

Clinical Study of Perforation Peritonitis- A Study of 100 Cases

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Abstract: For the gastrointestinal surgeon, the clinically most relevant form of peritonitis is secondary bacterial peritonitis that is peritoneal inflammation caused by loss of integrity of the gastrointestinal tract with consequent leakage of the intestinal contents into the peritoneal cavity. Despite advances in surgical techniques, antimicrobial therapy and intensive care support, management of peritonitis continues to be highly demanding, difficult and complex. This article attempts to study the etiology, clinical profile, aids to diagnosis and management of perforation peritonitis including management of complications encountered after surgery.

Keywords: clinical study; intestinal perforation; peritonitis; appendix, Peptic perforation

I. Introduction

Peritonitis is defined as inflammation of the peritoneal cavity. Perforation peritonitis is the most common surgical emergency in India. The spectrum of aetiology of perforation in India continues to be different from western countries and there is paucity of data regarding its aetiology, prognostic indicators, morbidity and mortality pattern. In majority of cases, presentation to the hospital is late with well-established generalized peritonitis with purulent/faecal contamination and varying degree of septicaemia.^{1,2}

Etiology: Typhoid fever is the commonest cause of ileal perforation in India. Other causes of perforation include perforation of peptic ulcers which are usually encountered along the first part of the duodenum anteriorly and in the pylorus of the stomach, nonspecific ileal perforations caused due to sub mucus vascular embolism, chronic ischemia due to atheromatous vascular disease, ischemia due to arteritis or drugs such as enteric coated potassium tablets. These 'nonspecific' ileal perforations are closely followed by small bowel perforations occurring in intestinal tuberculosis. Most of these (50-80%) occur in the ileum, usually proximal to strictures of the bowel. Other rare causes of perforation include blunt trauma abdomen, intestinal amoebiasis, gastrointestinal carcinomas, foreign bodies, ulcerative colitis, Meckel's diverticulum, steroid ulcer of ileum, radiation treatment for GI malignancy causing mucosal ischemia, iatrogenic perforation.

Other sites of perforation which cause secondary bacterial peritonitis include appendicular perforation secondary to appendicitis, gall bladder perforation secondary to gall stones, perforation due to obstruction, perforation arising from biliary tree, uterus, splenic and liver abscesses.

Patients with perforation peritonitis should be treated with antibiotics, i.v. fluids, electrolyte replacement and blood transfusion. The surgical treatment of perforation peritonitis is based on three basic principles 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.^{1,3}

Emergency laparotomy is performed to either repair or resect and anastomose the perforated segment or exteriorize the bowel segment bearing the perforation.

An exploratory laparotomy is associated with many complications that arise in the postoperative period. These complications are divided into:

- Immediate complications
- Late complications

Immediate complications include pain, fever, paralytic ileus, abscess (superficial or deep), wound infection/dehiscence, entero-cutaneous fistula.

Late complications include adhesive intestinal obstruction and incisional hernia.

A retrospective study was conducted which involved analysis of 192 patients treated for non-traumatic perforation of small intestine in a tertiary care teaching hospital in North India. The clinical profile and management of the patients were studied. The most common cause of non-traumatic perforation of small intestine was typhoid (46.4%); followed by non-specific inflammation (39.2%), tuberculosis (12.8%), and malignant neoplasm (1.6%). Primary repair was the most frequent procedure (44.0%), followed by ileostomy (25.5%), and resection-anastomosis (19.3%). Superficial wound infection was the most frequent post-operative complication (46.8%), followed by wound dehiscence (31.3%). The wound infection rate was reduced significantly following delayed primary closure of skin incision. Entero-cutaneous fistula/leak developed in

11.5% patients. Salvage ileostomy for post-operative intestinal leak resulted in a better survival rate as compared to conservative treatment (85.7% vs. 50.0%). The overall mortality rate was 16.6%.⁴

