



## An Audit on Gastrointestinal Perforation in a Tertiary Care Teaching Hospital Based in Northern Part of India: A Study of 100 Cases

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### Abstract

**Background:** A prospective study was conducted on 100 patients of perforation peritonitis: To find out the incidence of gastro intestinal perforation in various age groups, sex, rural or urban, socio economic status, To find out the various causes and sites of gastro intestinal perforations, To determine various types of procedures being done to treat gastro intestinal perforations. **Methods:** The study population consisted of 100 patients of perforation peritonitis admitted at surgical wards of Rajindra Hospital, Patiala. Patients underwent necessary investigations such as Blood counts, biochemical analysis and urine analysis. X-ray Abdomen and chest / USG Abdomen/Pelvis CT-Abdomen (as and when required). All diagnosed patients were subjected to surgery. In all cases, operative findings and postoperative course were followed up for three months. Final outcome was evaluated on the basis of clinical, operative and radiological findings. In pre-pyloric and duodenal perforation, GRAHAM'S PATCH REPAIR carried out. In Ileal and Jejunal perforations, primary closure or exteriorization done depending upon the condition of the gut and duration of the symptoms. The patient outcome was assessed by duration of hospital stay, wound infection, wound dehiscence, leakage/entero-cutaneous fistula, intra-abdominal collection/abscess, ileostomy related complications and reoperation. Wound infection was graded as per SSI grading. **Results:** Most common age group for perforation was 21-40 years (50%) followed by 41-60 (33%) years in present study. Mean age of the patients is 37.91 + 13.15 years with male predominance (78%) in our study. 4% of the patients were of upper socio-economic status while 32% of the patients were of middle and 64% of the patients were of lower socio-economic status. Abdominal pain was seen in 100% of the patients while abdominal distension was present in 69% of the patients. Nausea/Vomiting was seen in 61% of the patients while Fever and Constipation was seen in 53% and 86% of the patients respectively. Diarrhoea was seen in 3% of the patients. Tenderness, guarding & rigidity, distension, obliteration of liver dullness and evidence of free fluid were present in 100% of the patients. Bowel sounds were not detected in all the patients. Most common perforations were Duodena(37%), Ileal (25%), Gastric (25%) followed by Appendicular (9%), Jejunal (4%) and Colonic perforation (2%). The most common etiology of gastrointestinal perforations was Peptic ulcer followed by



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Typhoid, Appendicitis, Tuberculosis, Trauma, Malignancy and non-specific infection. In Gastric perforations, Peptic ulcer was the most common cause of perforation followed by Trauma. In Ileal perforations, Typhoid was the most common cause of perforation followed by Tuberculosis and non-specific infection. In Appendicular perforations, most common cause was Appendicitis. In Jejunal perforations, most common cause was Trauma. In Colonic perforations, most common cause was Malignancy. **Conclusions:** The incidence of gastrointestinal perforations was common in 21-40 years age group followed by 41-60 years age group with male preponderance in our study. The most common site of perforations was Gastro-duodenal followed by Ileal perforations and the most common cause for these perforations was peptic ulcer followed by typhoid. The most common procedure done to treat gastrointestinal perforations was primary closure, resection and anastomosis, appendectomy and stoma formation. However, small sample size and short follow up period were the limitations of the present study.

**Keywords:-** Gastrointestinal Perforation.

## INTRODUCTION

Gastrointestinal perforation is one of the most common cause of intra-peritoneal free air; its detection is important for diagnosis of life-threatening conditions in patients with acute abdomen. Gastrointestinal tract perforations can occur for various causes (peptic ulcer, inflammatory disease, blunt or penetrating trauma, iatrogenic factors, infections such as typhoid, tuberculosis etc., foreign body or a neoplasm); most of these perforations are emergency conditions requiring an early recognition and a timely surgical treatment.<sup>[1]</sup>

Ileal perforation is common surgical emergency in tropical countries. It is reported to constitute the common cause of abdominal emergencies due to high incidence of enteric fever in these countries.<sup>[2]</sup> Patients with perforation peritonitis should be treated with antibiotics, i.v. fluids, electrolyte replacement and blood transfusion if required. The surgical treatment of perforation peritonitis is based on

three basic principle viz. (1) to eliminate the source of bacterial contamination by treating the underlying pathologic process. (2) To decrease the degree of bacterial contamination in the peritoneal cavity. (3) To prevent recurrent or residual infection.<sup>[3,4]</sup>

