



## A Study of Prognostic Factors in Non Traumatic Ileal Perforation in Developing Countries

### KEYWORDS

perforation, peritonitis, non traumatic ileal perforation, prognosis ileal perforation

#### Dr. Ajay Kumar

Resident, Department of General Surgery, Subharti Medical College, Meerut, U.P.- 250005

#### Dr. M.K. Maheshwari

Professor, Department of General Surgery, Subharti Medical College, Meerut, U.P.- 250005

#### Dr. Rani Bansal

Professor, Department of Pathology, Subharti Medical College, Meerut, U.P.- 250005

#### Dr. Prabodh Bansal

Assistant Professor, Department of General Surgery, Subharti Medical College, Meerut, U.P.- 250005

#### Dr. Aman Kamra

Resident, Department of General Surgery, Subharti Medical College, Meerut, U.P.- 250005

#### Dr. Lovneet Dogra

Resident, Department of General Surgery, Subharti Medical College, Meerut, U.P.- 250005

#### Dr. Syamantak Srivastava

Resident, Department of General Surgery, Subharti Medical College, Meerut, U.P.- 250005

**ABSTRACT** Objectives- The purpose of our study was to identify the prognostic factors in non traumatic ileal perforation and evaluate Manheims Peritonitis Index (MPI) in assessing prognosis in these patients.

Methods- The study was conducted over a period of two years in the Department of Surgery. A total of 58 patients admitted through emergency department diagnosed as a case of non traumatic perforation peritonitis and intraoperatively found to have ileal perforation were included in the study. A written informed consent was obtained from the patient and patient's relatives. Complete clinical assessment lab investigations, ultrasound, x-rays, operative findings, MPI score and the course in hospital were recorded. Based on the above mentioned findings, factors affecting recovery, morbidity and mortality were evaluated.

Results- 58 patients of non traumatic ileal perforation were assessed. Elderly age, female patients, delayed presentation to the hospital and high MPI score had a poorer prognosis in patients of non traumatic ileal perforation.

### INTRODUCTION

Ileal perforation peritonitis is a frequently encountered surgical emergency in the developing countries.<sup>1,2</sup> Typhoid is the most common cause for this dreaded complication while tuberculosis, trauma, and nonspecific enteritis follow close suit, while in western countries non-infectious pathology is more common<sup>3,4</sup>.

A careful medical history, methodical clinical examination and radiological study plays a major role in the diagnosis of this acute abdominal emergency. The diagnosis is mainly clinical, supported by radiological finding of free gas under diaphragm. Despite the availability of modern diagnostic facilities and advances in treatment regimes, this condition is still associated with a high morbidity and mortality<sup>5</sup>.

Preoperative resuscitation, intravenous administration of broad spectrum antibiotics and good post operative care are the mainstay in the management of ileal perforation<sup>6</sup>. Over the years a definite changing trend has been observed in ileal perforations both in terms of causes, treatment and prognosis. Better antibiotics, aggressive surgery and the elimination of conservative treatment, better pre-operative and postoperative care have all significantly contributed to the improvement in patient outcome.

The best survival rates after ileal perforation in typhoid fever are to be found in patients undergoing operation within 24 hours of the incidence of perforation. The operative

management depends on number of perforations and condition of bowel wall intraoperatively. Surgical approach is the standard treatment of ileal perforations and is the only successful modality, but the choice of procedure continues to be debated. Surgical option such as Simple/Primary closure, Resection and end to end Anastomosis, Ileotransverse anastomosis, Primary Ileostomy are commonly performed<sup>7</sup>.

Various factors plays a vital role in morbidity and mortality in determining the outcome measures in nontraumatic ileal perforation such late presentation, inadequate pre-operative resuscitation, delayed operation, the number of perforations, anaemia, hypovolemic shock, septicaemic shock, fecal contamination of peritoneum, age etc. have been found to have a significant effect on the prognosis<sup>8,9</sup>. This contribute to high morbidity and mortality in developing countries where medical facilities are not readily available.

The proposed study aims to define the severity of peritonitis based on MANHEIM'S peritonitis, identify the cause, define the criteria for choosing a particular modality of treatment, and compare the short and long term outcome of the various treatment modalities. Effective management of the disease will help in decreasing morbidity and mortality associated with the disease.

