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Evaluation of Outcome of Various Operative Procedures for Non Traumatic Ileal Perforation

Dr. Dinesh Prasad [1], Dr. Milan Bhingaradiya[2]

[1]Additional Professor (M.S., F.I.A.G.E.S., F.M.A.S., F.L.C.S., F.I.S.C.P., F.A.L.S (Bariatric & Metabolic Surgery), Department of General surgery, SMIMER, Surat, Gujarat, India

[2]3rd Year Resident, Department of General Surgery, SMIMER, Surat, Gujarat, India

Abstract: ***Background: Ileal perforation is a common cause of acute abdomen in patients admitted for surgical emergencies. It is vital to diagnose early as the prognosis depends on accurate diagnosis and its management. Method: An observational study was done from January 2018 to June 2019 to study aetiology, clinical profile and morbidity of various surgical procedures for non-traumatic ileal perforation. Total 42 patient fulfilling inclusion criteria were operated during this period. Results: In our study, most common presenting complain is abdominal pain (100%) followed by abdominal distension (72%), fever (70%), nausea and vomiting (45%). Most common performed surgery is exploratory laparotomy with primary repair of perforation (41%) followed by resection and anastomosis with proximal ileostomy (28%), ileo-transverse anastomosis with proximal ileostomy (20%), resection and anastomosis (7%), primary repair with proximal ileostomy (4%). Exploratory laparotomy with primary repair of perforation has least complication with re-exploration rate with least mortality.***

1. Introduction

Ileal perforation is a common cause of acute abdomen in patients admitted for surgical emergencies. It is vital to diagnose early as the prognosis depends on accurate diagnosis and its management. Worldwide incidence of typhoid fever is decreasing but this is still endemic in India.[1]

Illeal perforation may be categorized as traumatic and non-traumatic. Aetiological factors associated with nontraumatic perforations are typhoid fever, intestinal tuberculosis, round worm infestation, malignant tumours of small intestine etc.[2] Traumatic perforation may be in the form of blunt abdominal trauma or penetrating injury causing perforation of ileum, may or may not associated with injury to other abdominal viscera.[3]

Abdominal tuberculosis is still a common disease today in India and this mainly affects terminal ileum and ileocecal junction. Abdominal tuberculosis usually presents as intestinal obstruction, perforation which may cause deleterious effect if not promptly managed.[5]In the under developed tropical countries small bowel perforation is quite a commonly encountered surgical emergency.10Although Tb is an important cause, the most important one is the endemic prevalence of typhoid fever in these countries. 11 Typhoid intestinal perforation is a common cause of surgical acute abdomen in our environment. The incidence of perforation varies considerably with West African sub region having one of the highest perforation rates in the world (15-33%), and the reasons for this remain speculative. Despite decades of improvement in patient care, the morbidity and mortality of typhoid perforation remain high, and this is related to multiple variable factors.12-14 The reported rate of bowel perforation in typhoid fever varies from 0.5% to 78.6%. 15-19

2. Aims & Objective

1) Evaluation of clinical profile and aetiology of non-traumatic ileal perforation.
2) Evaluation of morbidity of various surgical procedure for non-traumatic ileal perforation.

3. Material & Method

An observational study was done from January 2018 to June 2019 to study aetiology , clinical profile and morbidity of various surgical procedures for non-traumatic ileal perforation. Total 42 patient fulfilling inclusion criteria were operated during this period.

Inclusion Criteria:
- Patient's age between 12 and 60 years.

Exclusion Criteria:
- Age <12 and >60 years
- Abdominal pain with traumatic causes

Study Setting:
- All Patients Diagnosed with Ileal Perforation Pre-Operative and Intra-Operative.

Investigations
All patients had undergone Complete blood count, Liver function test, Serum electrolytes, Serum widal, Ig-M typhidot, Histopathological examinations of biopsy from perforated margins . Chest xray, X-ray abdomen standing, Ultrasound abdomen and pelvis, Erythrocyte sedimentation rate, Mantoux test. Out of 42 patient's, all 42 patient's x-ray abdomen suggestive of free gas under diaphragm.All 42 patients Usg suggestive of mild to severe free fluid with internal echoes in peritoneal cavity. 11 were S. widal positive while 17 patients positive for typhi dot. No any organism were isolated from blood during blood culture. 35 out of 42 patients had high ESR value.