Prajakt V Patil et al studied 150 cases of perforation peritonitis admitted in Dr. R.N.Cooper Municipal General Hospital, Mumbai in the year of 2006. All cases were diagnosed with perforation peritonitis. In the study, 126 patients were male, with male: female ratio of 5.25:1. The mean age was 42.5 years. Majority of patients were from the age group of 21-30 years. Mean hospital stay was of 13 days. The most common suspected etiology was duodenal perforation in 41% patients. The commonest cause was peptic ulcer perforation with 1st part of duodenum being the commonest site. USG revealed free fluid in 60%, dilated bowel loops in 20%, perforated appendix in 3% of patients. Commonest site of perforation was duodenum in 70 patients, out of which 1st part was involved in 98%, followed by ileum in 40(26%), stomach in 15% patients, appendix(5 patients), meckel's diverticulum (5 patients), fallopian tube(5 patients) and large bowel (2 patients) were the other sites. Overall mortality was 13% (20 patients). Duodenal perforation carried the maximum mortality (15 patients). The commonest complications were wound infection (20%), burst abdomen (20%), ARDS (10%) and pneumonia (10%). In cases of extensive contamination fecal fistula and anastomotic leak were seen. Commonest time interval for occurrence of complication was 10-15 days seen in 60 patients.⁵

II. Material And Methods

The study was conducted after approval from institutional thesis and ethical committee and informed consent of the patient was taken.

Sources of data:

All patients were admitted to the surgery wards at Guru Nanak Dev Hospital, attached to Govt. Medical College, Amritsar, with signs and symptoms of perforation peritonitis.

Method of data collection:

This is a prospective study in which patients presenting with clinical suspicion of perforation peritonitis in the department of surgery, Guru Nanak Dev Hospital/ Govt. Medical College, Amritsar, were taken into study.

- 100 cases were taken up for study and patients were subjected to detailed history and thorough physical examination.
- Patients underwent necessary investigations.
- Blood counts, biochemical analysis and urine analysis.
- USG abdomen/pelvis CT-abdomen (as and when required)
- All diagnosed patients were subjected to surgery.
- In all cases, operative findings and postoperative course was followed up for three months for any complication or any need of re-surgery.
- Final outcome was evaluated on the basis of clinical, operative and radiological findings.

Inclusion criteria:

- All cases of perforation peritonitis irrespective of age and sex
- All cases of perforation peritonitis due to any etiological factor.
- All cases of perforation peritonitis admitted in various wards in Guru Nanak Dev Hospital, Amritsar.

Exclusion criteria:

- Any case of perforation peritonitis due to penetrating trauma.

III. Results

Table 1: Showing Site Of Perforation

SITE	NO. OF CASES	% AGE
Stomach	20	20.00
Duodenum	7	7.00
Jejunum	2	2.00
Terminal ileum	55	55.00
Caecum	5	5.00
Appendix	8	8.00
Meckel's diverticulum	1	1.00
Not identified	2	2.00
Total	100	100.0

Table 1 shows the most common anatomical site for perforation was terminal ileum (55%) the next common site was stomach (20%), followed by appendix (8%), duodenum (7%), caecum (5%), jejunum (2%) and Meckel's diverticulum (1%). In 2% cases site was not identified due to severe adhesions between gut loops.

