

Clinicopathological Study of Perforation Peritonitis

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Abstract

Background: Peritonitis is defined as inflammation of the serosal membrane that lines the abdominal cavity and the organs contained therein. It is often caused by introduction of an infection into the otherwise sterile peritoneal environment through perforation of bowel. This study is an attempt to analyze perforation peritonitis according to demography, clinical presentations, investigations, anatomical sites of perforation, complications and outcome of surgical management. **Methods:** 100 patients of perforation peritonitis visiting the surgery department in last two years, more than 12 years of age, were included. Demographic details, chief complaints, past, personal and family history, general physical and local examination, hematological and radiological investigations were performed. Type of surgical procedure, treatment modalities and details of complications were noted. **Results:** Mean age at the time of presentation was 36.68 years. Male female ratio was 6.14:1. Most common symptom was pain abdomen (100.00%) followed by vomiting (67%). 28% patients were diabetic and 20% hypertensive. 48.00% were dehydrated, 82.00% had tachycardia while 10.00% patients presented in shock. Most common cause of perforation peritonitis was peptic (44%) followed by appendicular (22%), enteric (15%), traumatic (13%), gall bladder (3%) and ischemic (3%) perforations. Most common site of perforation was duodenum (32%) followed by appendix (22%). Repair with omental patch was the most frequent procedure performed. 25% patients developed wound infection while 12% had chest infection. Septicaemia occurred in 10% cases and 5% patients eventually developed burst abdomen. Mortality rate was 15%. **Conclusion:** Perforation peritonitis is mostly seen in males during 3rd and 4th decade of life & present with pain abdomen, vomiting and distension. History of fever is one of the most useful clinical criteria to differentiate typhoid from other perforations. Peptic perforation is the most common cause followed by appendicular perforation. These cases are managed surgically. Patients may develop complications like wound and chest infection in the post operative period.

Keywords: Perforation; Peritonitis; Peptic; Appendicular; Ileal

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I. Introduction

Peritonitis is defined as inflammation of the serosal membrane that lines the abdominal cavity and the organs contained therein. Peritonitis is often caused by introduction of an infection into the otherwise sterile peritoneal environment through perforation of bowel, such as ruptured appendix. The disease may also be caused by introduction of a chemically irritating material, such as gastric acid from a perforated ulcer. Peritonitis secondary to perforation of the gastro intestinal tract, a common occurrence in this country, requires emergency surgical intervention and is associated with significant morbidity and mortality rates.

The first clinical description of perforated peptic ulcer was made by Crisp in 1843. Smoking and use of non-steroidal anti inflammatory drugs are important risk factors for perforation¹. Diagnosis is made clinically and confirmed by the presence of pneumoperitoneum on radiograph. Ileal perforation is a common surgical emergency in the tropical countries. It is reported to constitute the 5th commonest cause of abdominal emergencies due to high incidence of enteric fever and tuberculosis in these countries. Despite the availability of modern diagnostic facilities and advances in treatment regimens, this condition is associated with a high mortality and unavoidable morbidity². In untreated cases of appendicitis, the infection progresses to local peritonitis with formation of an appendicular mass, gangrene of the appendix, perforation and generalized peritonitis. Acute mesenteric ischemia, though a relatively rare condition, poses a particular surgical challenge because failure to diagnose it early results in death. It refers to a threatened or established ischemic necrosis of the major part of the bowel and tends to occur in patients of either sex predominantly those above 50 years of

age. The presence of peritoneal signs mandates surgical exploration, as bowel infarction has probably occurred. In this study, perforation peritonitis patients were examined and studied for age and sex distribution, clinical presentations, investigations, various anatomical sites of perforation, complications and outcome of surgical management.

II. Materials And Methods

The present retrospective and prospective observational study was conducted in various wards of the Department of General Surgery of a tertiary care hospital in north India, after ethical approval. 100 cases of visiting the surgery department in last two years were enrolled in the study. All patients of peritonitis secondary to hollow viscous perforation, more than 12 years of age were included. Patients with tertiary peritonitis and those with peritonitis due to other causes other than hollow viscous perforation (anastomotic dehiscence or leak) were excluded. Demographic details like age, gender, religion, address, occupation, admission details were noted. Presenting chief complaints was recorded in chronological order along with history of presenting illness, past, personal and family history. General physical examination was done. Detailed Local examination was recorded followed by systemic examination in every case. Blood investigations including haemogram, random blood sugar, liver function tests, blood urea, serum creatinine were measured in all patients. Radiological investigations like X-ray chest & Flat Plate abdomen, ultrasonography abdomen, Contrast Enhanced Computed Tomography of abdomen(if required) were performed. Type of surgical procedure, various treatment modalities and details of complications were noted. Categorical data were assessed in the form of absolute numbers and percentages. Quantitative data was assessed by calculating range and measures of central tendency such as mean and standard deviation.