Emergency laparotomy is performed to either repair or resect and anostomose the perforated segment or exteriorise the bowel segment bearing the perforation. An exploratory laprotomy is associated with many complication that arise in the postoperative period. These complications are divided into Immediate complications and Late complications. Immediate complications include pain, fever, paralytic ileus, abscess (superficial or deep), wound infection/dehiscence, enterocutaneous fistula. Late complications include adhesive intestinal obstruction and incisional hernia.<sup>[3,4]</sup>

The present study was a prospective study conducted to determine the incidence of



gastrointestinal perforation in the various age groups, sex, rural/urban, socio-economic status. We also assessed the various causes, sites of gastrointestinal perforations and different procedures being done to treat gastrointestinal perforation.<sup>[5,6]</sup>

## MATERIAL AND METHODS

This study was conducted after approval from institutional ethical committee 100 cases presenting with perforation peritonitis in department of Surgery, Rajindra Hospital/ Govt. Medical College, Patiala were considered for the study after the informed consent. Patients underwent necessary investigations such as Blood counts, biochemical analysis and urine analysis. X-ray Abdomen and chest / USG Abdomen/Pelvis CT-Abdomen (as and when required). All diagnosed patients were subjected to surgery. In all cases, operative findings and postoperative course were followed up for three months. Final outcome was evaluated on the basis of clinical, operative and radiological findings.

In pre-pyloric and duodenal perforation, GRAHAM'S PATCH REPAIR carried out. In Ileal and Jejunal perforations, primary closure or exteriorization done depending upon the condition of the gut and duration of the symptoms. The patient outcome was assessed by duration of hospital stay, wound infection, wound dehiscence, leakage/entero-cutaneous fistula, intra-abdominal collection/abscess, ileostomy related complications and reoperation. Wound infection was graded as per SSI grading. The complications were managed as per standard guidelines with operative and non-operative means. Tabulation of cases was done. Data obtained

was compiled and analysed by using SPSS statistics software 22 version.

## RESULTS

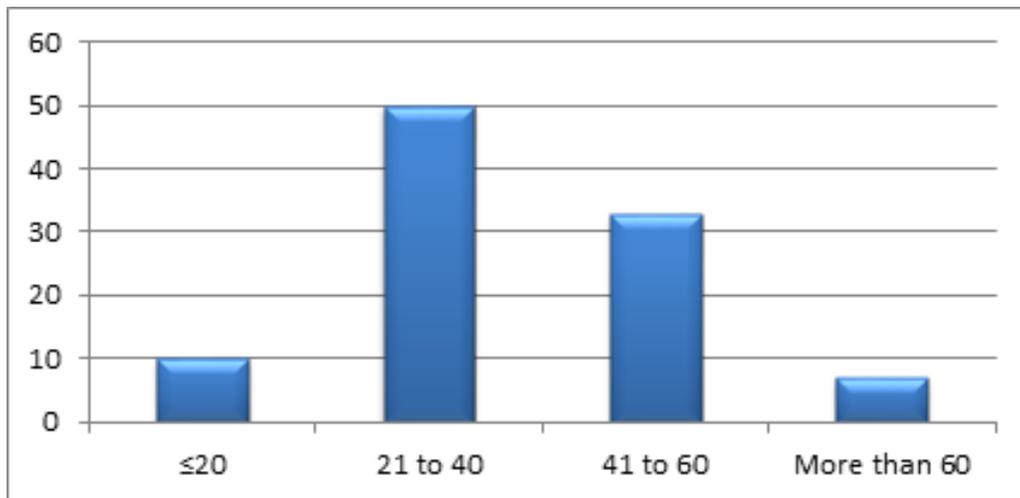
Most common age group for perforation was 21-40 years (50%) followed by 41-60 (33%) years in present study. Mean age of the patients is 37.91 + 13.15 years with male predominance (78%) in our study. 4% of the patients were of upper socio-economic status while 32% of the patients were of middle and 64% of the patients were of lower socio-economic status.

Abdominal pain was seen in 100% of the patients while abdominal distension was present in 69% of the patients. Nausea/Vomiting was seen in 61% of the patients while Fever and Constipation was seen in 53% and 86% of the patients respectively. Diarrhoea was seen in 3% of the patients. Tenderness, guarding & rigidity, distension, obliteration of liver dullness and evidence of free fluid were present in 100% of the patients. Bowel sounds were not detected in all the patients. Most common perforations were Duodena (37%), Ileal (25%), Gastric (25%) followed by Appendicular (9%), Jejunal (4%) and Colonic perforation (2%). The most common etiology of gastrointestinal perforations was Peptic ulcer followed by Typhoid, Appendicitis, Tuberculosis, Trauma, Malignancy and non-specific infection.

