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A study of clinical profile and management of perforation peritonitis in a tertiary health centre located in Central India

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ABSTRACT

Background: Perforation peritonitis is the most common surgical emergency in India. The spectrum of etiology of perforation in tropical countries continues to be different from its Western counterpart. The objective of the study was to highlight the spectrum of perforation peritonitis as encountered by us at RKDF medical college and research centre, Bhopal, Madhya Pradesh, India.

Methods: Our prospective observational study was conducted at Department of General Surgery, R.K.D.F. Medical College and Research Centre, Bhopal, Madhya Pradesh, India during period of August 2013 to August 2015. Total 110 cases of perforation peritonitis were included. Patient detailed history, symptoms, sign, blood investigation finding, cause of perforation, site of perforation, type of surgery, post-operative complications and mortality were assessed and result were compared with other studies.

Results: The most common cause of perforation in our series was perforated peptic ulcer (52 cases) followed by typhoid fever perforation (21 cases), appendicular (16 cases) and tuberculosis (11 cases). Despite delay in seeking medical treatment, the overall mortality (16.36%) was comparable with other published series though the overall morbidity (63%) was unusually high.

Conclusions: In contrast to western literature, where lower gastrointestinal tract perforations predominate, upper gastrointestinal tract perforations constitute the majority of cases in Central India.

Keywords: Appendicular, Morbidity, Mortality, Perforation Peritonitis, Peptic ulcer, Typhoid, Tubercular

INTRODUCTION

Perforation peritonitis, in tropical countries like India most commonly affects men as compared to the studies in the west where the mean age is between 30- 50 years. ¹⁻⁷ Majority of cases present late in hospital after taking massage, on counter medication, and treatment from local practitioner and present with well-established generalized peritonitis with purulent and fecal contamination and varying degree of septicemia. The signs and symptoms are typical and, it is possible to make clinical diagnosis of

peritonitis in all patients by using clinical examination, USG abdomen, x - ray chest and abdomen. Instead of many advances in surgical techniques, antimicrobial therapy and intensive care support, management of peritonitis continues to be highly demanding, difficult and complex.

A critical analysis of the cases of gastrointestinal perforation brings forth a conclusion of utmost importance that prognosis is related with age of patient, duration, and cause of perforation, line of treatment and complications. Aim of the study was to study of clinical profile and management of perforation peritonitis in a Tertiary health centre (RKDF medical college and research centre, Bhopal) located in Central India.

Objectives of the study was to evaluate the frequency of perforation peritonitis in RKDF medical College and Research Centre, Bhopal, Madhya Pradesh, India, to evaluate the frequency in relation to age, sex and risk factors (like smoking, alcohol and medication), to find the relative frequency of anatomical site and etiology of perforation peritonitis, to evaluate intraoperative findings and methods of repair of perforation and there post operative management, to analyze the complications, mortality and morbidity of various methods of surgical management of perforation peritonitis.

METHODS

Observational study of gastrointestinal perforations was carried out at RKDF medical college and Research centre, Bhopal, Madhya Pradesh, India from August 2013 to August 2015. The patients presented with signs and symptoms suggestive of peritonitis in Department of Surgery, RKDF Medical College and Research Centre, Bhopal, Madhya Pradesh, India.

Inclusion criteria

All cases found to have peritonitis as a result of perforation of any part of gastrointestinal tract at the time of clinical examination and surgery were included in the study.

Exclusion criteria

All cases with either primary peritonitis or that due to anastomotic dehiscence, Patients with history of recent previous abdominal surgery and traumatic perforation were excluded.

A detailed history was taken of all patients. Past illness particularly relating to dyspepsia, fever, bowel habits, any chronic illness and history of on counter medication, was asked for personal history especially for dietary habits and addictions like smoking and alcohol were recorded.

A general examination of patient was carried out to detect any signs of dehydration, a record of pulse, blood pressure, respiration, and temperature was kept. Local examination of abdomen was done and any distension, rigidity, guarding, tenderness, lump, bowel sounds, liver dullness, free fluid were recorded.