III. Results

In our study maximum incidence of perforation peritonitis was observed among the age group 21-50 years. Mean age at the time of presentation was 36.68 years. The youngest patient was 14 years old while oldest was 70 years of age. Out of 100 patients 86(86%) were males and 14(14%) females.

Male female ratio noted was 6.14:1. The most common symptom was pain abdomen (100.00%) followed by vomiting (67%), abdominal distension (51%) & fever in 30% patients. History of addictions and comorbidities revealed, 28% were diabetic, 20% hypertensive and 7% had chronic obstructive pulmonary disease. 39% cases had history of chewing tobacco, 36% were tobacco smokers, 23% alcoholics, 19% were addicted to opium & 15% had history of taking NSAID regularly. On general examination 48 (48.00%) were dehydrated, 82(82.00%) had tachycardia and 10 (10.00%) patients presented with shock. On local examination abdominal distension was present among 60% patients. Tenderness over abdomen was found in all the patients with perforation peritonitis. Guarding/rigidity over abdomen was noted in 84 % cases. On percussion, liver dullness was obliterated in 65% cases and on auscultation, bowel sound was absent in 80% cases. Figure 1 shows the distribution of cases according to etiology of perforation peritonitis. Most common cause of perforation peritonitis was peptic perforation (44%) followed by appendicular (22%), enteric (15%), traumatic (13%), gall bladder (3%) and ischemic (3%).

Figure 1: Distribution of cases according to etiology of perforation peritonitis.

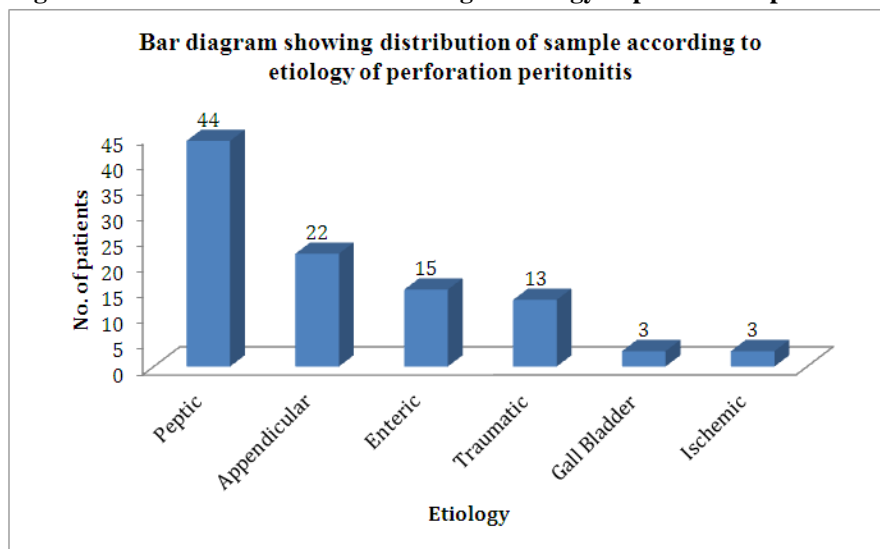


Table 1 shows that maximum cases of perforation peritonitis occurred within the age group of 21-50 years. The incidence of peptic perforation was maximum in the age group 31- 50 years. Appendicular perforation was commonly noted among young patients between 12-30 years of age. Enteric perforation was frequent during 2nd to 4th decade of life. Traumatic perforation was considerably prevalent amongst 21-50 years of age.