### Materials and Methods:-

The present prospective study was carried out in the Department of Surgery at Netaji Subhash Chandra Bose Sub-

harti Medical College, Meerut. Patients presenting with ileal perforation admitted in the hospital within two years from September 2013 to September 2015 were included from commencement study. A complete history and clinical examination at the time of admission detailed history with sign and symptom of all patients were noted down and every patient was investigated as per performa. The patients in the study group were subjected to: Detailed history; Complete general physical examination; Selection of patients into groups by MPI scoring; Investigations

The patients were divided into study groups based on their MPI scores:

Group A :	<21
Group B :	21-29
Group C :	> 29

Patients with MPI score between 21-29 were considered either for Primary closure or ileostomy formation

Pre-operative patients were investigated for the free air under the diaphragm using erect abdominal and chest X-rays. The diagnosis was further supported by operative findings of ileal perforation with associated peritoneal soilage. Pre-operative resuscitation was done including correcting anemia, correcting serum electrolytes level to get adequate urinary output and normal urea level. Exploratory laparotomy was done with appropriate skin incisions (right paramedian, midline) Operative findings were noted including the amount of pus and fecal matter. The edge of the ileal perforation was excised and closed transversely in two layers, proximal ileostomy, ileo-transverse anastomosis, resection anastomosis in selected cases. Biopsy material from the ulcer sent for histopathological examination.

Wound was closed and the appropriate intravenous antibiotics were administered. Attention was given to wound infection, wound dehiscence, residual intraabdominal abscess, faecal fistula and death. Patient was evaluated as per Mannheim Peritonitis index.

#### MANHEIM PERITONITIS INDEX

RISK FACTOR	SCORES
Age >50 years	5
Female sex	5
Organ failure*	7
Malignancy	4
Preoperative duration of peritonitis > 24 hr	4
Origin of sepsis not colonic	4
Diffuse generalized peritonitis	6
<b>Exudate</b>	
Clear	0
Cloudy, purulent	6
Faecal	12

Organ failure was considered if; Kidney failure = Creatinine level >177 umol/L or urea level > 167mmol/L or oliguria < 20ml/hour; Pulmonary insufficiency = P02 <50 mmHg or PC02 > 50 mmHg; Intestinal obstruction/paralysis > 24hours or complete mechanical ileus, shock hypodynamic or hyperdynamic

**Outcome was assessed by:** Number and duration of hospital stay, Wound infection, Wound Dehiscence, Leakage/ Faecal fistula, Intra-abdominal collections/Abscess, Ileostomy related complications (output; fluid & electrolyte imbalance; retraction ; stenosis), Reoperation(s)

All patients above 12 years undergoing surgery for non traumatic ileal perforation who has given written consent to participate in this study. After obtaining clearance and approval from the institutional ethical committee and patients fulfilling the inclusion/ exclusion criteria will be included in the study after obtaining informed consent.

#### RESULT AND OBSERVATIONS

On the basis of criteria described, 58 patients were studied and evaluated and the following observations were made.

**Table I: AGE & SEX DISTRIBUTION**

Age (Years)	Sex Distribution		Patients Number& (%)
	Male	Female	
≥ 12-20	14	2	16 (27.5)
21-30	15	8	23 (39.6)
31-40	8	1	9 (15.5)
41-50	5	-	5 (8.6)
≥50	4	1	5 (8.6)
Total	46 (79.3%)	12 (20.6%)	58

**Table I** show that maximum ileal perforations occurred in the second to third decade. Ileal perforation was more common in males with Male: Female ratio of 3.8:1. The youngest patient was 13 years and oldest was 70 years.

**Table II: DURATION OF PERFORATION**

Duration (in hours)	Number of Patients & (%)
< 12	4 (6.8)
13-24	23 (39.6)
25-48	14 (24.1)
49-72	7 (12.0)
73-96	9 (15.5)
>96	1 (1.7)
Total	58

Most of the patients (82.7%) presented within 72 hours of perforation and were operated within 24 hours of presentation after adequate resuscitation. However one patient who had drain placed from outside was operated after 5 days of admission. As the duration of perforation increased, the morbidity and mortality increased.

**Table III: MANHEIM'S PERITONITIS INDEX SCORE & OPERATIVE PROCEDURES**

MPI Score	Number	Group 1		Group 2
		Primary	RA	Ileostomy
<21	31	15	5	11
21-29	26	13	3	10
>29	1	1	-	-
Total	58	29	8	21

MPI score represented the extent of intra-abdominal sepsis with derangements of physiological processes and extent of peritonitis of a patient. 31 Patients had a score <21 of which 15 had primary repair of perforation, 5 underwent resection anastomosis and 11 in underwent ileostomy. Twenty six patients (44.8%) had MPI score between 21-29. 13 patients underwent primary repair of the perforation and 3 patients underwent resection-anastomosis whereas in 10 patients, ileostomy was made.