Brief Methodology

After admission, data for my study was collected by direct interview with the patient or patient's relatives and obtaining a detailed history with clinical examination.Study of clinical findings and relevant diagnostic investigations performed over the patients.

4. Observation

a) Sex Distribution

In my observation, male were more commonly affected than females. There were 31 male patients and 11 female patients. So male to female ratio is 3:1.

b) Causes of Perforation

In this study, enteric fever was the most common of non-traumatic ileal perforation, 2nd most common cause was non-specific. Two cases out of 42 cases were due to tuberculosis.

Causes of Perforation

Causes	No. of cases	Percentage (%)
Enteric fever	28	65
Non -specific	12	30
Tuberculosis	2	5

c) Surgery

Exploratory laparotomy was performed in all the patients and type of surgery depended on bowel condition & contamination.

Type of Surgery

Surgery	No. of cases	Percentage (%)
Primary repair of perforation	17	41
Primary repair with proximal ileostomy	2	4
Resection and anastomosis	3	7
Resection and anastomosis with proximal ileostomy	11	28
Ileo-transverse anastomosis with proximal ileostomy	9	20

d) Surgery Association with Etiology

Surgery	Enteric fever	Non-specific	tuberculosis
Primary repair of perforation	12	5	0
Primary repair with proximal ileostomy	1	1	0
Resection and anastomosis	2	1	0
Resection and anastomosis with proximal ileostomy	8	2	1
Ileo-transverse anastomosis with proximal ileostomy	5	3	1

e) Type of surgery and associated complications

Surgery	Wound infection	wound dehiscence	Enterocutanous fistula	Anastomotic leak	Re-exploration
Primary repair of perforation	16	9	0	3	2
Primary repair with proximal ileostomy	1	1	0	0	0
Resection and anastomosis	3	3	1	2	3
Resection and anastomosis with proximal ileostomy	11	6	1	0	3
Ileo-transverse anastomosis with proximal ileostomy	9	6	0	0	2

5] Number of Perforation

Number of Perforation

Number of perforation	No. of cases	Percentage (%)
One	27	65
>One	15	35

Type of surgery done in cases with single perforation

Single perforation	Primary repair of perforation	Ileo-transverse anastomosis with proximal ileostomy	Primary repair with proximal ileostomy	Total
No. of cases	17	8	2	27

Type of surgery done in cases with multiple perortion

>One perforation	Resection and anastomosis	Resection and anastomosis with proximal ileostomy	Ileo-transverse anastomosis with proximal ileostomy	Total
No .of perforation	3	11	1	15

6] Contamination of Peritoneal Cavity

Contamination of Peritoneal Cavity and Mortality

Contamination	No. of cases	Percentage (%)	Mortality (no of cases)
Mild	15	35	0
Moderate	9	21	1
severe	18	44	6

(mild=Reactionary fluid, moderate=Purulent, severe=Feculent)

Complication & It's Association with degree of Contamination

Complication	Mild contamination	Moderate contamination	Severe contamination
Wound infection	2	8	32
Wound dehiscence	2	5	18
Enterocutaneous fistula	0	0	2
Anastomotic leak	0	1	4
Re-exploration	0	1	9

7] Distributions of Complications

Distributions of Complications

Complication	No of cases
Wound infection	40
wound dehiscence	25
Enterocutaneous fistula	2
Anastomotic leak	5
Ileostomy complication	15
Death	7

8] Re-Exploration

Out of 42 cases, 10 cases needed to re-exploration

Causes	No of cases
Typhoid	7
Non-specific	3
Tuberculosis	0

5. Discussion

Non traumatic ileal perforation is most commonly associated with enteric fever. In my study 42 cases of non-traumatic ileal perforations were studied from January 2018 to June 2019 at our tertiary care hospital. Following are a few studies similar to this study whose data has been compared with my study.

1] Sex Groups: In my study out of 42 cases 31 were male and 11 were female patients, so male : female ratio is 2.8:1. Sher-i-Kashmir had reported male to female ratio to be 3:1,Al Kindy 2:1 , Guru TegBahadur and Yüzüncü Yıl andVan, had a higher maleto female ratio.