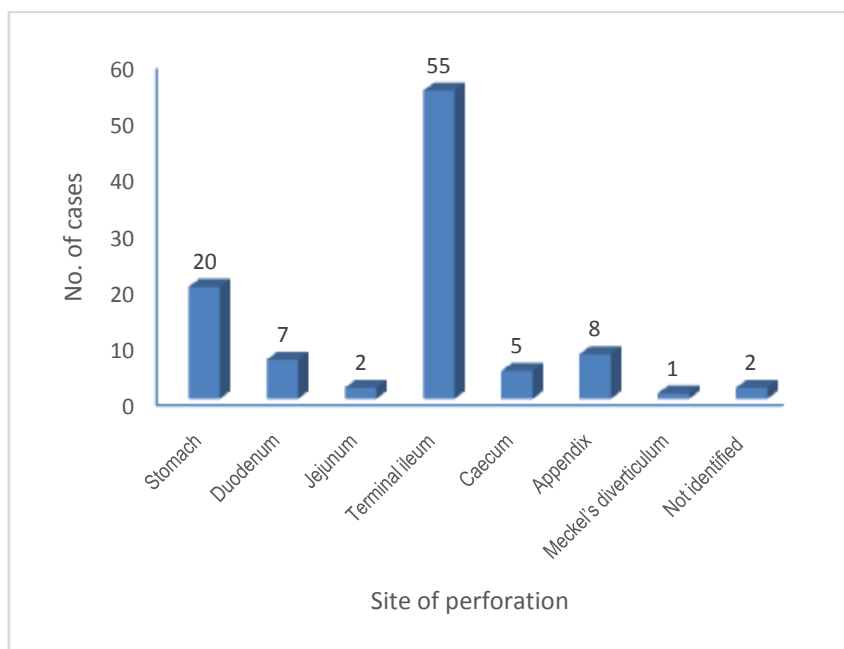


Table 2 Showing Etiological Analysis

Etiology	No. Of Cases	%Age
Enteric Fever	42	42.0
Peptic Ulcer (Gastroduodenal)	27	27.0
Traumatic	3	3.0
Tubercular	15	15.0
Appendicular	8	8.0
Meckel's Diverticulum	1	1.0
Intestinal Obstruction	4	4.0
Total	100	100.0

Table 2 shows the most common aetiology of perforation peritonitis was Enteric fever (42%) followed by peptic ulcer perforations (27%), tubercular perforations (15%), appendicular perforations (8%), intestinal obstruction (4%), traumatic perforations(3%) and meckel's diverticular perforation (1%).

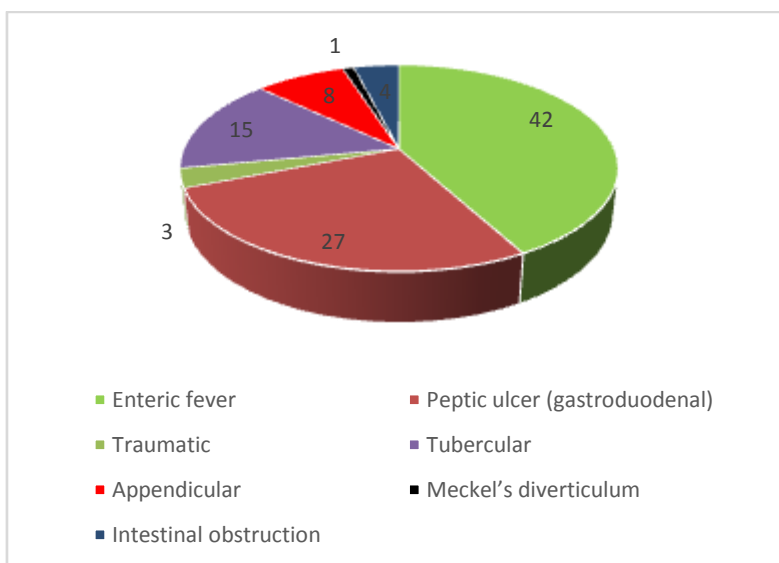


Table 3 Showing Type Of Surgical Procedure

Etiology	Suturing	Omental patching	Resection and anastomosis	Appendicectomy	Ileostomy

Enteric fever	30	0	3	0	9
Peptic ulcer	0	27	0	0	0
Traumatic	2	0	1	0	0
Tubercular	3	0	6	0	6
Appendicular	0	0	1	7	0
Meckel's diverticulum	0	0	1	0	0
Obstruction	0	0	2	0	2
Total	35	27	14	7	17

Table 3 shows suturing of the perforation was the most common surgical procedure done in 35% of the cases, followed by omental patching in 27% of the cases, followed by ileostomy in 17% of the cases. Resection and anastomosis was done in 14% of cases followed by appendicectomy in 7% of the cases.