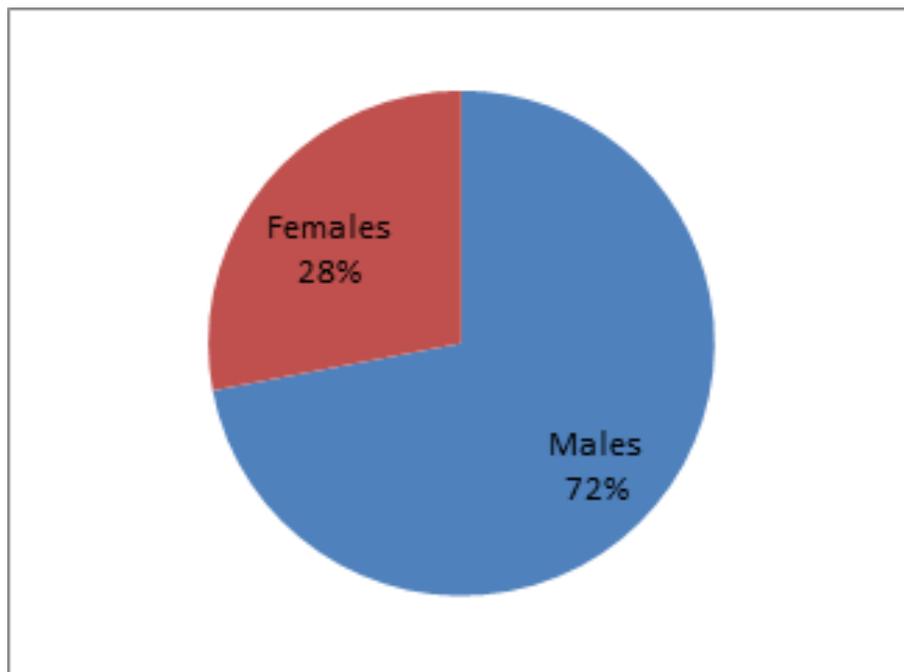
In Gastric perforations, Peptic ulcer was the most common cause of perforation followed by Trauma. In Ileal perforations, Typhoid was the most common cause of perforation followed by Tuberculosis and non-specific infection. In Appendicular perforations, most common

cause was Appendicitis. In Jejunal perforations, most common cause was Trauma. In Colonic perforations, most common cause was Malignancy. [Table 4] showed the incidence of surgical treatment given according

to the site of perforation. The Outcome of patients with gastrointestinal perforation. Death occurred in 5% (N=5) of the patients. While 95% (N=95) of the patients showed survival. [Figure 5].



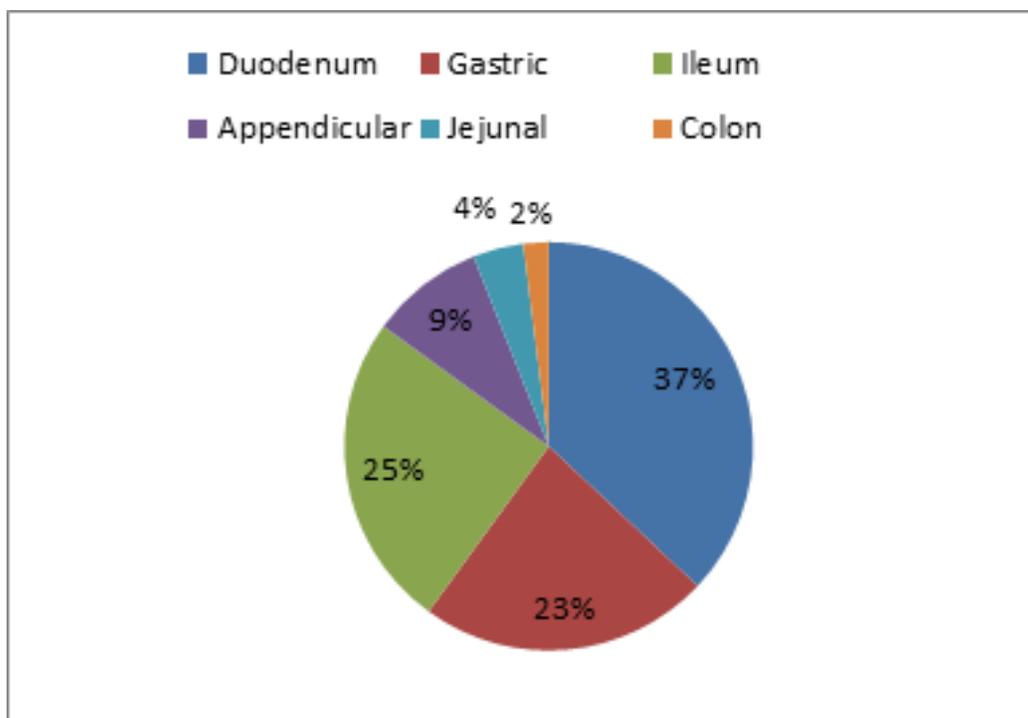
**Figure 1:** Incidence of gastrointestinal perforations according to different age groups



