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RESEARCH ARTICLE

SPECTRUM OF PERFORATION PERITONITIS: CLINICAL PRESENTATION, IMAGING, BIOCHEMICAL, OPERATIVE CORELATION AND OUTCOMES

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ABSTRACT:

Peritonitis is defined as the inflammation of the peritoneum. Perforation of a hollow viscera leads to escape of contents into the peritoneal cavity. Even if initial escape is sterile, it will subsequently get contaminated due to direct bacterial invasion following perforation of gastrointestinal tract. Present study is aimed to analyze causative factors, modes of presentations, management of cases of perforation peritonitis of non traumatic origin. An attempt is made to identify the outcome of such patients in terms of mortality and morbidity of patients. To analyze various signs and symptoms, imaging for establishing there diagnostic value in perforation peritonitis. To identify the causes, bacteriology and outcomes of different secondary peritonitis. To study Operative findings and procedure undertaken for each patient. This study was conducted at LMH, NKPSIMS & RC Nagpur with fixed inclusion and exclusion criteria during October 2012-november 2014. Total 66 patients are included in this study. Present study is a descriptive observational study. In present study total 66 cases of gastrointestinal perforation are included. Mean age of the patients included in the study was 45.9 years. Male to female ratio was 4.07:1. The commonest site of perforation according to our study was in the duodenum. Pneumoperitoneum was seen in 53 i.e. 80.3% of cases. Primary closure of perforation was the commonly performed procedure. All the patients of appendicular perforation were treated with appendicectomy. Chest infection and wound infection increased the hospital stay of the patients. E. coli was the most common organism seen to be contaminating the peritoneal cavity. 12 of 66 cases died post operatively in follow up period of 30 days.

KEYWORDS: Pneumoperitoneum, Gastrointestinal perforation, Secondary peritonitis

INTRODUCTION

Peritonitis is known from the days of Hippocrates. The Hippocratic facies seen in terminal stages of peritonitis was described by Hippocrates in 460 B.C[1]. The spectrum of perforation peritonitis in India continues to be different from its western counterpart with duodenal ulcer perforation, appendicular perforation, enteric fever perforation and tubercular perforation being the major causes of generalized peritonitis with the increasing incidence of hollow visceral injuries.[2] In India, peptic ulcer perforation is the commonest followed by enteric, tubercular, appendicular,

traumatic and malignant perforations.[3,4,5,6] In majority, cases present late in the hospital. Present study is aimed to analyze causative factors, modes of presentations, management of cases of perforation peritonitis of non traumatic origin. An attempt is made to identify the outcome of such patients in terms of mortality and morbidity of patients.

MATERIALS AND METHODS

This study was conducted at LMH, NKPSIMS & RC Nagpur with fixed inclusion and exclusion criteria during October 2012-november 2014. Total 66 patients are included in this study. Present study is a descriptive observational study. These were the cases which were admitted consecutively and treated. Ethical clearance was also obtained from the committee. Patients with perforation of esophagus, biliary tree Urinary bladder and reproductive organs and post operative anastomotic leak were excluded from the study. Patients of perforation peritonitis managed conservatively, traumatic perforation & Patients having immunodeficiency syndrome (HIV+ve) were also excluded. In all the cases, pre operative correction of fluid and electrolyte imbalance and broad spectrum antibiotics were administered. A detailed history was taken in all patients. A general & systemic examination of patient was carried out along with rectal examination. In all patients X-ray chest and abdomen in erect position was done, followed by abdominal ultrasound. In some cases where the diagnostic dilemma was persistent, a CT scan was done. Complete blood count, blood grouping and renal function test was done. Widal test was done in relevant cases.

All the patients underwent emergency exploratory laparotomy. Patients were operated by surgeon of the level of senior register and above who were trained in doing emergency laparotomy. A standard midline incision was used. The surgical procedure was carried out depending on etiology, site and pathology of perforation. A thorough peritoneal lavage was carried out and drain was left in peritoneal cavity depending on amount of contamination. Peritoneal fluid was obtained after exploration and sent for culture studies. Ulcer biopsy was taken in gastric perforation. Post operative patients were put on nasogastric tube aspiration, intravenous fluids like crystalloids and colloids, and broad spectrum antibiotics. PPI's were given in cases of peptic ulcer perforation. After return of bowel sounds nasogastric tube was removed and patients were allowed orally, gradually from plain water, soft diet to normal diet. Complications, if occurred were noted and treated accordingly. Most of patients were discharged after removal of sutures. Regular follow-up of the patients was carried after 15 days in first month and there after monthly for next 3 months.

