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Study of pattern and outcome of peritonitis secondary to small bowel perforation

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Abstract:
Introduction: *Mortality of secondary peritonitis was as high as 90% in the early 20th century and is still 30-50% despite advances in antibiotics, surgical technique, radiographic imaging, and resuscitation therapy.*
Material and methods: *After obtaining approval from Institutional ethical committee, the present study was undertaken at a tertiary care hospital. This was an observational clinical study.Adult patients above the age of 12 years who were diagnosed intra-operatively to have a small bowel perforation were enrolled in the study.*
Results : *At admission, maximum comorbidity was found to be Hypertension in 37 patients (38.5%) followed by Diabetes Mellitus in 26 (27.1%) patients. 22 (22.9%) patients were known cases of Bronchial Asthma. 1 patient was a known case of Ca Caecum (metastatic) on palliative treatment who presented with obstruction followed by perforation. Most patients presented to Casualty within 12-24 hours and the cause for delay was a delay in diagnosis by primary care giver followed by delay in transportation. The delay can also be attributed to the inconsistent nature of presentation in patients with perforation. Patients may also present acutely or indolently.*
Conclusion: *In our present study, we found commonest site of small bowel perforations was the ileum followed by jejunum and duodenum. The commonest complications associated with perforated small intestine were septicemia,chest infections followed by wound dehiscence.*
Keywords:*Small bowel perforations,Hypertension, Outcome*

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I. Introduction:

Mortality of secondary peritonitis was as high as 90% in the early 20th century and is still 30-50% despite advances in antibiotics, surgical technique, radiographic imaging, and resuscitation therapy.[1] The morbidity rate also remains significant in patients with small intestinal perforation.Considering this background, this study was taken to ascertain the age and sex prevalence of small bowel injuries and clinical features. It also was taken to study the time of presentation since first symptom, patient's important blood investigations, etiology and site of perforation and to correlate these findings with outcome. The correlation of these factors to the outcome is used to take measures in order to improve morbidity and mortality for patients. Early diagnosis, resuscitation and source control by the means of surgery cause a favourable outcome. [2]A delay in diagnosis, presence of co morbidities, increased age and deranged renal function tests are responsible for poorer outcome. This study took place in a tertiary care centre of Maharashtra state.

II. Material And Methods:

After obtaining approval from Institutional ethical committee, the present study was undertaken **at** a tertiary care hospital.This was an observational clinical study.
Adult patients above the age of 12 years who were diagnosed intra-operatively to have a small bowel perforation were enrolled in the study.

Inclusion criteria:

- All patients above 12 years of age duodenal/ileal/jejuna perforations diagnosed intraoperatively
- Patients giving written, informed and valid consent.

Exclusion criteria:

- Patients below 12 years of age
- Patients not willing to participate in study

97 patients diagnosed intraoperatively with small bowel perforations were enrolled serially. The study used a descriptive survey method to assess sociodemographic profile of patients with acute abdomen with clinical or radiological suspicion of small bowel perforation.

III. Results:

Maximum number of patients (35) were in the elderly i.e. >61 yrs age group (36.1%).
In the present study, there were 63 (64.9%) male and 34 (35.1%) female patients. The second most common age group was 51-60years with 21 patients (21.6%).
Of the 97 patients in the study, there was a clear male preponderance in the number of perforations but however, there were 5 female deaths (5.2%) and 2 male deaths (5.2%).
The mean age of patients was 52.35 years.
There were total 7 deaths in the present study, out of which 5 (5.2%) were female and 2 (2.1%) were male. There was a clear female preponderance of deaths in the study.

Table no. 1: co-morbid conditions

Comorbid Conditions	No. (x)	Total no. (%)
Diabetes	26	27.1
Hypertension	37	38.5
Bronchial Asthma	22	22.9
Infectious Disease	15	15.6
Known Malignancy	2	2.1
Others	1	1.1

At admission, maximum comorbidity was found to be Hypertension in 37 patients (38.5%) followed by Diabetes Mellitus in 26 (27.1%) patients. 22 (22.9%) patients were known cases of Bronchial Asthma. 1 patient was a known case of Ca Caecum (metastatic) on palliative treatment who presented with obstruction followed by perforation.

Most patients presented to Casualty within 12-24 hours and the cause for delay was a delay in diagnosis by primary care giver followed by delay in transportation. The delay can also be attributed to the inconsistent nature of presentation in patients with perforation. Patients may also present acutely or indolently.

Table no 2: Distribution of study subjects according to site of perforation

Site of Perforation	Sex		Total No (%)
Duodenal	9(9.2)	3(3.1)	12(12.3)
Ileal	28 (28.9)	16(16.5)	44(45.4)
Jejunal	24(24.7)	14(14.4)	38(39.2)
Jejunal, Ileal	2(2.1)	1(1)	3 (3.1)
Total	63(64.9)	34(35.1)	97(100)

The commonest site of perforation in present study is ileal (45.4%), followed by jejunal (39.2%) and duodenal (12.3%).