Rectal examination was done in all cases to detect any bulge or tenderness.

Other systems of body were examined with a view to detect pulmonary complications, any associated systemic disease.

Investigations

- Routine examination of blood was done for hemoglobin, blood sugar, and blood urea & urine routine examination.
- Radiological investigations: chest X ray and X ray abdomen (scout film) was done in standing posture to find out pneumoperitoneum, gas fluid levels etc.
- Ultrasonography of abdomen was done for all patients to rule out any other pathology.
- Widal test was done in relevant cases.
- Histopathological examination of biopsy material taken from edge of perforation was done in relevant cases.

Treatment

On the basis of clinical findings & investigations, decision for operative line of treatment was taken. The procedures adopted in the management were omental patch closure mainly; simple closure, open appendicectomy, resection anastomosis, laparoscopic appendicectomy and laparoscopic omental patch closure were carried out accordingly.

Patients were followed up in the post-operative period to know the post-operative complications, mortality and morbidity rates. After satisfactory improvement patients were discharged from the hospital. If patients died in the ward, the possible cause of death established. The data was analyzed by statistical methods.

RESULTS

Incidence of perforation peritonitis is most common in 4th and 5th decade of life with mean Age 39.18 years. Male predominance is seen in our study with Male:Female ratio 4.24:1. Majority of patients (87%) presents with generalized peritonitis with contamination of peritoneal cavity.

Peptic Ulcer perforation (47.27%) is most commonly seen in 5th decade of life. Small bowel perforation most commonly occurs in 2nd & 3rd decade of life. Appendicular perforation 16(14.54%) cases mostly occur in younger age group with maximum incidence in 2nd decade of life. Colonic perforation (1%) occurs in age group 4th decade of life (Table 1).

Drug abuses, smoking and alcohol are the major risk factors in perforation peritonitis, with their combination increasing the likelihood of perforation peritonitis. Gastric ulcer perforation due to acid peptic disease is the most common cause of perforation peritonitis in Bhopal with 41 cases (37.27%), next most common cause is small Bowel perforation due to enteric fever with 21 cases (19.09%).

Pain in abdomen is the most constant and predominant symptom present in almost (100%) in every case.

Guarding and rigidity (90%) and tenderness (100%) were the important clinical sign that clinches the clinical diagnosis of perforation peritonitis. X-ray chest and abdomen (scout) is the most commonly done investigation with pneumoperitoneum present in 71.81% of cases.

No gas under right dome of diaphragm was found in appendicular perforation (Table 2). Major causes of morbidity include wound infection (28%), dyselectrolytemia (21.81%), wound dehiscence, septicemia, faecal fistula and respiratory complication which may require relook laparotomy.

Table 1: Distribution of cases according to etiology, symptoms, signs and risk factors of perforation.

Causes	No. of cases (110)	Percentage
Peptic ulcer perforation	52	47.27%
Enteric fever perforation	21	19.09%
Tubercular perforation	11	10%
Appendicular perforation	16	14.54%
Ischemic bowel disease	4	3.63%
Malignant	1*	0.9%
Idiopathic	6	5.45%
Symptoms		
Abdominal pain	110	100%
Abdominal distension	78	70.9%
Vomiting + nausea	74	67.27%
Fever	64	58.18%
Altered bowel habit (constipation and diarrhea)	99	90%
Constipation	95	86.36%
Diarrhea	4	3.63%
Signs		
Tenderness	110	100%
Guarding and rigidity	99	90%
Distension	78	70.9%
Obliteration of liver dullness	70	63.63%
Evidence of free fluid	89	80.9%
Bowel sounds- Absent	76	69.1%
Risk factors		
Smoking	22	20%
Medications	10	9.09%
Alcohol	6	5.45%
Alcohol + smoking	33	30%
Smoking + medications	4	3.63%
Smoking + Alcohol + medications	23	20.9%

^{*}Malignant small intestine perforation with gastric perforation

DISCUSSION

Despite striking advances in various disciplines of medicine better understanding of etiopathology of disease and improved surgical technique, gastrointestinal perforation continues to remain of problem of high mortality and morbidity and complications. Delay in hospitalization and appropriate treatment further complicates the picture. Successful outcome depends entirely on early diagnosis, prompt treatment and post-operative care.