TABLE 1: Distribution of sample according to etiology and age in perforation peritonitis

Age (yrs)	Peptic	Appendicular	Enteric	Traumatic	Gall bladder	Ischemic	Total
12-20	0	12	2	2	0	0	16
21-30	9	5	3	2	0	1	20
31-40	14	2	5	3	2	1	27
41-50	16	1	2	4	0	0	23
51-60	4	0	1	1	0	0	6
61-70	1	2	2	1	1	1	8
Total	44	22	15	13	3	3	100

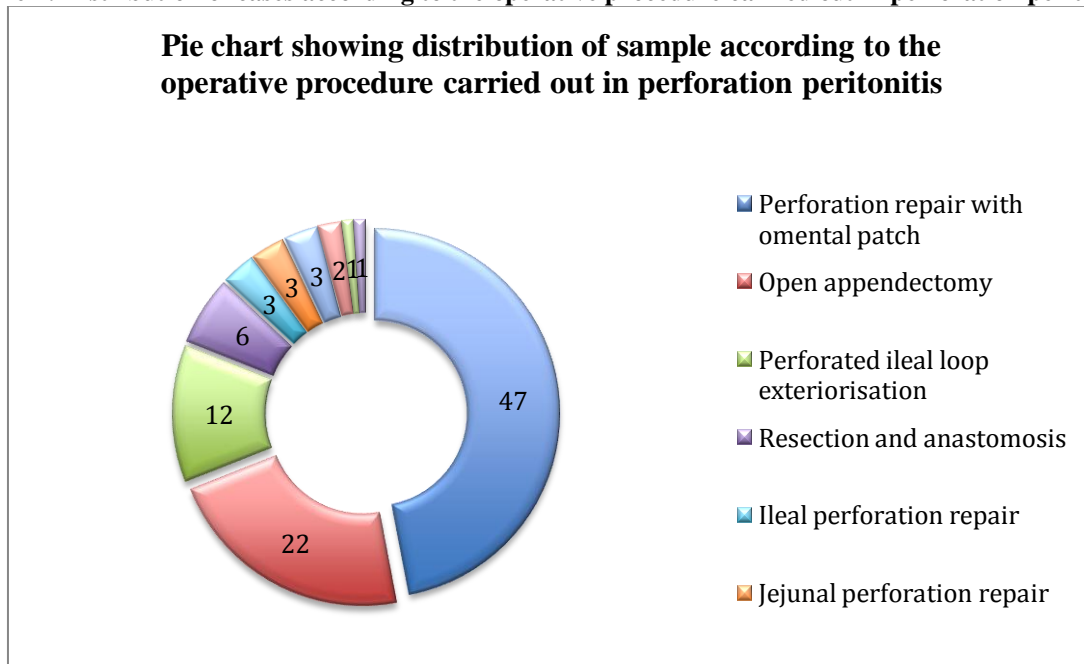
Table 2 shows distribution of sample according to etiology and clinical presentation in perforation peritonitis. Pain was present in all 100 cases of perforation peritonitis (100%). Vomiting was common in peptic (81.81%), appendicular (77.27%) and enteric (46.66%) perforations. 38.46% patients with traumatic perforation had vomiting. Abdominal distension was more in cases of peptic (75%) and enteric (66.66%) perforations. Fever was significantly present in 80% cases of enteric perforation and it was antecedent to pain abdomen.

Table 2: Distribution of sample according to etiology and clinical presentation in perforation peritonitis.

Etiology	Pain		Vomiting		Abdominal distension		Fever	
	No.	%	No.	%	No.	%	No.	%
Peptic	44	100	36	81.81	33	75.00	7	15.90
Appendicular	22	100	17	77.27	3	13.63	9	40.90
Enteric	15	100	7	46.66	10	66.66	12	80.00
Traumatic	13	100	5	38.46	3	23.07	1	7.69
Ischemic	3	100	1	33.33	1	33.33	0	0.00
Gall bladder	3	100	1	33.33	1	33.33	1	33.33

In this study, gas under diaphragm on X-ray flat plate abdomen was present in 70 % cases of perforation peritonitis. Gas under diaphragm was noted in 100% cases of peptic perforation, 92.30% traumatic perforation & 80% enteric perforation cases. It was absent in cases of appendicular and gall bladder perforations. Among the 15 cases with enteric perforation 12(80.00%) had positive Widal test while 3 (20.00%) were negative for Widal test. Out of 100 cases of perforation peritonitis nearly all patients (98%) had free fluid in peritoneal cavity on USG abdomen scan. 30 patients with perforation peritonitis in this study underwent CECT abdomen. Free fluid and free air was noted in 46.66%, free fluid and fat stranding in 33.33%, fat stranding in 13.33% & only 6.67% had fat stranding and air pockets. In this study most common site of perforation was found in duodenum (32%) followed by appendix (22%). Ileum was perforated in 17% cases, stomach in 15%, jejunum in 7%, colon in 4% and gall bladder in 3% cases. Figure 2 depicts the distribution of cases according to the operative procedure carried out in perforation peritonitis.

