presented with fever and abdominal distension was present in 83.3% and other symptoms were vomiting (13.3%) and Nonpassage of flatus and stool were present in 96.6% of patients.

### 4. Signs of Ileal Perforation

Signs	No of patients	Percentage
Dehydration	30	50.0%
Tenderness	58	96.6%
Guarding	58	96.6%
Distension of the abdomen	54	90.0%
Free Fluid	58	96.6%
Shock	30	50.0%

Most common sign were guarding and tenderness which was present in 96% of patients and 90% patients presented with Distension of the abdomen and shock was present in 50% of patients.

### 5. Perforation presentation interval (lag period):

Lag period in hours	No. of cases	Percentage
24-48 Hrs	16	26.6
>48Hrs	44	73.3

It is the time interval between the onset of abdominal pain and the presentation of the patient at the hospital. In our study lag period was 24-48 hours in 26.6% patients and 73.3% of patients presented in hospital after >48 hours as shown in Table.

### 6. Surgical Procedures done for Intestinal Perforation:

Procedures	No. of Pt.	No. of death	Percentage
Limited surgery	52(86.6%)	5	09%
Extensive procedure	08(13.3%)	3	37%

Limited surgery like stoma formation were done in 86.6% patients in which mortality were in 9% of patients and extensive procedure were performed in 13.3% of patients in which mortality were 37% of patients.

### 7. No. of perforations in Ileal Perforation:

No. of perforation	No of Patients	Percentage
Single	40	63%
Multiple	20	33%
Total	60	100%

60% patients presented with single perforation and 33% of patients presented with multiple perforation.

### 8. Surgical complications:

complications	No of Patients	Percentage
Wound infections	32	53.3%
URTI	09	15.0%
UTI	03	05.0%
Wound dehiscence	06	10.0%
Faecal fistula	01	1.50%
Skin excoriation	38	63.3%
Stoma retraction	02	03.0%

63.3% of patients having complication out of them 53.3% with SSI, 15% with URTI, 05.0% with UTI, wound dehiscence was present in 10% patients and 63.3% presented with skin excoriation, stoma retraction was present in 03.0% patients. 1(1.50%) patients having faecal fistula.

### 9. Duration of surgical procedures with mortality:

Timing (min)	No of patients	%	Mortality	%
60-80	25	41.6	2	8.00
90-120	18	30.0	2	11.1
120-140	09	15.0	2	22.2
>140	08	13.3	2	25.0
Total	60	100	8	100

Range of duration of surgery was 60min to 150 min. The average surgery time was 105min, mortality were higher with more duration of surgery. With duration of 60-80 min mortality was 8% and time > 140 than mortality was 25%.

### 10. No. of perforation with mortality:

No of perforation	No of patients	Mortality	Percentage
Single	40	3	7.5%
Multiple	20	5	25%

20 patients presented with multiple perforation in which mortality were 25% and 40 patients presented with single perforation in which mortality were 7.5%.

### 11. Relation of Number of Perforations to Complications and Death:

No of perforation	No of Patients	complication	mortality	%
Single	40(63.3%)	25(41.6%)	3	12%
Multiple	20(33.3)	15(75%)	5	25%

In this study 63.3% patients presented with single perforation and 33.3% with multiple perforations, complication rate were 41.6% and 75% respectively with rate of mortality were 12% and 25%.

#### DISCUSSION:

In our study during the last 24 months high frequency of cases presented in emergency with similar symptoms and likelihood of terminal ileum perforation. Small bowel perforation is a potentially fatal complication. The leading cause is typhoid enteritis followed by abdominal tuberculosis. Most commonly present in third and fourth decade of life. which is comparable to the study incidence was found to be very high in young people ranging from 15-35 years, and with a study of Sheikh et al conducted at Chandka Medical College Larkana, who showed up to 80% incidence ranging from 13 to 30 years[13]. Ali S et al also reported highest incidence in young age group i.e., 64% ranging from 21 to 30 years. But the incidence reported by study conducted on 82 patients by Abdullah et al in Baghdad varies considerably where the mean average age was 42 years. The decision for a laparotomy was mainly clinical supplemented by investigations. The delay in operation since the estimated time of perforation was mainly pre hospital. This is due to the fact that, most of the cases came from remote areas where the medical facilities are scarce.

Typhoid perforation is the commonest cause of ileal perforation in this study and second most common cause for terminal ileal perforations is tuberculosis. Most common age group is 30 to 45 year with male: female is 3:1. We proceeded with initial resuscitation which included intravenous fluids and broad spectrum antibiotics.

Widal test was positive in 46% cases. In a series of 60 patients, All of our cases underwent exploratory laparotomy through midline approach within 8-16 hours.