Two patients with primary repair had leak, one was managed conservatively, and other had re-operative and ileostomy was made, but the succumbed to his illness. 2 patients with resection-anastomosis also had anastomotic leak, one of which developed fecal fistula. Both were managed conservatively

**Table IV: MORBIDITY & MORTALITY PATTERN**

	Group 1 (n=37)	Group 2 (n=21)		P
	Primary closure + RA	Ileostomy formation	Ileostomy closure	
Morbidity	67.5%	80.9%	52.3%	.046%
Mortality	2.7%	4.7%	-	ns

Morbidity was found more in group II, which was related to ileostomy related complications (p value < 0.05). One patient in both group expired accounting for mortality. The average duration of hospital stay in group I was 13.3 days as compared to 16.7 days in group II. The total average duration of the hospital stay in group II was 27.9 days, which included ileostomy closure

## DISCUSSION

In the present study male preponderance was found with male to female ratio of 3.8:1 that is consistent with the ratio of 3:1 reported by Wani et al<sup>8</sup>.

In our study, about 46.2% of patient presented within 24 hours of perforation and had favorable outcome from those who presented late. Two patients out of ten who presented 3-4 days after perforation, died accounting for 20% mortality.

In the present study, different operative procedures- simple closure of perforation, resection-anastomosis and ileostomy were performed according cause and severity of illness. Simple closure of perforation was done in 29 patients, 13 of which had MPI score 21-29. These patients had single perforation, small in size (< 1cm), located within 60 cm of terminal ileum with less peritoneal contamination. In 8 patients resection-anastomosis was performed, 3 of which had MPI score 21-29. Resection-anastomosis was performed because of multiple perforation or large perforation (> 2 cm) or when segment of bowel appeared unhealthy for simple closure. In the literature study by Pal et al, Beniwal et al and others, simple closure of perforation is recommended for single perforations with less peritoneal contamination while wedge excision, segmental resection & anastomosis, ileo-transverse anastomosis have been recommended for multiple perforations, diseased segment of bowel<sup>7,8</sup>

Primary closure of perforation was done in 27 patients with single perforation of size less than 1 cm. The complication rate was 44.4%. Ten patients with large perforation also underwent primary closure. The complication rate in them was 100% and one of them died with development of fecal fistula. Resection- anastomosis was done in 8 patients, 3 out of which had large perforations (> 1cm). The complication rate was 66.6%.

If there are multiple perforations or any other areas of bowel seem unhealthy or liable to perforate, a length of small bowel should be resected, including all the diseased part, and a two-layer anastomosis be performed. Ileostomy was performed in 21 patients, 10 of who had MPI score 21-29. Ileostomy was recommended in cases of poor general condition, extensive contamination, perforation situated near to ileo-cecal junction, large perforations (> 1 cm), intra-operative findings suggestive of caseating lymph nodes and tubercular abdomen.

In 17 patients with single, small perforation (< 1 cm), ileostomy was made depending on high MPI score, extensive fecal contamination, unhealthy bowel wall. The complica-

tion rate was 56.2%. 5 patients with large perforation > 1cm) and 4 patients with multiple perforations underwent ileostomy formation. The complication rate in them was observed to be 62.5%.

Development of fecal fistula was unrelated to number of perforation<sup>10</sup>. Extensive procedures such as resection anastomosis and right hemicolectomy should be avoided in patients with poor general condition and toxemia. Ileostomy as a secondary procedure should be considered once fecal fistula develops in order to avoid peritoneal contamination.

The morbidity rate from ileal typhoid perforation is high irrespective of the surgical procedure. Prognosis is directly related to the degree of septicemia which depends on the resistance of organism, degree of peritoneal contamination and delay in manifestation which is reflected in high MPI scores<sup>11</sup>

The morbidity was higher (80.9%) in patients who underwent ileostomy as compared to 60.5% in patients who underwent primary closure & resection- anastomosis in our study. The mortality in our study was 3.4% which is low in comparison to other studies which reported about 28%. Wound infection was the most common post operative complication about 50% in Group 1 and 66.6% in Group 2, followed by wound dehiscence, intra-abdominal collections and anastomotic leak which is in accordance with previous studies by Wani et al and others (p value <0.05)<sup>8</sup>. The other complications in Group 2 were related to ileostomy which hampered quality of life and significantly added to morbidity in these patients.

Ileostomy related complications occurred in 13 patients (61.9%) and closure related complications occurred in 11 patients (52.3%). Peri-stomal skin excoriation occurred in 57.1% of the patients and this was the most frequently recognized early complication<sup>12</sup>. It was followed by weight loss (47.6%), retraction (14.2%), fluid & electrolyte imbalance (9.5%) and prolapse (4.7%).

The average hospital stay of the patients was slightly longer in case of ileostomy (16.5 days) in comparison with other procedures (15 days)<sup>12</sup>. Patients with MPI score 21-29 had 73.0% morbidity and mortality 7.6%. Chest infection, sepsis and renal failure accounted for their mortality. Liverania A, Correnti SF<sup>11</sup> et al observed that for Mannheim peritonitis index score of less than 26 the mortality was 2% while the mortality was 40.5% for scores greater than 26. In our study, high score was related to high morbidity as well.