**Figure 2:** Incidence of gastrointestinal perforations according to gender.

**Table 1:** Shows the incidence of various associated symptoms in gastrointestinal perforations.

Signs	Number of patients
Abdominal pain	100
Abdominal distension	69
Nausea/ vomiting	61
Fever	53
Constipation	86
Diarrhoea	3



**Figure 3:** Distribution of patients according to the site of perforation

**Table 2:** Etiologic profile of gastrointestinal perforations

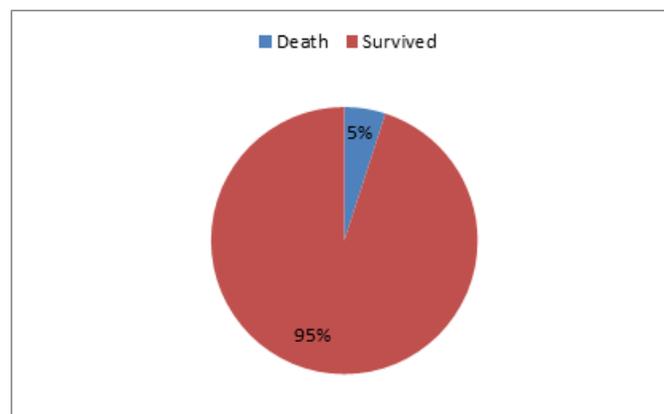
Etiologic profile	Number of patients
Peptic ulcer	57
Trauma	7
Typhoid	15
Tuberculosis	8
Appendicitis	9
Malignancy	2
Non-specific infection	2
Total	100

**Table 3:** Correlation of site of gastrointestinal perforations according to the etiologic profile.

Etiologic profile	Duodenum		Gastric		Ileum		Appendicular		Jejunal		Colon		Total	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Peptic ulcer	36	97.29%	21	91.30%	0	0%	0	0%	0	0%	0	0%	57	57%
Trauma	1	2.71%	2	8.7%	0	0%	0	0%	4	100%	0	0%	7	7%
Typhoid	0	0%	0	0%	15	60%	0	0%	0	0%	0	0%	15	15%
Tuberculosis	0	0%	0	0%	8	32%	0	0%	0	0%	0	0%	8	8%
Appendicitis	0	0%	0	0%	0	0%	9	100%	0	0%	0	0%	9	9%
Malignancy	0	0%	0	0%	0	0%	0	0%	0	0%	2	100%	2	2%
Non-specific infection	0	0%	0	0%	2	8%	0	0%	0	0%	0	0%	2	2%
Total	37	100%	23	100%	25	100%	9	100%	4	100%	2	100%	100	100%

**Table 4:** incidence of surgical treatment given according to the site of perforation

Site	Operative Procedure	Number of patients	%age
Duodenum (n=37)	PC with OP	33	89.18%
	B/L flank drain	4	10.81%
Gastric (n=23)	PC with OP	20	86.95%
	Closure in single layer	3	13.04%
Ileum (n=25)	Closure in single layer	10	40%
	PC with OP	13	52%
	Resection & anastomosis	2	8%
Jejunum (n=4)	Closure in single layer	3	75%
	Resection & anastomosis	1	25%
Appendix (n=9)	Appendectomy	9	100%
Colon (n=2)	Primary Closure	1	50%
	Colostomy	1	50%



**Figure 4:** Outcome of patients with gastrointestinal perforation

## DISCUSSION

Despite progress in emergency medicine, gastrointestinal tract perforation remains a condition associated with considerable mortality, ranging from 30 to 50%. Clinical presentation varies; oesophageal perforations can present with non-specific symptoms such as acute chest pain, odynophagia and vomiting; gastro-duodenal perforations typically present with acute abdominal pain, whereas colonic perforations tend to follow a slower progression course, presenting with secondary bacterial peritonitis or localised abscess formation. A subset of patients exhibits delayed symptoms, abscess formation that mimics an abdominal mass, or with sepsis.<sup>[7]</sup>