Figure 2: Distribution of cases according to the operative procedure carried out in perforation peritonitis.



Patients were observed for any complications. 48 (48%) patients had uneventful recovery in post operative period. 25 (25%) patients developed wound infection while 12 (12%) had chest infection. Septicemia occurred in 10 (10%) cases and 5 (5%) patients eventually had burst abdomen in the post operative period.

11 (25%) patients with peptic perforation developed wound infection, 7 (15.90%) had chest infection. Septicemia and burst abdomen occurred in 3(6.81%) patients each respectively. In appendicular perforation 3 (13.63%) patients developed wound infection and 1 (4.54%) suffered from chest infection. In enteric perforation 6 (40%) patients developed wound infection, 2 (13.33%) septicemia and 1 (6.66%) patient each had chest infection and burst abdomen. Cases with traumatic perforation had 38.46% wound and 23.07% chest infection. 15.38% progressed to septicemia and 7.69% had burst abdomen. Septicemia was also found in 2 cases of gall bladder and 1 case of ischemic perforation. (Table 3)

TABLE 3: Distribution of sample according to etiology and complications in perforation peritonitis

Complications	Peptic		Appendicular		Enteric		Traumatic		Ischemic		Gall bladder	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Wound infection	11	25.00	3	13.63	6	40.00	5	38.46	0	0.00	0	0.00
Chest infection	7	15.90	1	4.54	1	6.66	3	23.07	0	0.00	0	0.00
Septicemia	3	6.81	0	0.00	2	13.33	2	15.38	1	33.33	2	66.66
Burst abdomen	3	6.81	0	0.00	1	6.66	1	7.69	0	0.00	0	0.00
Nil	20	45.45	18	81.81	5	33.33	2	15.38	2	66.66	1	33.33
Total	44	100	22	100	15	100	13	100	3	100	3	100

The outcome of management was: 85(85%) were discharged while 15(15%) expired. Thus, the mortality in this study was found to be 15%. 15% patients had expired amongst which 10 (66.66%) were addicted to opium. 85% patients recovered and were discharged amongst which 9 (10.59%) were opium addicts. 5 (11.36%) cases with peptic perforation, 2 (13.33%) enteric, 5 (38.46%) traumatic, 2 (66.66%) gall bladder and only 1 (33.33%) case with ischemic perforation expired. Overall mortality observed was 15%.

IV. Discussion

The present study was conducted on 100 patients of perforation peritonitis admitted in various surgical wards over a period of two years.

In this study, maximum incidence of perforation peritonitis was observed among the age group 31-40 years. Our study confirms well with the study of Mukherjee S et al³ who also noted the mean age at the time of presentation 39.8 years, while in their study maximum number of patients belonged to the age group 31-40 years. Jhobta RS et al⁴ also observed mean age of 36.8 years whereas Bali et al⁵ noted mean age of 37.8 years.

In this study, male female ratio noted was 6.14:1 confirming a male preponderance of perforation peritonitis. It is comparable to that of Sarkar R et al⁶ who found 82.2% males and 17.8% females among patients with perforation peritonitis. Jhobta RS et al⁴ obtained similar incidence of perforation peritonitis involving 84% males. Bali et al⁵ also observed that majority of the patients in their study were males (68.5%)

Most common symptom in this study was pain abdomen followed by vomiting, abdominal distension & fever. Jhobta RS et al⁴ also observed pain abdomen as the most common symptom (98%) followed by vomiting (59%), abdominal distension (44%) & fever in 25% cases. Bali et al⁵ reported 98% patients with pain abdomen, 41.5% with vomiting and 28% with abdominal distension whereas Thirumalagiri VR et al⁷ noted abdominal pain in all cases, vomiting in 68% & fever in 54% of cases.

Co-morbid conditions are commonly associated with perforation peritonitis. Mukherjee S et al³ reported 48% cases with chronic obstructive pulmonary disease, 9.9% with hypertension and 3.16% cases with diabetes mellitus in their study on perforation peritonitis whereas in the study done by Jhobta RS et al⁴ on perforation peritonitis 10% cases had chronic obstructive pulmonary disease, 2% had hypertension and 1% had diabetes mellitus. Our finding on NSAID intake is similar to the study conducted by Bali et al⁵ on perforation peritonitis with 15% patients having positive history of NSAID intake whereas in the study by Mukherjee S et al³ 42% patients had history of NSAID intake.