In conclusion, primary closure of perforation is advocated in patients with single, small perforation (<1 cm) with MPI score 21-29 irrespective of duration of the perforation. The operative management consists of liberal peritoneal lavage with closure of perforation<sup>13-15</sup>. Ileostomy is advocated in MPI score 21-29, where the terminal ileum is grossly inflamed with multiple perforations, large perforations (> 1 cm), fecal peritonitis, matted bowel loops, intra-operative evidence of caseating lymph nodes, strictures and an unhealthy gut due to edema. The repair of the perforation has been advocated as better procedure than temporary ileostomy due to its cost effectiveness, absence of complications related to ileostomy and the need for second surgery for ileostomy closure.

## CONCLUSIONS

The conclusions drawn on the basis of evaluation of 58 pa-

tients with ileal perforation peritonitis are:

In conclusion, elderly age, female patients, delayed presentation to the hospital and high MPI score had a poorer prognosis in patients of non traumatic ileal perforation. While multiple perforations and size of the perforation, etiology had no bearing on the outcome. Primary closure of perforation is preferable in patients with single, small perforation (<1 cm) with MPI score <21 irrespective of duration of the perforation. Resection-anastomosis is advocated in multiple perforations, diseased segment of bowel. Ileostomy was preferable in MPI score 21-29, where the terminal ileum is grossly inflamed with multiple perforations, large perforations (> 1 cm), fecal peritonitis, and an unhealthy gut due to edema. The repair of the perforation is definitely better procedure than temporary ileostomy due to its less morbidity related to absence of ileostomy related complications and the need for second surgery for ileostomy closure.

## References

1. R. S. Jhobta, A. K. Attri, R. Kaushik, R. Sharma, and A. Jhobta, "Spectrum of perforation peritonitis in India—review of 504 consecutive cases," *World Journal of Emergency Surgery*, vol. 1, article 26, 2006.
2. A. Sharma, A.-P. Deeb, A. S. Rickles, J. C. Iannuzzi, J. R. T. Monson, and F. J. Fleming, "Closure of defunctioning loop ileostomy is associated with considerable morbidity," *Colorectal Disease*, vol. 15, no. 4, pp. 458–462, 2013
3. Sharma MP, Bhatia V. Abdominal tuberculosis. *Indian J Med Res*. 2004; 120:305–315.
4. Atamanalp SS, Aydinli B, Ozturk G, et al. Typhoid intestinal perforations: twenty-six year experience. *World J Surg*. 2007;3:1883–1888.
5. Ahmed HN, Niaz MP, Amin MA, et al. Typhoid perforation still a common problem: situation in Pakistan in comparison to other countries of low human development. *J Pak Med Assoc*. 2006;56:230–232.
6. A. El-Hussuna, M. Lauritsen, and S. Bülow, "Relatively high incidence of complications after loop ileostomy reversal," *Danish Medical Journal*, vol. 59, no. 10, pp. 4517–4522, 2012..
7. Pal DK. Evaluation of best surgical procedures in typhoid perforation-an experience of 60 cases. *Trop Doct*. 1998 Jan;28(1):16-8.
8. Wani RA, Parray FQ, Bhat NA, Wani MA, Bhat TH, Farzana F. Nontraumatic terminal ileal perforation. *World J Emerg Surg*. 2006 Mar 24;1:7.
9. Talwar S, Sharma RK, Mittal OK, Prasad P. Typhoid enteric perforation. *Aust N Z J Surg*. 1997 Jun;67(6):351-3.
10. Adesunkanmi ARK, Badmus TA, Fadiora FO, Agbakwuru EA. Generalised peritonitis secondary to typhoid ileal perforation Assessment of severity using modified APACHE II score. *Indian J Surg* 2005;67(1):29-33.
11. Liverani A, Correnti SF. The value of 2 distinct prognostic scores in patients with peritonitis. The MPI versus the APACHE II score. *Chirurg*. 1990; 61 (4) : 297-300
12. Perez RO, Habr-Gama A, Seid VE, Proscurshim I, Sousa AH Jr, Kiss DR, Linhares M, Sapucahy M, Gama-Rodrigues J. Loop ileostomy morbidity: timing of closure matters. *Dis Colon Rectum*. 2006 Oct;49( 10): 1539-45.
13. Fugger R, Rogy M et al Validation study of the Mannheim peritonitis index. *Chirurg*. 1988; 59:598-601.
14. A Billing, D. Frohlich. Predication of outcome using the Mannheim peritonitis index in 2003 patients. *British Journal of Surgery* 1994, 81, 209-213.
15. Demmel N, Magg A. The value of clinical parameters for determining the prognosis of peritonitis validation of the mannheim peritonitis index. *Langenbecks Arch Chirurg*, 1994, 379(3):152-158.