The data was analysed by using SPSS 20.0 EPR Info software and application of chi-square test.

RESULTS

In present study total 66 cases of gastrointestinal perforation are included. Mean age of the patients included in the study was 45.9 years. Male to female ratio was 4.07:1. In peptic ulcer perforation previous history of drug intake (NSAID's) was found in 15 cases, combination of alcohol and smoking present in 7 (16.27%) cases. Overall smoking was risk factor in 11(25.58%) cases, alcohol in 11 (25.58%) cases. The commonest site of perforation according to our study was in the duodenum (35 cases) followed by appendicular perforation (10 cases) and gastric perforation (9 cases), ileal perforation (9 cases), 2 colonic perforation and 2 Jejunal perforation. According to aetiology of the perforation, peptic ulcer perforation was the major causative factor

leading to peritonitis. One male patient found to have duodenal as well as appendicular perforation at the time surgery.

All patients had pain in abdomen as a presenting symptom. Vomiting and altered bowel habits were present in 35 (53.03%) cases. 26 cases (39% of cases) complained about distension of abdomen. 5 (71.42%) cases of enteric perforation had fever along with pain in abdomen. Tenderness was present in 100% of cases. Guarding and rigidity were found to be present in 84.84% (56 cases) of cases. Distension of abdomen was present in 45 (68.18%) cases. The bowel sounds were absent in 46(69.69%) of cases. Pneumoperitoneum was seen in 53 i.e. 80.3% of cases. In appendicular perforation 3 out of 10 cases of were diagnosed on ultrasonography of abdomen, in 2 patients it was suggestive of mild ascites with intestinal obstruction. CECT ABDOMEN was done in 4 patients, which confirmed the diagnosis of perforation of gastrointestinal tract. Out of 66 cases, in 23 cases (34.84%) there was no growth, 20 (30.30%) cases peritoneal fluid culture was positive for E-coli,12(18.18%) for Klebsiella. Anaerobic and fungal culture was not done in this study only aerobic culture was done due to non-availability of the culture media.

Graham's technique of simple closure of the perforation was done followed by live omental pedicle patch in all the patients of peptic ulcer perforation. 2 patients of enteric ileal perforation were having multiple perforations, resection of involved segment with ileo-ileal anastomosis were done in these cases. In rest of the enteric ileal perforation cases simple primary repair of perforation was done. Tubercular perforation was managed with exteriorization of ileum which is perforated. All the patients of appendicular perforation were treated with appendicectomy. Both colonic perforation was treated with total Colectomy with permanent Ileostomy. Post operatively 31 patients (46.96%) had complications. Most of the cases had chest infection 13 (19.69%) as the post operative complication followed by wound infection which was seen in 11 (16.66%) cases. In this study, total 54 patients were discharged. 39 patients had hospital stay ≤ 14 days. Total 15 patients had hospital stay ≥15 days, 9 of them had developed post operative complications. 12 of 66 cases died post operatively in follow up period of 30 days.

DISCUSSION:

The maximum incidence of perforation irrespective of pathology was seen between 41-50 years. M C Dandpat et al[7] 1991, D C M Rao et al[8] 1984 had reported similar incidences. Peptic ulcer was more common in 5th -6th decade. Sillakivi T et al[9] 2000 have reported similar incidences. Appendicular perforation was seen in younger age group and older patients in our study, same as the incidence which was observed by M C Dandpat et al[7] 1991. Male to Female ratio was 4.07:1 & is consistent with ARK Adesunkunmi[10] 1997 and Lee FY et al[11] 2001. Smoking, medication (NSAID's, and alcohol are the major risk factors in peptic ulcer perforation. Torab FC[12] 2009 has described smoking, history of peptic ulcer and use of NSAID's as common risk factors for perforation.