In this study, out of 100 patients, 48 (48.00%) were dehydrated, 82(82.00%) had tachycardia and 10 (10.00%) patients presented in shock. In the study conducted by Thirumalagiri VR et al⁷ dehydration was present in 70% patients with perforation peritonitis at the time of presentation. Tachycardia was noted in 23% cases in a study conducted by Jhobta RS et al⁴ on perforation peritonitis. Mukherjee S et al³ also found 8.6% patients of perforation peritonitis with shock at presentation in their study.

In the present study, abdominal distension was present among 60% patients. Tenderness over abdomen was found in all the patients with perforation peritonitis. Our study is comparable to that of Thirumalagiri VR et al⁷ who noted abdominal tenderness in all cases, abdominal distension in 50% cases, guarding/rigidity in 90% cases and obliteration of liver dullness in 74% cases.

Among the causes, peptic perforation was commonest, followed by appendicular, enteric, traumatic, gall bladder and ischemic. Our study is comparable to that of Bali et al⁵ where the commonest cause of perforation peritonitis was gastroduodenal perforation due to acid peptic disease (45%) followed by appendicitis (18.5%), typhoid fever (12%) and trauma (9%). Similarly, in the study conducted by Sarkar R et al⁶ the most common cause of perforation was peptic ulcer disease found in 65% of patients, followed by acute appendicitis found in 21.3% of cases.

In this study, the incidence of peptic perforation was maximum in the age group 31-50 years. Appendicular perforation was commonly noted among young patients between 12-30 years of age. Enteric perforation was frequent during 2nd to 4th decade of life. Traumatic perforation was considerably prevalent amongst 21-50 years of age. In the study done by Rohit DK et al⁸ on peptic perforation, the peak incidence of the condition was in the 4th and 5th decade of life. The age of the patients was within a range of 16 to 75 years. Thirumalagiri VR et al⁷ noted most cases of appendicular perforation among age group 20-29 years of age. Enteric perforation was high among the age group 30-39 years in the study done by Jain S et al⁹. Maximum number of patients were young adults in their 2nd and 3rd decades. SH Kulkarni¹⁰ in his study found maximum cases of traumatic perforation in younger age group of 21-40 years.

In our study pain was present in all 100 cases of perforation peritonitis. Vomiting was common in peptic, appendicular and enteric perforations. Abdominal distension was more in cases of peptic and enteric perforations. Fever was significantly present in 80% cases of enteric perforation and it was antecedent to pain abdomen. In the study performed by Jain S et al⁹ on enteric perforation the commonest symptoms were abdominal pain (100%) and fever (93.33%). Bali et al⁵ noted that patients with typhoid perforation had an initial history of high grade fever prior to abdominal complaints. Rohit DK et al⁸ in their study on peptic perforation found pain abdomen in 100% cases, vomiting in 75.5% & abdominal distension in 57.7% cases. In the study conducted by Thirumalagiri VR et al⁷ all 14% patients had appendicular perforation and all of them presented with abdominal pain and vomiting.

With reference to X ray findings, Bali et al⁵ in their study on perforation peritonitis noted pneumoperitoneum on chest X-ray in 79% patients. 67% patients had gas under diaphragm on chest X- ray in the study conducted by Jhobta et al⁴. Rohit DK et al⁸ noted gas under diaphragm on chest X-ray in 80% cases of

peptic perforation. Jain et al noted pneumoperitoneum on chest X-ray in 91.42% cases of enteric perforation. In the study done by Bajiya PR et al¹¹ pneumoperitoneum was present in 65.4% cases of traumatic perforation.

Our study is similar to that of Jain S et al⁹ in terms of Widal test positivity, where it was positive in 78.09% cases of enteric perforation.

In our study, out of 100 cases of perforation peritonitis nearly all patients (98%) had free fluid in peritoneal cavity on USG abdomen scan. This is comparable to that of Heinz Neugebauer¹² who in his study on 70 cases of perforation peritonitis found peritoneal free fluid on USG abdomen in all the cases.