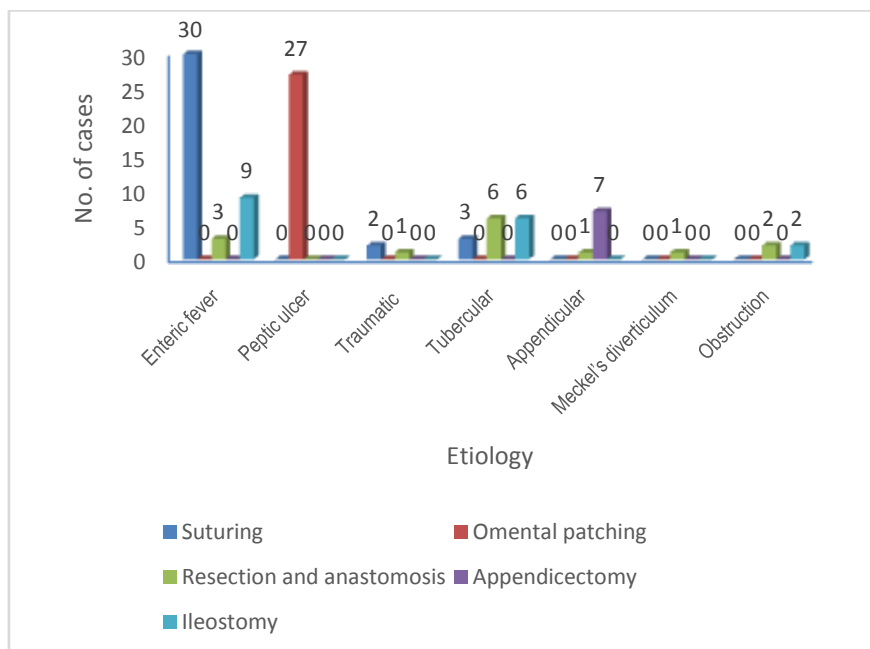


Table 4 Showing Postoperative Complications

Complications	No. of cases	%age
Pain	100	100.0
Fever	94	94.0
Paralytic ileus (>2 days)	85	85.0
Wound infection/ dehiscence	70	70.0
Abscess (superficial/deep)	5	5.0
Anastomotic leak	8	15.0
Burst abdomen	12	12.0
Chest infection	25	25.0
Anemia / hypoproteinemia	30	30.0
Intestinal Obstruction	04	4.0
Incisional hernia	02	2.0

Table 4 shows pain was the most common postoperative complication which was present in 100% of cases followed by fever which was the 2nd most common early postoperative complication (94%). The next common early postoperative complication was paralytic ileus (85%) and superficial wound infection was present in 70% cases. Other postoperative complications were anemia/hypoproteinemia (30%), chest infection (25%), burst abdomen (12%) and anastomotic leak (8%), abscess in 5% of cases. 4 cases of intestinal obstruction (4%) and 2 cases of incisional hernia (2%) were encountered during the follow up period of 3 months.

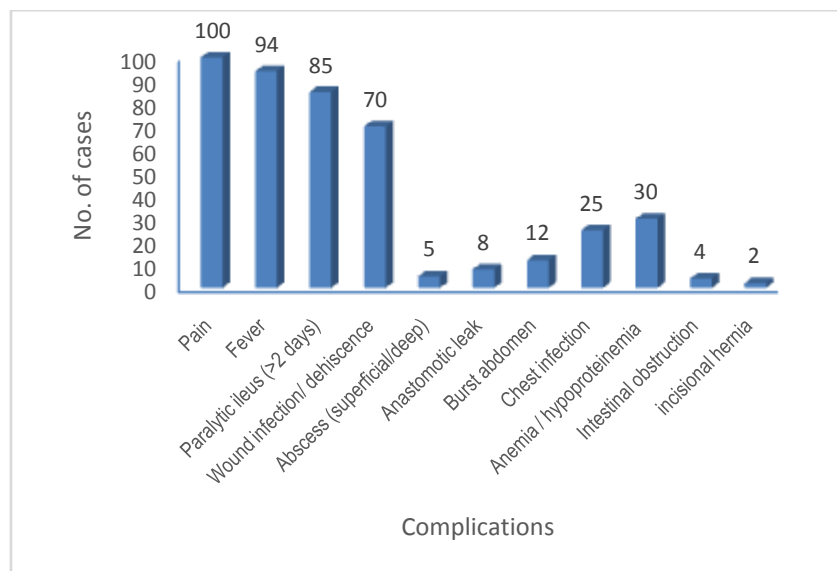


Table 5 Management Of Complications In Follow Up Period Of 3 Months

Complication	Resurgery done				
	Resuturing	Ileostomy closure	Resection and anastomosis	Exploratory laparotomy with Adhesiolysis	Mesh repair
Wound dehiscence (35 cases)	15				
Burst abdomen (12 cases)	12	-	-	-	-
Ileostomy (17 cases)	-	13	-	-	-
Anastomotic leak (8 cases)	-	-	2	-	-
Obstruction (4 cases)	-	-	-	2	-
Incisional hernia (2 cases)	-	-	-	-	2