History of fever in the recent past followed by pain in abdomen was a diagnostic tool for enteric fever perforation clinically. S K Nair[13]1981 and M A Noorani[14]1997 have observed similar history. Vomiting was relatively common in appendicular perforation. Fever was seen only in 40% cases with appendicular perforation. M C Dandpat et al[7] 1991 found similar results in his study of 340 cases. Tenderness was present in 66 that is 100% of cases, Distension in 45 cases,

guarding/ rigidity in 56 cases, absent bowel sounds in 46 cases. In a study conducted by J C Baid and T C Jain[15]1988 found distension in 46 cases, guarding/ rigidity in 54 cases and absent bowel sounds in 29 cases. The study correlates with the above mentioned study with regard to signs of perforation. Pneumoperitoneum was found in 53 (80.3%) cases, which correlates well T Kempraj et al[16] 2012. WIDAL test was positive in 6 (85.71%) cases in our study out of 7 cases of enteric fever perforation. S K Nair et al[13] 1981 demonstrate positive test in 72.5%. Out of 66 cases, in 23 cases (34.84%) there was no growth, 20 (30.30%) cases culture was positive for E-coli,12 (18.18%) for Klebsiella. Present study correlates with the VPN Ramakrishnaiah et al[17] 2012 (352 cases).

As shown in **TABLE 1,** gastroduodenal perforations are most common perforation 66.66%, & is consistent with other previous studies like Jhobta et al[2] 2006, Chen et al[18] 2000. The small bowel is 2nd most common perforation 16.66%. This is consistent with other previous studies like Jhobta et al[2] 2006, Shreshtha et al[20] 1993, Shah et al[22] 1988. Appendicular perforation is 15.15%, consistent with other previous studies like Jhobta et al[2]2006, Khan et al[5]2004, Chen et al[18]2000, Dorairajan et al[19]1995, Sharma et al[21]1991. Colonic perforation is 3.03%. This is consistent with other previous studies like Jhobta et al[2] 2006, Shah et al[22]1988.

TABLE 2 shows that duodenal perforation was in 35 cases i.e.79.55% of gastroduodenal perforations. This present data is consistent with other studies like Khan et al[5] 2004 and Wakayama et al[24] 1994. In present study small bowel perforations were 11 and enteric fever perforation in 7 patients (63.63%). This data is consistent with other studies like Dorairajan et al[19]1995 and Sharma et al[21]1991. Laparotomy was performed in all 66 cases; In 44 peptic ulcer perforations cases simple closure of the perforation was performed with live omental patch. M C Dandapat et al[7]1991 did the same in his study. For typhoid perforation, after trimming the edges, simple closure of the perforation was done in 5 cases. 2 cases had multiple perforations and thus resection and anastomosis was done. M A Noorani et al[14]1997 have reported the operation of choice as simple closure of perforation in 2 layers. For all 10 cases of appendicular perforation, appendicectomy was done. M C Dandapat et a[7]1991 also supported appendicectomy in appendicular perforation.

Wound infection was seen in 11 cases (16.66%). M C Dandapat et al[7]1991 reported wound sepsis in 13.5% of gastrointestinal perforation. Jhobta et al[2]2006 reported wound infection in 25% of gastrointestinal perforation. 13 patients had chest infection as a complication (19.69%). Kempraj et al[16]2012, Shahid hussain soomro et al[25]2010 reported similar incidence of chest infection. 2 patients (3.03%) had burst abdomen for which tension suturing was done. Out of which one patient had COPD and other patient had anaemia along with bilateral pleural effusion and pneumonia. Jhobta et al[2]2006 reported burst abdomen in 8.7% of gastrointestinal perforation. 3(4.54%) patients developed intra-abdominal abscess in present study and was treated with percutaneous extra peritoneal aspiration under ultrasound guidance. Jhobta et al[2]2006 reported intra- abdominal abscess in 9.1% of gastrointestinal perforation. 8 (12.12%) patients had features of MODS and septicaemia in present study. T Kempraj et al[16] 2012 reported this complication in 16% patients.

TABLE 3 shows the overall mortality rate in perforation peritonitis is very high ranging from 6-28% as mentioned in previous series. There were 12 deaths (18.18%) which are comparatively higher in contrast to other series. Major cause of mortality in this study is MODS and septicemia which is mainly due to delayed presentation hence delayed surgical intervention. Poor general condition, anemia, Hypoproteinemia, co-morbid conditions like COPD adds to the post-operative mortality and morbidity.