In this study the incidence was found to be very high in people ranging from 25-45 years, Symptoms and signs were not different from those in other studies. All the patients presented to the hospital with history of pain abdomen and abdominal distension with fever and nonpassage of flatus and stool and with symptoms of guarding, rigidity and tenderness. 30% patients were Widal test positive and 15 % showed biopsy proven tuberculosis and 10% on clinical basis according to intraoperative finding like multiple tuberculoma, mesenteric lymphadenopathy with caseous material on cut section of lymph nodes. Presently there is no such controversy in the treatment of intestinal perforation with the current recommendation being surgical management. The various methods in use are local drains, simple closure, closure with omental patch, wedge resection, resection and anastomosis, ileotransverse anastomosis and ileostomy. In this study patients underwent loop ileostomy in single perforation or resection and double barrel ileostomy in multiple perforations to decrease intraoperative time for better postoperative outcome. No patients were treated by conservative measures, wedge resection, omental patch repair ileotransverse anastomosis. Per operatively, a single perforation at anti mesenteric border of ileum within 2 feet of ileocecal valve was found in 40 (63%) patients, while rest of 20 patients (33%) had two or more than two(multiple) perforations. 50 patients were managed by loop ileostomy and 10 patients were managed by resection and double barrel ileostomy in this group intraoperative time were longer than limited surgery(just stoma formation). Lag period were <24 hr in 26.6% of patients who does have better outcome with lesser complication and 73.3% present in hospital after 24 hour. Limited surgery like stoma formation were done in 52 (86.6%) patients in which mortality were in 5 (9%) of patients and extensive procedure like resection and double barrel ileostomy were performed in 8(13.3%) of patients in which mortality were 3 (37%) patients. Survivors of intestinal perforation were faced with various post-operative complications, such as wound infection and wound dehiscence, with prolonged hospitalization and increased cost of management. The overall wound infection was observed 53.3% and wound dehiscence was present in 10.0% cases. In the literature wound infection had been observed 33-100%. This figure is not comparable with the study of Ansari AG et al, and he reported 27.3% wound dehiscence in this study. Rashid A et al revealed 12.5% cases. Wound dehiscence was noted in 7.2% of our patients[15]. Most deadly complication is faecal fistula present in 1.50% presents which is low when compared with 10%, 8% and 8.3% in other studies, respectively. surgical procedure and other complication were skin excoriation in 63.3%, stoma retraction in 3.0%, URTI in 15%, UTI in 5.0% patients. In this study patients with Short leg period with lesser intraoperative timing with single perforation with limited surgical procedure does have better outcome.

Eggleston reported that the procedure done did not influence outcome. Talwar and Sharma reported that mortality was least with early primary closure and Ameh et al found mortality was highest with wedge resection and least with resection and anastomosis[16]. Lag period has been known to influence both mortality and morbidity. Increasing lag period was associated with increased mortality in series by Archampong, Eggleston, Bose and Talwar (8,16).

The management protocol of ileal perforations regarding the surgical repair vary. Different studies have discussed different surgical options .In this study ileostomy with limited surgery having better outcome with lesser complication and mortality instead of extensive surgical procedure. Interestingly there is a study recommending ileostomy in all the cases. Ileostomy has also been treatment of choice in some other studies including the one conducted at LUMHS, Jamshoro, whose results are comparable to this study(17).

In this study Septicaemia was found in 10(16.6%) patients. Overwhelming septicaemia, intraoperative timing and lag period was the major cause of mortality in this study. Overall mortality rate was 13.3 % (8) which is less comparable to other studies as 28% reported Adesunkanmi and Ajao[13], 16.4% by Talwar[16], 13.8% by Aziz and 48% by Ameh(16).

#### CONCLUSION:

Ileal perforation should be considered as a possibility in obscure peritonitis. In developing countries enteric perforation is a strong possibility and second one is tuberculosis. Early diagnosis and treatment avoids extensive procedures and is associated with lower morbidity and mortality. In this series most of patients came from remote area and presented in emergency with a long lag period and septicaemia, investigate the patients and exploration and stoma formation was done in all patients after resuscitation according to need because due to long lag period or septicaemia, terminal ileum become grossly inflamed, friable and unhealthy having more chances of suture dehiscence so the best option exteriorization is a safe option which remained a mainstay of treatment in this study. Patients who underwent limited surgery(stoma formation) having lesser complication with less morbidity and mortality rate with better postoperative outcome in compare to extensive surgery like resection and stoma formation in the patients with multiple ileal perforation who have more complication and higher mortality and morbidity because more exposure of anesthetic drugs.

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