Table 5 shows management of complications in the follow up period of 3 months. Out of 35 cases of wound dehiscence 15 cases (42.86%) required resuturing of the wound, rest of the cases were treated by local wound management. 12 out of 12 cases (100%) of burst abdomen were managed by resuturing. Ileostomy closure was done in 13 out of 17 cases (76.5%). 4 cases (23.5%) died postoperatively. Out of 8 cases of anastomotic leak 2 cases (25%) had to go for resection and anastomosis, rest were managed conservatively. Out of 4 cases of obstruction, 2 cases (50%) had to undergo exploratory laparotomy with adhesiolysis, rest 2 cases were managed conservatively. 2 out of 2 cases (100%) of incisional hernia were managed by mesh repair of the defect.

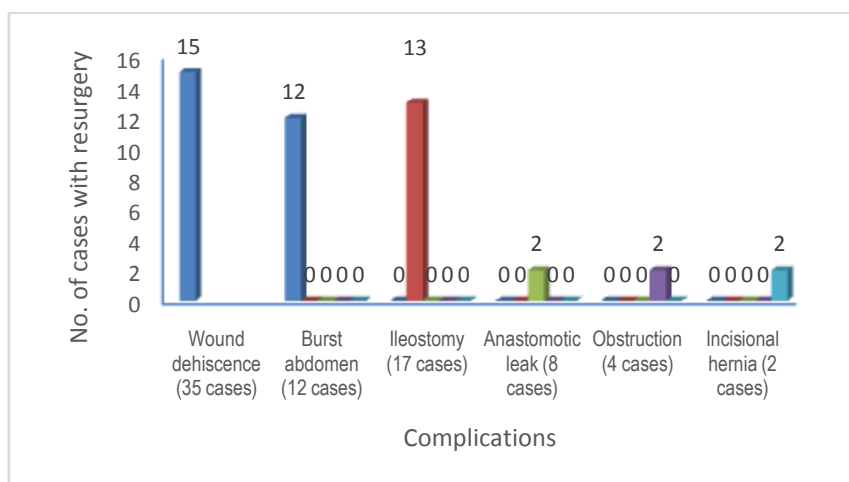
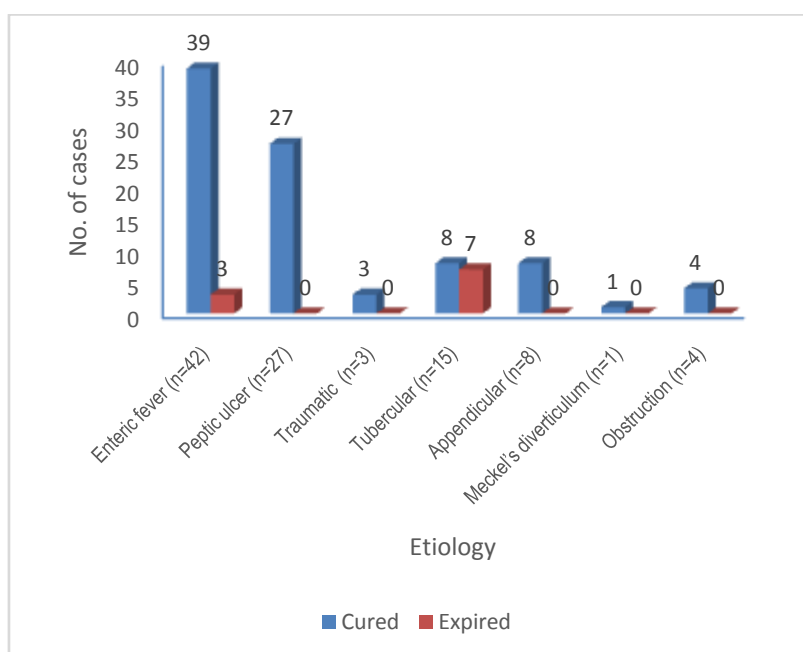