Age incidence

Maximum incidence of peptic ulcer perforation occur in 5th and 6th decade of life which is similar to that of study

Croft TJ et al and Tonnessen T et al.^{5,7} Maximum incidence of enteric perforation occur in 3rd decade of life in study as compared to series of ARK Adensunkunmi et al, Mock CN et al in which maximum number of cases occur in 2nd decade of life.^{2,8}

Sex incidence

Male preponderance is seen, with Male to Female ratio 4.24:1. This is consistent with the previous studies like Nanini LD, ARK Adesunkunmi et al, Lee F et al and Tonnessen et al.^{1-4,7}

Site incidence in gastrointestinal perforation (Table 3). The gastroduodenal perforation is most common perforation 47.27%. This is consistent with other

previous studies like Bhansali et al, Rao et al, Shah et al, Chen et al and Nishida et al.^{9-11,14,15} The small bowel perforation is second most common perforation 36.4 %. This is consistent with other previous studies like

Bhansali et al, Rao et al, Shah et al, Nishida et al and Quereshi. 9-11,15,16 Appendicular perforation is 14.54%. This is consistent with other previous studies like Sharma et al and Chen et al. 12,14

Table 2: Distribution of cases according to investigations, operative procedure and post-operative complications.

Investigations	No. of cases	Percentage
Anaemia	31	28.18%
Leucocytosis	39	35.45%
Pneumoperitoneum on X-ray abdomen and x-ray chest	79	71.81%
Air fluid level on X-ray abdomen (Standing)	10	9.09%
Hyponatremia (Na ⁺ <125 mg/L)	22	20%
Hypokalemia ((K ⁺ <3 mg/L)	14	12.72%
S. creatinine (>1.5)	10	9.09%
Urine albumin	74	67.27%
Urine sugar	10	9.09%
Surgical procedures		
Repair of closure	27	24.54%
Repair of closure + omentopexy	46	41.81%
Lap Repair of closure + omentopexy	1	0.9%
Lap Repair of closure	5	4.54%
Repair of closure/ileostomy	1	0.9%
Resection with anastomosis	6	5.45%
Resection without anastomosis / ileostomy	2	1.81%
Caecostomy	1	0.9%
Appendicectomy	16	14.54%
Resection with anastomosis + exteriorization	3	2.71%
Peritoneal lavage and drainage	2	1.81%
Complications		
Wound Infection	29	26.36%
Electrolyte imbalance	24	21.81%
Wound dehiscence/burst abdomen	16	14.54%
Abdominal collection	12	10.90%
Septicemia	12	10.90%
Respiratory complication	10	9.09%
Faecal fistula	08	7.27%
Renal failure	02	01.81%
Urinary tract infection	02	01.81%
Morbidity	70	63.63%
Mortality	18	16.36%

Table 3: Site incidence in gastrointestinal perforation.

Author's name	No. of case	GDP* n (%)	SBP* n (%)	APP*n (%)	CRP* n (%)	Mortality
Bhansali ⁹	96	48 (50)	40 (41.6)	-	0	20.8%
Rao ¹⁰	46	26 (56.5)	18 (39.1)	2 (4.3)	0	26.1%
Shah ¹¹	110	51 (46.4)	16 (14.5)	31 (28.1)	3 (2.7)	6.4%
Sharma ¹²	155	47 (30.3)	62 (40)	23 (14.8)	2 (1.3)	8.4%
Danpat ¹³	340	276 (81.1)	34 (10)	22 (6.4)	4 (1.2)	15.9%
Chen ¹⁴	98	57 (58.1)	6 (6.1)	13 (13.2)	14 (14.3)	NA
Nishida ¹⁵	229	92 (40.2)	71 (31)	0	66 (28.8)	13.1%
Quereshi ¹⁶	126	31 (24.6)	37 (29.4)	12 (9.5)	3 (2.4)	15%
Present study	110	52 (47.27)	40 (36.4)	16 (14.54)	2 (1.81)	18 (16.36%)

*GDP = Gastroduodenal perforation; SBP = Small bowel perforation; CRP perforation=colorectal perforation; APP = Appendicular perforation

Table 4: Comparision of gastroduodenal perforation.