In this study most common site of perforation was found in duodenum followed by appendix. Sarkar R et al⁶ also found in their study that duodenum was the commonest site of hollow viscus perforation (63.8%), followed by appendicular (20.7%) and ileal (10.3%) perforation. In the study conducted by Mukherjee S et al³, duodenum (54%) was the most common site of perforation followed by ileal perforation (23%). Gall bladder was involved in only 2 out of 221 cases. Jhobta RS et al⁴ noted duodenum as the commonest site of perforation (57%) followed by ileal (15%), appendicular (12%), gastric (8%) and colonic (4%).

In this study, most of the patients underwent perforation repair with omental patch (47%). Open appendectomy was performed in 22% cases. Perforated ileal loop exteriorisation was done in 12% cases. Resection and anastomosis, ileal perforation repair, jejunal perforation repair, open cholecystectomy, sigmoid resection with end colostomy, perforated sigmoid loop exteriorisation and transverse colostomy were the less frequent ones. In the study carried out by Thirumalagiri VR et al⁷, most common procedure done was omental patch closure (60%). Appendectomy was done in 14% of cases, closure was done in 12% of cases, Resection and anastomosis was done in 6% of cases and loop ileostomy was done in 8% of cases whereas in the study conducted by Bali et al⁵, most common procedure done was omental pedicle closure of peptic ulcer perforation (43.75%), followed by exteriorisation of the gut in the form of ileostomy or colostomy (22.5%). Appendectomy was the third most common procedure (17%).

On the basis of complications observed, our study shows that wound infection was commonest. Mukherjee S et al³ in their study reported wound infection as the most common post operative complication in perforation peritonitis (22.1%). Chest infection was present in 13.5% cases. 18% patients developed septicaemia and 6.7% had burst abdomen post operatively. In the study conducted by Jhobta RS et al⁴, wound infection was noted in 25% cases, pneumonia in 28% cases, septicaemia in 18% cases and burst abdomen in 9% cases post operatively.

In our study 11 (25%) patients with peptic perforation developed wound infection, 7 (15.90%) had chest infection. Septicemia and burst abdomen occurred in 3(6.81%) patients each respectively. In appendicular perforation 3 (13.63%) patients developed wound infection and 1 (4.54%) suffered from chest infection. In enteric perforation 6 (40%) patients developed wound infection, 2 (13.33%) septicaemia and 1 (6.66%) patient each had chest infection and burst abdomen. Cases with traumatic perforation had 38.46% wound and 23.07% chest infection. 15.38% progressed to septicaemia and 7.69% developed burst abdomen. Septicaemia was also found in 2 cases of gall bladder and 1 case of ischemic perforation.

In the study conducted by Jain S et al⁹ on enteric perforation, most common post operative complication seen was wound infection (22.85%). Rohit DK et al⁸ in their study on peptic perforation noted wound infection in 57.7% cases, chest infection in 26.6%, septicaemia in 11.1% and burst abdomen in 6.6% cases post operatively. Bajiya PR et al¹¹ in their study on traumatic perforation reported chest infection in 35.9% cases, wound infection in 21.8% & wound dehiscence in 7.7% cases postoperatively.

Mortality in this study was found to be 15%. Bali et al⁵ in their study observed overall mortality rate 7% in perforation peritonitis. Mortality rate was 12.2% in the study done by Mukherjee S et al³ and 10% in the study conducted by Jhobta RS et al⁴ on perforation peritonitis. The overall mortality in perforation peritonitis ranges between 6 and 27 percent¹³. Factors involved in death included septicaemia due to fecal peritonitis, respiratory complications, pulmonary embolism, and late presentation. One of the most important factors responsible for mortality is septicemia. Adequate preoperative resuscitation (with fluids, etc.), correction of electrolyte imbalances followed by an early surgical intervention, to remove the source of infection and stop further contamination, is imperative for good outcome minimizing morbidity and mortality.

Rohit DK et al⁸ in their study on peptic perforation observed 11.1% mortality. Jain S et al noted a mortality rate of 9.52% in cases of enteric perforation and Bajiya PR et al¹¹ reported 12.8% mortality rate in cases with traumatic perforation.

It can be concluded that perforation peritonitis is mostly seen in males during 3rd and 4th decade of life & present with pain abdomen, vomiting and distension. History of fever is one of the most useful clinical criteria to differentiate typhoid from other perforations. Peptic perforation is the most common cause followed by appendicular perforation. These cases can be confirmed with X-ray flat plate abdomen. Ultrasonography and CECT abdomen are done in selected cases. These cases are managed surgically. Patients may develop complications in the post operative period in which wound and chest infection are the common complications encountered. Septicaemia can occur in some patients which increases the mortality.

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