Table 6

Showing Mortality

Etiology	Cured	Expired	Mortality %age
Enteric fever (n=42)	39	3	7.14
Peptic ulcer (n=27)	27	0	0
Traumatic (n=3)	3	0	0
Tubercular (n=15)	8	7	46.6
Appendicular (n=8)	8	0	0
Meckel's diverticulum (n=1)	1	0	0
Obstruction (n=4)	4	0	0
Total	90	10	10.0

Table 6 shows overall mortality was 10% in this study. Highest mortality was present in the tubercular pathology (46.6%). Mortality in enteric perforation was 7.14%



IV. Discussion

Perforation peritonitis is a frequently encountered surgical emergency in any hospital with high morbidity and mortality, which continues to be a matter of great concern to the surgeons, particularly in a tropical country like India.

At the time of presentation, general condition of the patient is usually very much deteriorated and his/her outlook is very grim, he/she is in great agony and deserves skillful emergency surgical management.

The present study was undertaken to study the etiology, clinical profile, aids to diagnosis and management of perforation peritonitis. A total of 100 cases of perforation peritonitis coming to the surgical emergency and OPD of the Guru NanakDev Hospital/ Govt. Medical College Amritsar were studied.

Out of 100 cases which were studied, the most common etiology of perforation peritonitis was due to enteric fever (42 cases), the 2nd most common etiology was due to peptic ulcer perforations (27 cases), other cases were due to tuberculosis (15 cases), appendicular perforations (8 cases), perforation due to intestinal obstruction (4 cases), blunt trauma (3 cases) and Meckel's diverticular perforation (1 case).

This study matches with the study of Khanna AK et al⁶ (108 out of 204 cases were of typhoid Etiology), but differs with several other previous studies (Jhobta et al², Vagholkar¹, Gupta et al⁷, Sharma et al⁸ in their studies peptic perforations were the most common etiology and typhoid perforations were 2nd most common etiology).

In this study the most common site of perforation was terminal ileum (upto 30 cms proximal to ileocaecal junction) present in 55 cases (55%), next most common site was stomach (20 cases), other sites were 1st part of duodenum (7 cases), appendix (8 cases), caecum (5 cases), jejunum (2 cases), Meckel's diverticulum (1 case) and in 2 cases site of perforation was not identified due to severe adhesions between the gut loops.

In present study, the average time of presentation to the hospital with signs/symptoms of perforation peritonitis was 2.98 days (71.5 hours). This delay in presentation to the hospital was also noted in the previous

studies by Jhobtaet al² and Kim et al⁹ (more than 50% cases were explored more than 24 hours after their perforation occurred).

Acute abdominal pain (100% cases) was the most common symptom of perforation peritonitis; other symptoms were abdominal distension (92%), vomiting (88%) constipation (78%) and fever (77%). All the patients (100%) were presented to the hospital with signs of abdominal tenderness, rigidity and guarding, other signs were tachycardia (96%), obliteration of liver dullness (85%), shock (32%) and absence of bowel sounds (80%). X-ray chest PA view including both domes of diaphragm in standing position is a very useful investigation to diagnose the perforation of abdominal hollow viscus by detecting pneumoperitoneum. X-ray chest was done in 100 cases and pneumoperitoneum was detected in 93 X-rays. X-ray abdomen was done in 100 cases, pneumoperitoneum was detected in (85%) and multiple air-fluid levels with or without pneumoperitoneum was the finding in (15%) cases. USG abdomen was done in 100 cases. The most common ultrasonographic findings were free fluid in the peritoneal cavity (95%) and dilated gut loops with sluggish or absent peristalsis (90% cases). Pneumoperitoneum was detected in 50% cases only.

In the present study management was mainly surgical. Exploratory laparotomy was done in all cases after 3 to 4 hours of initial resuscitation. Pre-operative resuscitation included I.V fluids with electrolytes, Ryle's tube aspiration, Foley's catheterization, maintenance of input – output balance, blood transfusion, I.V antibiotics against gram positive, gram negative and anaerobes, monitoring of temperature, pulse and blood pressure regularly. Foul smelling seropurulent fluid with or without flakes in the peritoneal cavity was observed in 22 cases, foul smelling bilious fluid with or without flakes was observed in 27 cases, foul smelling fecal matter with or without flakes was observed in 46 cases, haemorrhagic fluid was observed in 5 cases.