Table No.1: Anatomical Site Incidence In Gastrointestinal Perforation

Author's name	**No. of cases**	**Gastroduodenal perforation n (%)**	**Small bowel perforation n (%)**	**Appendicular perforation n (%)**	**Colorectal perforation n (%)**
Jhobta*2006[2]	504	331 (65)	92 (18)	59 (12)	19 (4)
Khan2004[5]	54	21 (38.8)	14 (25.9)	6 (11.1)	4 (7.4)
Chen2000[18]	98	57 (58.1)	6 (6.1)	13 (13.2)	14 (14.3)
Dorairajan 1995[19]	250	80 (32)	103 (41.2)	38 (15.2)	5 (2)
Shreshtha 1993[20]	80	26 (32.5)	15 (18.7)	27 (33.7)	0
Sharma 1991[21]	155	47 (30.3)	62 (40)	23 (14.8)	2 (1.3)
Shah1988[22]	110	51 (46.4)	16 (14.5)	31 (28.1)	3 (2.7)
Rao 1984[8]	46	26 (56.5)	18 (39.1)	2 (4.3)	0
Present study (2012-2014)	66	44 (66.66)	11 (16.66)	10 (15.15)	2 (3.03)

* - includes esophageal perforation and traumatic perforation.

Table No.2: Comparison of Gastroduodenal Perforation

Author's Name	**No. of cases**	**Duodenal ulcer perforations (%)**	**Gastric ulcer perforations (%)**	**Perforation of gastric carcinoma (%)**
Khan 2004[5]	21	16 (76.2)	5 (23.8)	0
Sugimoto 1994[23]	101	90 (89.1)	11 (10.8)	0
Wakayama 1994[24]	136	110 (80.9)	19 (13.9)	7(5.1)
Present study 2012-2014	44	35 (79.55)	9 (20.45)	0

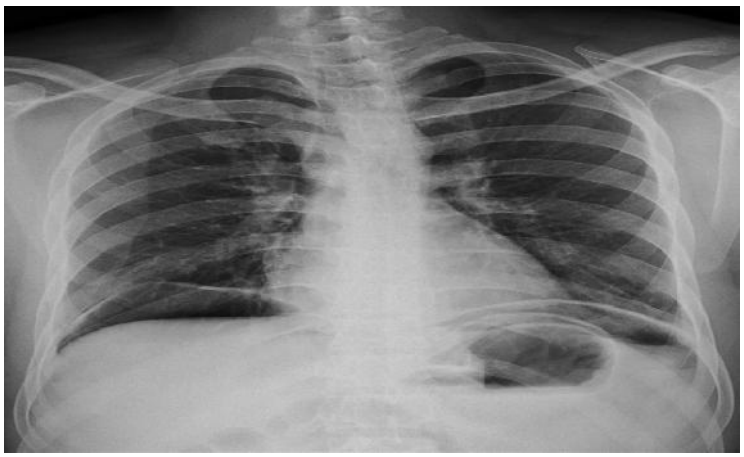
Table No.3: Mortality In Gastrointestinal Perforation

Sr. No.	Authors name (Year)	Total No. of Pts	Total no. of mortality	Mortality (%)
I	Hermansson M et al[26] (1999)	246	32	13
II	T Kemparaj et al[16] (2012)	369	51	13.8
III	Jhobta et al[2] (2006)	504	51	10.1
IV	**Present study (2012-2014)**	66	12	18.18

SUMMARY AND CONCLUSION:

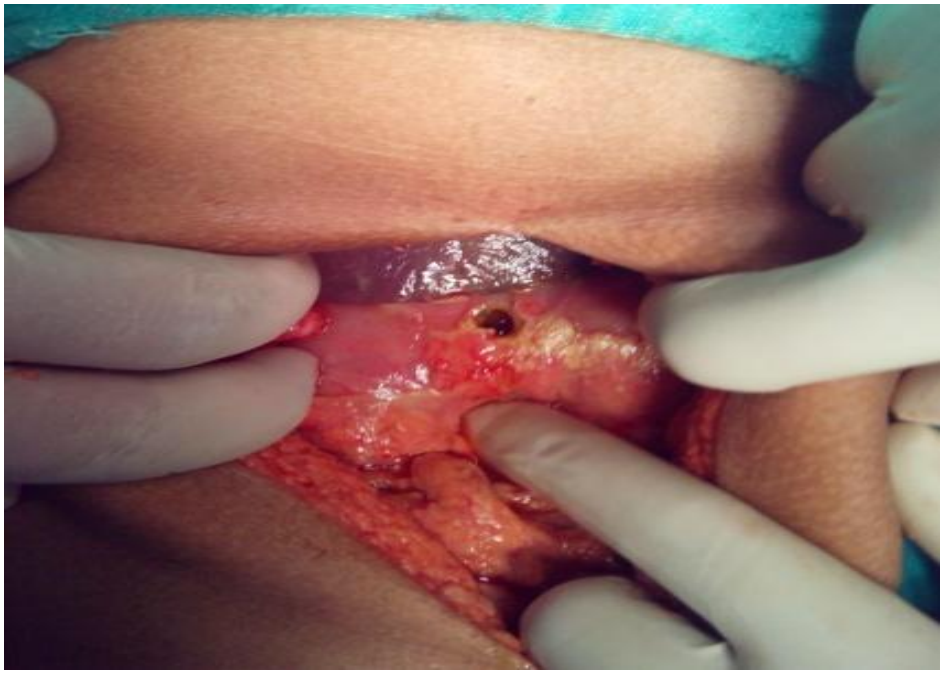
Most common site for gastrointestinal perforation was duodenum followed by appendicular perforation and gastric perforation and ileal perforation. Perforation peritonitis was more commonly seen between age group of 41-50 years. There was definite male preponderance of gastrointestinal perforation. X ray abdomen standing is simple and sensitive investigation for the confirmation of gastrointestinal perforation. E. coli was the most common organism seen to be contaminating the peritoneal cavity followed by Klebsiella and Proteus mirabilis. Primary closure of perforation with or without live omental patch was the procedure with peritoneal drainage used in peptic ulcer perforation. Appendicectomy was the choice in appendicular perforation.

Chest infection and wound infection increased the hospital stay of the patients. The mortality of perforation peritonitis depends on early approach to the hospital, quick diagnosis, and prompt surgical treatment. It also reflects the degree and duration of peritoneal contamination; the age of the patient; the general health of the patient and the nature of the underlying cause.



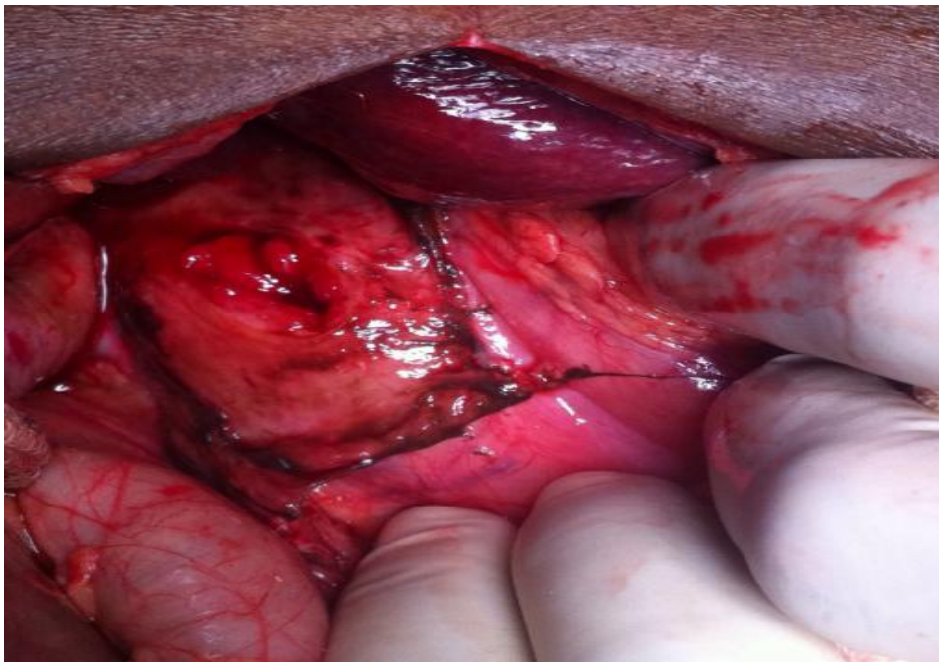
(FIG 1) X RAY CHEST SHOWING PNEUMOPERITONEUM

(FIG 2) APPENDICTIS



(FIG 3) GASTIRC ULCER PERFORATION

(FIG 4) ILEAL PERFORATION DUE TO ENTERIC FEVER



(FIG 5) GASTRIC ULCER PERORATION

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