The most common age group for perforations was 21-40 years followed by 41-60 years with Mean age of 37.91 + 13.15 years in our study. The results were in concordance with the result obtained by previous authors who also reported similar findings. (Singla S et al Ersumo T et al and Utaal M et al).<sup>[6,7]</sup> Present study showed male predominance, similar results were reported by Utaal M et al and Ersumo T et al.<sup>[6,7]</sup> The male preponderance can be explained by excessive intake of alcohol, smoking, tobacco chewing which is more common in males than females. Also the incidence of acid peptic diseases is more in males as compared to the females.

In the present study Abdominal pain (100%) was most common symptom followed by abdominal distension (69%), Nausea/

Vomiting (61%) Fever(53%), Constipation(86%) and Diarrhoea (3%) of the patients. Tenderness, guarding & rigidity, distension, obliteration of liver dullness and evidence of free fluid were present in 100% of the patients. Bowel sounds were not detected in all the patients.

In a study conducted by Gupta et al, authors reported that Pain, Vomiting, Distension and Fever presented in 100%, 80%, 66% and 20% respectively.<sup>[8]</sup> Shah PH, Panchal HA, in their study reported presence of Abdominal pain, Vomiting, Distension and Nausea in 100%, 72%, 22% and 10% of the patients with Peptic ulcer perforations.<sup>[9]</sup> In another study conducted by Shah KD et al, Pain, Vomiting, Distension of abdomen, Fever and Constipation were seen in 100%, 76%, 72%, 56% and 64% of the patients respectively.<sup>[10]</sup> Chalya PL et al, in their study on patients with Peptic ulcer perforation, reported that the commonest presenting symptoms were sudden onset of Severe epigastric pain in 82 (97.6%), Abdominal distension in 64 (76.2%) and Vomiting in 31 (36.9%) patients.<sup>[11]</sup> Bhamre S et al, in their study on patients with Tuberculosis perforation, reported that Fever, Pain abdomen, Vomiting, Abdominal distension, Constipation and Diarrhoea were seen in 100%, 100%, 66.67%, 62.2%, 11.1% and 4.44 % of the patients respectively.<sup>[12]</sup> In a study conducted by Singla et al,<sup>[5]</sup> Acute abdominal pain was a symptom present in all the 100 cases. Other symptoms were Vomiting (64%), Abdominal distension (38%) and Fever (22%).

**Table 5:** Distribution of patients according to the site of perforation

Site	Present study (%)	Shah KD et al, <sup>[10]</sup> (%)	Utaal et al, <sup>[7]</sup> (%)	Singla S et al, <sup>[5]</sup> (%)
Duodenum	37	60	20	43%
Gastric	23	8	27.5	
Ileum	25	12	35	30%
Appendicular	9	14	10	10%
Jejunal	4	2	5	5%
Colon	2	2	2.5	7%
Meckel's diverticulum	0	2	0	6%
Rectal	0%	0%	0%	5%

In Gastric perforations, Peptic ulcer was the most common cause of perforation followed by Trauma. In Ileal perforations, Typhoid was the most common cause of perforation followed by Tuberculosis and non-specific infection. In Appendicular perforations, most common cause was Appendicitis. In Jejunal perforations, most common cause was Trauma. In Colonic perforations, most common cause was Malignancy. Our results were in concordance with the result obtained by Singla S et al and Utaal MS et al who also reported Peptic ulcer was the most common cause for gastrointestinal perforations in their respective studies.<sup>[5,7]</sup>

The results of our study are in congruence with the studies Gupta et al and Vagholkar.<sup>[8,13]</sup> In their studies, Peptic perforation was the most common etiology followed by Typhoid perforations. Khanna et al however, showed Enteric fever as the most common cause (108 out of 204 cases). High incidence of peptic

perforation was due to smoking and drinking habits of local population.<sup>[14]</sup>

In present study, in Duodenal and gastric perforations, Peptic ulcer was the most common etiology followed by Trauma. In Ileal perforations, Typhoid was the most common cause of perforation followed by Tuberculosis and non-specific infection. In Appendicular perforations, most common cause was Appendicitis. In Jejunal perforations, most common cause was Trauma. In Colonic perforations, most common cause was malignancy.