Sex	My study	Sher-i-Kashmir[6]	Guru Teg Bahadur [7]	Al Kindy[8]	Yüzüncü Yıl, *Van*
Male	73.80%	66.6%	83.33	67.07%	*81.81%*
Female	26.20%	33.3%	16.66%	32.92%	18.18%
Male : female ratio	2.8:1	3:1	5:1	2:1	4.5:1

2] Causes of Perforation: In my study as well as other studies typhoid fever is the most common cause of non-traumatic ileal perforation. 2nd most common cause is non-specific in mine as well as other studies.

Causes	My study	Sher-i-Kashmir	Guru Teg Bahadur	Al Kindy	Sadaf Khalid[50]
Enteric fever	65%	62%	46.4%	71.9%	65.6%
Non-specific	30%	26%	39.2%	20.7%	30.4%
Tuberculosis	5%	4%	12.8%	6.1%	-
Obstruction	-	6%	-	-	-
Radiation enteritis	-	1%	-	-	-
Malignant neoplasm	-	-	1.6%	-	-
Other	-	-	-	-	4%

4] Operation: In my as well as other studies (Sherp-i-kashmir:49%, Guru teg Bahadur: 44.2%, Al kindy: 50%) the most commonly performed surgery was primary closure of perforation(41%) and it was associated with minimum complications.

Surgery	My study	Sher-i-Kashmir	Guru Teg Bahadur	Al Kindy
Primary repair of perforation	41%	49%	44.2%	50%
Primary repair with proximal ileostomy	4%	-	25.5%	6%
Resection and anastomosis	7%	6%	19.3%	3.6%
Resection and anastomosis with proximal ileostomy	28%	1%	5%	25.6%
Ileotransverse anastomosis with proximal ileostomy	20%	44%	5.9%	3.6%

In my study, wound infection was higher in Primary repair with proximal ileostomy surgery(50%) and least incidence in Ileo-transverse anastomosis with proximal ileostomy (23.8%).

In Al-kindy study, Wound infection was higher in loop ileostomy (40%) and least in Resection +Ileo-transverse Anastomosis and Side To Side anastomosis (0).

In my study, Wound dehiscence was higher in Primary repair with proximal ileostomy (50%) and least incidence in Resection and anastomosis with proximal ileostomy and Ileo-transverse anastomosis with proximal ileostomy (23.8).

In al-kindy study, Wound dehiscence was higher in loop ileostomy (20%) and least in Resection +Ileotransverse Anastomosis, Side To Side anastomosis and simple closure (0).

In my study, Incidence of Enterocutaneous fistula was same in Resection & anastomosis and Resection & anastomosis with proximal ileostomy (2.3%)

In al-kindy study, Incidence of Enterocutaneous fistula was higher in Resection+Ileotransverse Anastomosis (66.6%) and least in side to side anastomosis(0).

My Study

Complication	Primary repair of perforation	Primary repair with proximal ileostomy	Resection and anastomosis	Resection and anastomosis with proximal ileostomy	Ileotransverse anastomosis with proximal ileostomy
Wound infection	38.1%	50%	28.6%	26.2%	23.8%
wound dehiscence	21.4%	50%	19%	14.3%	14.3%
Enterocutaneous fistula	0	0	2.3%	2.3%	0
Anastomotic leak	7.1%	0	4.7%	0	0

Al-kindy study

Complication	Simple Closure	Resection+End To End Anastomosis	Loop Ileostomy	Resection+Ileotransverse Anastomosis	Side To Side anastomosis
Wound infection	12%	9.5%	40%	0	0
Wound dehiscence	0	9.5%	20%	0	0
Enterocutaneous fistula	2%	9.5%	20%	66.6%	0

5] Complication: In my study the most common complication was wound infection(95.2%) though Guru Teg Bahadur and Sadaf Khalid studies had lower wound infection which were 46.8% and 30.4% respectively. In my study, Incidence of wound dehiscence was 59.5%. In another study, Sadaf Khalid incidence of wound dehiscence was low (7.2%). In my study, Incidence of Enterocutaneous fistula was 4.7%. Guru Teg Bahadur had higher incidence of

Enterocutaneous fistula (11.5%). Anastomotic leak was 11.9% in my study where as in Guru Teg Bahadur and Sadaf Khalid there was no anastomotic leak. In my study, ileostomy related complications were high(35.7%). In another study, Guru Teg Bahadur. (0.5%), Sadaf Khalid. (1.6%%) had minimal ileostomy related complication.