The aims of surgical intervention are twofold: to drain the pus and bowel contents from peritoneal cavity and to prevent further contamination. Minimum required operative procedure was performed. In all the cases of peptic perforation, the edges were excised and margins freshened and perforation was closed in two layers by applying at least one layer with non-absorbable suture. Omental patch along with pedicle was also applied in all the cases. Meticulous peritoneal toileting was done with normal saline. ADK drain was inserted in pelvic cavity and paracolic gutter. In enteric perforation, simple closure of perforation was done with atraumatic needle in two layers/single layer. As the patients were poor surgical risk and they tolerate minimum anaesthesia, simple closure has the advantage of being quick and easy. An alternative procedure like resection and ileo-ileal anastomosis was also done in 3 cases where there were multiple perforations or distal gut was not healthy.

In 9 cases of enteric perforation where the gut was not healthy enough or with multiple perforations or there was excessive soiling, exteriorization of gut was done (ileostomy). Drainage of the peritoneal cavity is essential to drain out the residual pus and was done in all the cases.

In cases of tubercular perforations tubercles were present over the mesentery, omentum and serosal surface of the gut. Caseous material was also noted in the peritoneal cavity. Adhesions between gut loops were also present. In 4 cases stricture distal to the perforation was present. In most of the tubercular perforations resection and anastomosis (6 cases) or ileostomy (6 cases) was done. Majority of the appendicular perforations were treated by appendectomy (7 out of 8 cases), 1 case had to undergo resection and ileoascending anastomosis because of perforation at the base of appendix and severe inflammation of the caecum. 2 of the 4 cases of obstruction underwent resection and anastomosis. In other 2 cases of obstruction where site of perforation could not be found, ileostomy had to be done. 2 out of 3 cases of traumatic perforations were treated by primary closure of the perforation. In one case resection and anastomosis was required due to multiple perforations. Meckel's diverticular perforation required resection and anastomosis.

Postoperatively patients were given I/V fluids, ryle's tube aspiration, blood transfusion, antibiotics such as 3rd generation cephalosporin and metronidazole for anaerobic organisms. This treatment is recommended by most of the previous authors. Anti-tubercular drugs given to all patients with tuberculosis. In this study pain was the most common postoperative complication which was presented in 100% of the patients, 2nd most common postoperative complication was fever, which was presented in 94% of the patients. Other postoperative complications were paralytic ileus (85%), wound infection/dehiscence (70%), anaemia/hypoproteinemia (30%), chest infections (25%), burst abdomen (12%), anastomotic leaks (8%), superficial/deep abscess (5%), intestinal obstruction (4%) and incisional hernia (2%). In the study of Agrawal et al¹⁰, incidence of major complications was 25% (burst 11%, leak 5%, intra-abdominal abscess 5% and multi organ failure 6.5%). In the study of Jain et al⁴, superficial wound infection (46.8%) was the most frequent postoperative complication followed by wound dehiscence (31.3%) and entero-cutaneous fistula/leak (11.5%).

During the follow up period of 3 months, out of 35 cases of wound dehiscence, in 15 cases (42.86%) resuturing of the wound was done after the wound was red and healthy. Rest 20 cases (57.14%) were healed by secondary intention by local wound management (dressing). All the 12 cases of burst abdomen in which defect in the rectus sheath was present, resuturing of the defect was done. Out of 17 cases of ileostomy, ileostomy closure was done in 13 cases after primary pathology was cured and gut was healthy. 4 cases expired postoperatively 2 out of 8 cases of anastomosis leak required resection and anastomosis, rest were treated

conservatively by bowel rest, IV antibiotics, IV fluids. Out of 4 cases of obstruction encountered during followed up, 2 cases required exploratory laparotomy with adhesiolysis, 2 cases were managed conservatively by RT aspiration, bowel rest, IV antibiotics, IV fluids. 2 cases of incisional hernia developed at the scar site, required mesh repair of the defect. The overall mortality in the present study is 10%. The causes of mortality in the present series are very poor general condition of the patient at the time of admission, anemia, toxemia, dehydration and patients reported later after the perforation. Most of the cases (7 of 15) were of tubercular perforations.