Table no 3: Distribution of study subjects according to amount of peritoneal contamination

amount of peritoneal contamination	Sex		Total No. (%)
	Male No. (%)	Female No. (%)	
Mild	9 (9.3)	2 (2.1)	11 (11.3)
Moderate	35 (36.1)	22 (22.7)	57 (58.8)
Gross	19 (19.6)	10 (10.3)	29 (29.9)
Total	63 (64.9)	34 (35.1)	97 (100)

(X^2= 1.694, d.f. = 2 P value= 0.429)

58.8% of patients presented with moderate peritoneal contamination and 29.9% presented with gross and infected peritoneal contamination. However, 11.3% presented with mild, well contained peritoneal spill on account of surrounding organs, omentum or liver, which act as a plug to prevent gross contamination by bowel contents.

Table no 4 : Distribution of study subjects according to Etiology of perforation
(X^2= 1.694, d.f. = 2 P value= 0.429)

Etiology	Male (%)	Female(%)	Total
Typhoid	13 (13.4%)	8 (8.24%)	21 (21.64%)
Tuberculosis	2 (2.06%)	0	2(2.06%)
Malignancy	2 (2.06%)	1(1.03%)	3(3.09%)
Iatrogenic	1 (1.03%)	0	1(1.03%)
Trauma	4 (4.12%)	0	4(4.12%)
Nonspecific	46 (46.42%)	23(23.71%)	69(71.13%)
Total	**68 (70.1%)**	**32 (32.98%)**	**97 (100)**

IV. Discussion:

In our study, maximum number of patients i.e. 69 (71.13%) did not have a clear histopathological diagnosis pertaining to any disease pathology. The most common amongst the patients who did have a proven cause was typhoid, responsible for perforations in 12 male patients (13.4%) and 8 females (8.24%), which accounted for a total of 21 (21.64%) of patients. The other causes of perforation in small bowel were tuberculosis of the abdomen in 2 (2.06%) patients and malignancy in 3 (3.09%) patients. Other etiologies were perforation by trauma in 4 (4.12%) and iatrogenic in 1 (1.03% of patients).

The maximum number of complications in the current study was in wound infection in 36.3% patients, followed by chest infections in 34 (35.4%) of patients. The third commonest complication was septicaemia in 15 (15.4%) patients. The other complications were strangulated ileostomy and hematemesis in 1 (1%) patients each. Perforations due to peptic ulcer disease were seen to be the most common cause of perforations in the studies by Jhobta RS 2006, Mohan R 2015, [3,4,5]except that of Doraijan et al [6] , who showed that the majority of the perforations were due to tuberculosis.

In the present study, Maximum number of patients i.e. 69 (71.13%) did not have a clear histopathological diagnosis pertaining to any disease pathology. The most common amongst the patients who did have a proven cause was typhoid, responsible for perforations in 12 male patients (13.4%) and 8 females (8.24%), which accounted for a total of 21 (21.64%) of patients. The other causes of perforation in small bowel were tuberculosis of the abdomen in 2 (2.06%) patients and malignancy in 3 (3.09%) patients. Other etiologies were perforation by trauma in 4 (4.12%) and iatrogenic in 1 (1.03% of patients). When correlating the etiology with outcome in present study, it was discovered that maximum mortality i.e. 5 deaths (5.1%) did not have a clear etiology on histopathological examination. 1 (1.1%) patient of traumatic perforation and 1 patient (1.1%) with known metastatic malignancy of colon died.

Dorairajan et al most common site of perforation as the duodenal region was reported as 36.92% by Mohan Rao, 2015, 32% by Dorairajan et al 1995 and 38.8% by Khan et al .[3,4,5] In the present study, the commonest site of perforation in present study is ileal (45.4%), followed by jejunal (39.2%) and duodenal (12.3%). However, in regards to the outcome of patient depending on the site of perforation, maximum mortality was seen in jejunal perforations i.e. 4 (4.1%), followed by 2 patients with ileal perforation (2.1%) and no deaths were noted in patients with duodenal perforation.

In the present study, the commonest complications associated with perforated small intestine were wound infection in 36.3% patients, followed by chest infections in 34 (35.4%) of patients. The third commonest complication was septicaemia in 15 (15.4%) patients. The other complications were strangulated ileostomy and hematemesis in 1 (1%) patients each.

Pandian M.S. [7]in his study reported morbidity and mortality related to delayed diagnosis, Velappan DP [8]reported no mortality noted in their study. Nahar and Ranjan et al [9]reported that there were 5 post-operative mortalities recorded in patients who presented late to us more than 72 hours from the time of perforation and all were present in patients of typhoid ileal perforation. Sai Dutta reported overall mortality of 11%.Ramchandra et al (2007) [10] reported 14% mortality and Agrawal et al 2007 [11] reported 10% mortality in small bowel perforations. The present study, showed overall mortality in these patients of 7% which is in par with other studies conducted in India.

V. Conclusion:

From this study, we conclude that the most common age of presentation in perforated small intestine was found >61 years with male preponderance. Age, co-morbid conditions and time of presentation since the first symptom were important factors contributing to small bowel perforations and leading to adverse outcomes. The clinical features of patients with small bowel perforation seen commonly were pain in abdomen and vomiting, constipation and abdominal distension.

In our present study, we found commonest site of small bowel perforations was the ileum followed by jejunum and duodenum.The commonest complications associated with perforated small intestine were septicaemia , chest infections followed by wound dehiscence. Small bowel perforations had a mortality rate of 7%.

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