Shah PH, Panchal HA, conducted a study on acute peptic gastrointestinal perforations and found Duodenal involvement in 83.67% (N=41/50) and Gastric involvement occurred in 16.33% (N=9/50) of the patients with Peptic ulcer perforations.<sup>[9]</sup>

Sule AZ, conducted a study on gastrointestinal perforations following blunt trauma abdomen and found that Ileum was involved in 34.78%

(N=8/23) of cases, Gastric in 8.69% (N=2/23) cases, Jejunal in 39.13% (N=9/23) cases, Colon in 8.69% (N=2/23) cases, Jejunal/Ileal in 8.69% (N=2/23) cases of traumatic perforation. Ciftci AO et al, in their study on patients with traumatic perforations found Gastric involvement occurred in 11.42% (N=4/35) cases, Duodenal in 5.71% (N=2/35) cases, Ileum in 34.28% (N=12/35) cases, Jejunal in 31.42% (N=11/35), Colon in 5.71% (N=2/35), Jejunal/Ileal in 8.57% (N=3/35) and Ileum and colon in 2.85% (N=1/35) cases of traumatic perforations.<sup>[15,16]</sup>

In patients with Duodenal perforations, PC with OP is done in 89.18% while B/L flank drain is done in 10.81% patients. In Gastric perforations, PC with OP is done in 86.95% patients while closure in single layer is done in 13.04% patients. In patients with Ileal perforations, closure in single layer is done in 40% patients, PC with OP is done in 52% patients and resection & anastomosis is done in 8% patients. In patients with Jejunum perforations, closure in single layer is done in 75% patients while resection & anastomosis is done in 25% patient. In patients with Appendicular perforations, appendectomy is done in 100% patients. In patients with Colon perforations, primary closure is done in 50% patient and colostomy is done in 50% patient.

In a study conducted by Mukhopadhyay M, patients with traumatic perforations, treatment consisted of simple closure of the perforation, resection & anastomosis and repair followed by protective colostomy for colonic perforations.<sup>[17]</sup>

In another study, Ciftci AO, reported that Gastric and Duodenal involvement were treated with simple closure while Ileum involvement were treated with simple closure and resection & anastomosis.<sup>[16]</sup>

Singla et al, in their study, reported that patients with traumatic perforations were managed with Primary repair (3 patients), resection & anastomosis (1 patient) and ileostomy/colostomy (3 patients).<sup>[5]</sup>

In another study conducted by Arslan et al, the most affected organ was the Ileum, which was detected in 37 (39 %) patients. Primary repair was performed on 71 (74 %) patients. Resection was performed on 22 (23 %) patients while 3 (3 %) patients underwent an ostomy.<sup>[18]</sup>

Bhamre et al, in their study on patients with Tubercular perforations reported that closure was done in 73.3% of the cases while resection & anastomosis was done in 22.2% of the cases. In another study by Chalya et al, simple closure of the perforations was the most commonly done procedure accounting for 78.8% of cases with tubercular perforation and this was generally done in two layers after excising the edges.<sup>[11]</sup> Shah PH et al, in their study on patients with Peptic ulcer perforation, simple closure + omentopexy was done in 80% of the patients while drainage was done in 4%.<sup>[9]</sup> Singla et al, in their study on patients with Appendicular perforation reported that all the patients were treated with appendectomy.<sup>[5]</sup>

**Table 6:** shows Mortality outcome of gastrointestinal perforation of various studies

Various studies	Mortality outcome
Utaal et al, <sup>[2]</sup>	12.5%
Noguiera et al, <sup>[19]</sup>	10%
Ciftci AO et al, <sup>[16]</sup>	5.7%
Arslan S et al, <sup>[18]</sup>	5%
Shah PH et al, <sup>[9]</sup>	2.04%
Chalya PL et al, <sup>[11]</sup>	10.7%
Nuhu A et al, <sup>[20]</sup> Nasio NA et al, <sup>[21]</sup>	2-25%
Bhamre et al, <sup>[6]</sup>	6.67%
Singla et al, <sup>[3]</sup>	5%
Present study	5%

## CONCLUSIONS

The incidence of gastrointestinal perforations was common in 21-40 years age group followed by 41-60 years age group with male preponderance in our study. The most common site of perforations was Gastro-duodenal followed by Ileal perforations and the most common cause for these perforations

was peptic ulcer followed by typhoid. The most common procedure done to treat gastrointestinal perforations was primary closure, resection and anastomosis, appendectomy and stoma formation. However, small sample size and short follow up period were the limitations of the present study.

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