V. Conclusion

Perforation peritonitis causes considerable morbidity and mortality as patients usually present late to the hospital for treatment and their general condition is deteriorated. Following are the main features and conclusions of this study:

1. Enteric perforation is the most common cause of perforation peritonitis (42%), followed by peptic ulcer perforation (27%).
2. The most common site of perforation is terminal ileum (55%), followed by stomach (20%) and appendix (8%).
3. Diagnosis is made by clinical examination and confirmed by the detection of pneumoperitoneum on X-ray chest/abdomen, ultrasonography of the abdomen and often by the four quadrant aspiration.
4. Pain abdomen (100%) is the most common symptom of perforation peritonitis, other symptoms are distension (92%), vomiting (88%), constipation (78%) and fever (77%).
5. Abdominal tenderness, muscle rigidity and guarding are the most common (100%) signs of perforation peritonitis
6. Tachycardia (96%), obliteration of liver dullness (85%), absent bowel sounds (80%) and shock (32%) are the other signs of perforation peritonitis
7. Exploratory laparotomy and closure of perforation is the commonest surgical procedure done in ileal and jejunal perforations.
8. Omental patching is the commonest surgical procedure done in peptic ulcer perforations.
9. Resection and anastomosis and Ileostomy are the surgical procedures done in case of multiple ileal perforations and/or in case of unhealthy, oedematous bowel wall or perforation with tubercular pathology.
10. Pain is the most common early postoperative complication (100%), followed by fever (94%), paralytic ileus (85%), wound infection / dehiscence (70%), anaemia/ hypoproteinemia (30%), chest infection (25%), burst abdomen (12%), anastomotic leak (8%), superficial/deep abscess (5%), intestinal obstruction (4%) and incisional hernia (2%).
11. Incidence of resurgery in patients of perforation peritonitis is 46% with most common surgical procedure performed during resurgery is resuturing of the laparotomy wound (27%), either due to wound dehiscence (15%) or due to burst abdomen (12%), followed by ileostomy closure (13%), resection and anastomosis (2%), exploratory laparotomy with adhesiolysis (2%) and mesh repair of incisional hernia (2%).
12. Overall mortality in perforation peritonitis is 10% with highest mortality in tubercular perforations (46.6%).

References

- [1]. Vagholkar KR. Therapeutic options in perforation peritonitis. *Hospital Today* 2011; 6(5):277-81.
- [2]. Jhobta RJ, Attri AK, Kaushik R, Rajeev Sharma and Aupam Jhobta. Spectrum of perforation peritonitis in India-review of 504 consecutive cases. *World journal of Emergency Surgery* 2006, 1:26
- [3]. Chouhan MK, Pande SK. Typhoid enteric perforation. *Br J Surg* 1982; 69:173-5.
- [4]. Jain BK, Arora H, Srivastava UK, Mohanty D, Garg PK. Insight into the management of non-traumatic perforation of the small intestine. *J Infect Dev Ctries* 2010;4(10):650-54.
- [5]. Patil PV, Kamat MM, Milan MH. Spectrum of perforative peritonitis-a prospective study of 150 cases. *Bombay Hosp J.* 2012;54:38-50.
- [6]. Khanna AK, Mishra MK. Typhoid perforation of the gut. *Postgraduate Medical Journal* 1984;60:523.
- [7]. Gupta S, Kaushik R. Peritonitis –the Eastern experience. *World J Emer Surg* 2006; 1:13.
- [8]. Sharma L, Gupta S, Soini AS, Sikora S, Kapoor V. Generalized peritonitis in India-the tropical spectrum. *Jpn J Surg* 1991; 21(3): 272-7.
- [9]. Kim JP, Oh SK, Jarrett F. Management of ileal perforation due to typhoid fever. *Ann Surg* 1975;181:88-91.
- [10]. Agarwal N, Saha S, Srivastava A, Chumber S, Dhar A, Garg S. Peritonitis: 10years' experience in a single surgical unit. *Tropical Gastro* 2008, pp. 1-6.