Complication	My study	Guru Teg Bahadur	Sadaf Khalid
Wound infection	95.2%	46.8%	30.4%
wound dehiscence	59.5%	31.3%	7.2%
Enterocutaneous fistula	4.7%	11.5%	3.2%
Anastomotic leak	11.9%	-	-
Ileostomy complication	35.7%	0.5%	1.6%

6] Mortality: Out of 42 patients, 7 patients expired, which is 16.6% of total patients which is almost similar to another study that is Guru Teg Bahadur and higher as compared to al-kindy(16.7% vs 8%).Inspite of giving higher antibiotics mortality is higher.

My study	Guru Teg Bahadur	al-kindy
16.7%	16.6%	8%

6. Sub group analysis in my Study

1) Investigation

In my study all 42 patients were investigated for blood, serological and radiologically preoperatively. Histopathological examination of edges of perforation as well as resected segment of bowel was done post operatively. 28 out of 42 patients were diagnosed with typhoid, [11 patients were widal positive and 17 patients were typhi dot (ig m antibody) positive.] All 42 patients x-ray abdomen standing suggested free gas under diaphragm, all 42 patients USG suggested free peritoneal fluid collection with internal echoes. 2 out of 42 had necrotic mesenteric lymph nodes which later turned out to be tubercular.

2) Contamination

In my study, 35% patients had Reactionary fluid, 21% patients had purulent fluid, 44% patient had fecal contamination. Contamination of the peritoneal cavity leads to postoperative complication. Fecal contamination leads to higher morbidity like wound infection (76.1%), wound dehiscence (42.8%), enterocutaneous fistula(4.76%), anastomotic leak(9.5%) Fecal contamination has higher risk of re-exploration (21.4%). Severe contamination has higher mortality (14.3%).

3) Number of perforation

In my study most commonly performed surgery for single perforation was primary repair of perforation (45.2%). 2nd most commonly performed surgery was ileo-transverse anastomosis with proximal ileostomy (19.04%). So the primary repair of single perforation is the best method [(51)]. For more than one perforation, most commonly performed surgery was Resection and anastomosis with proximal ileostomy (26.2%) and then Resection and anastomosis(7.1%). Ileo-transverse anastomosis with proximal ileostomy (2.3%) was least performed surgery in multiple perforations. Resection and anastomosis with proximal ileostomy was the best method for multiple perforation but complications associated with ileostomy were there.

4) Re-exploration

In my study re-exploration rate is higher in enteric perforation (16.7%). No re-exploration required in tuberculous perforation. Resection and anastomosis and Resection and anastomosis with proximal ileostomy surgeries had higher re-exploration rate (7.1%). Primary repair and Ileo-transverse anastomosis with proximal ileostomy had same re-exploration rate(4.8%).

Primary closure with proximal ileostomy had no re-exploration.

7. Conclusion

1) Non traumatic ileal perforation is most commonly seen in males.
2) Most common cause of non- traumatic ileal perforation is enteric fever, 2nd most common cause is non-specific, 3rd is tuberculosis.
3) In our study, most common presenting complain is abdominal pain (100%) followed by abdominal distention (72%), fever (70%), nausea and vomiting(45%).
4) X-ray abdomen standing and USG have higher sensitivity to diagnose intestinal perforation. S.widal and typhi dot are used to diagnose enteric fever .
5) Most commonly performed surgery is exploratory laparotomy with primary repair of perforation (41%) followed by Resection and anastomosis with proximal ileostomy(28%), Ileo-transverse anastomosis with proximal ileostomy(20%), Resection and anastomosis(7%), Primary repair with proximal ileostomy(4%).
6) Exploratory laparotomy with primary repair of perforation has least complication with least re-exploration rate with least mortality.
7) In single perforation most commonly done surgery is primary repair of perforation where as in multiple perforation, most commonly performed surgery is Resection and anastomosis with proximal ileostomy.
8) Severe contamination of peritoneal cavity has higher rate of complication as well as higher rate of mortality.
9) Histopathological examination of margin of perforation has no significant value in diagnosis.

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