Author's name	No. of cases	Duodenal ulcer perforations (%)	Gastric ulcer perforations (%)	Gastric malignancy (%)	Mortality
Sharma ¹²	47	45 (95.7)	1 (2.1)	1 (2.1)	4.2%
Wakayama ¹⁷	136	110 (80.9)	19 (13.9)	7 (5.1)	5.1%
Sugimoto ¹⁸	101	90 (89.1)	11 (10.8)	0	0
Chen ¹⁴	206	196 (95.1)	10 (4.8)	0	10.7%
Present Study	52	11 (21.2)	41 (78.8)	0	5 (9.6%)

Table 5: Comparison of etiology incidence of small intestinal perforation in various studies.

Author's name	No. of cases	Typhoid perforations (%)	Nonspecific ulcer perforations (%)	Tubercular perforations (%)	Mortality
Bhansali ⁹	46	29 (63)	0	7 (15.2)	NA
Mehendale 19	32	9 (28.1)	2 (6.2)	13 (40.6)	37.5%
Nadkarni ²⁰	32	8 (25)	18 (56.2)	3 (9.3)	28.1%
Bose ²¹	75	46 (61.33)	1 (1.3)	8 (10.6)	16%
Sharma ¹²	62	42 (67.7)	5 (8.1)	12 (19.3)	11.3%
Ray ²²	30	8 (26.7)	5 (6.7)	4 (13.3)	6.7%
Chitkara ²³	216	92 (42.6)	36 (16.7)	36 (16.7)	11.5%
Present Study	110	21 (19.09)	8 (7.42)	11 (10)	11 (10%)

Table 6: Operative intervention.

Author's name	No. of cases	Simple closure±Omentopexy	Truncal vagotomy with pyloroplasty	Gestro-jejunostomy	Bilorth II	Resection without anastomosis / Ileostomy	Appendi-cectomy	Resection without anastomosis / Colostomy	Resection with anastomosis	Peritoneal lavage and Drainage
Meyer C et al ²⁴	74	-	-	-	-	-	-	30	44	-
Mock CN et al ⁸	221	221	-	-	-	-	-	-	-	-
Sharma et al ¹²	155	140	-	8	-	-	-	-	7	-
Hermansson M et al ²⁵	246	246	-	-	-	-	-	-	-	-
Tonnessen and Carsen E et al ⁷	84	77	-	-	6	-	-	-	-	-
Present study	110	82	-	-	-	1	16	1	8	2

The colonic perforation is very rare perforation 1.81% is consistent with other previous studies like Sharma et al, Danpat et al. 12,13 The mortality rate was 16.36 % which was consistent with other studies like Bhansali et al, Danpat et al, Nishida et al, Quereshi et al. 9,13,15,16

The gastric perforation was 78.8% in gastroduodenal perforation. This data is not consistent with any other study. In this Study, pyloric and pre pyloric perforation

were added in gastric perforation, as per data available in books of anatomy. There is no study done in Bhopal district so far therefore in comparison to other part of world, gastric perforation are common here.

The cause may be attributed to counter medication, smoking, and alcohol drinking being quite higher in this region. Mortality rate is 9.6% which consistent with only one study Chen et al. ¹⁴

In G.I. perforation, typhoid perforation is 19.09%. This data is consistent with previous study like Mehendale et al and Ray et al. 19,22 Non-specific small bowel perforation is 7.42%, this data consistent with previous study like Sharma et al, Mehendale et al and Ray et al, tubercular small bowel perforation is 10%, this data consistent with previous study like Bhansali et al, Sharma et al, Nadkarni et al, Bose et al, Ray et al. 9.12,19,20-22

Management

Exploratory laparotomy was done following clinical diagnosis of perforation peritonitis and adequate resuscitation in emergency setting. Operative intervention includes simple closure+omentopexy, truncal vagotomy

with pyloroplasty, gastrojejunostomy, bilroth I, bilroth II, resection with or without anastomosis, ileostomy, colostomy and definitive procedure were carried out. Although our experience and also mentioned in previous series simple closure of perforation using a pedicle omental patch gives good results even in larger perforation. Exteriorization of perforation as loop ileostomy/colostomy is safe procedure to be done in emergency situation followed by elective closure 6-8 weeks later, as consistent with previous studies.

Simple closure with or without omentoplexy was done in 74.62%, which is consistent with other study like Mock CN et al, Sharma L et al, Hermansson M et al and Tonnessen et al. 7,8,12,25

Table 7:	Comp	lication	in GI	perforation.

Authors	No. of cases	Toxemia	Wound infection	Burst abdomen	Fistula	Pelvic abscess	Bleeding
Boey Z, Wong J, Ong GB ⁴	213	12 (5.6%)	7 (3.2%)	-	4 (1.9%)	-	3 (1.4%)
Meyer C et al ²⁴	74	-	7 (9.5%)	-	12 (16.2%)	3 (4%)	-
ARK Adesunkunmi et al ²	50	-	16 (32%)	12 (24%)	1 (2%)	3 (6%)	-
Present study	110	12 (10.9%)	29 (26.36%)	16 (14.54%)	08 (7.27%)	12 (10.9%)	-

Table 8: Mortality in GI perforation.

Author's name	No. of patients	Mortality (%)
Leo D Naninni et al ¹	31	10
Sharma1et al ¹²	47	4.2
ARK Adensunkunmi et al ²	50	28
Hermansson M et al ²⁵	246	13
Chen SC et al ¹⁴	206	10.7
Tonnessen T and Carlsen E et al ⁷	84	15.5
Nishida ¹⁵	229	13.1
Quereshi et al ¹⁶	126	15
Present study	110	16.36

Morbidity

Morbidity is very high in our series 70 cases (63.63%). Major cause of morbidity include wound infection (26.36%), electrolyte imbalance (21.81%), respiratory complication, abdominal collection, septicemia and faecal fistula leading to relook laparotomy and high morbidity. These should be prevented and treated early. Delay in presentation, decrease immunity and poor general condition of patients adds to postoperative morbidity.

Mortality

The overall mortality rate in peritonitis is very high ranging from 6-27% as mentioned in previous series.

Different studies show different mortality in duodenal ulcer perforation (32.2%), gastric perforation (36%), enteric perforation (17.7%), and colorectal perforation (17.5%).

The overall mortality is 16.36% (18 deaths) with one month follow up which is comparatively higher in contrast to other series.

The major causes of mortality in our series is septicemia which is mainly due to delay in presentation and delay in surgical intervention; So by early surgical intervention, we can prevent further contamination and septicemia thus reducing mortality.

Our experience and previous studies like Mock CN et al, Sharma L et al, Hermansson M et al confirms simple closure of perforation using a pedicle omental patch gives good results even in larger perforation. 8,12,25

CONCLUSION

Perforation peritonitis is the most common surgical emergency in India. Spectrum of etiology, clinical presentation, management and complications were studied over 110 patients. The spectrum of etiology of perforation peritonitis in Bhopal district differs from other regions around. Combination Antibiotics are effective in preventing post-operative complications following peritonitis, but there is no evidence to support that one regimen is superior to another, and at the same time has less side effects. Surgical options are wide ranging from Simple Closure to definitive acid reducing procedures like Bilroth I, Bilroth II, Truncal Vagotomy and drainage procedures. Morbidity is very high in our series 70 cases (63%). These should be prevented and treated early. The overall mortality is 16.36% with one month follow up which is comparatively higher than other series. The major causes of mortality in our series is septicemia which is mainly due to delayed presentation hence delayed surgical intervention. Delay presentation, decrease immunity and poor general condition of patients adds to postoperative morbidity and mortality.

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