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Original Research Article

Etiology and management of perforation peritonitis: perspective from developing world

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ABSTRACT

Background: Gastrointestinal perforation peritonitis is one of the commonest surgical emergencies encountered by surgeons all over the world.
Methods: Present study was a retrospective study conducted at Lok-Nayak Hospital by analyzing the case records of 246 patients of perforation peritonitis presenting to the Emergency Department from January 2012 to December 2015.
Results: A total of 246 patients were analyzed retrospectively. Mean age of present study group was 38.6 years, with male to female ratio of 2:1. The commonest etiology was gastro-duodenal ulcers followed by (in order of decreasing frequency) appendicitis, typhoid, trauma, tuberculosis, malignancy, bowel strangulation, amoebiasis, diverticulitis and unknown etiology. Mortality was 20 (8.13%) cases in the present study group.
Conclusions: The spectrum of etiology of perforation peritonitis in the developing world differs markedly from that in the developed world. Early and aggressive fluid and electrolyte correction followed by prompt surgical intervention to address the cause under the cover of broad spectrum antibiotics are the cornerstones in achieving a favourable and good outcome.

Keywords: Gastroduodenal, Peritonitis, Perforation

INTRODUCTION

One of the commonest emergency encountered by surgeons' world over is gastrointestinal perforation peritonitis.[1,2] Many an advances have been made in the management of perforation peritonitis with regards to antimicrobial therapy, surgical therapy and intensive care but it still continues to be a very difficult, complex and challenging problem. Moreover, the etiology of perforation peritonitis in India varies considerably from that in the developed world.[1,3] Patients with perforation peritonitis usually present as an acute abdomen having abdominal tenderness, guarding or rigidity, fever, absent or diminished bowel sounds, tachycardia, tachypnoea, dehydration, oliguria and shock.[4] We carried out a retrospective study to assess the etiology and management of perforation peritonitis in our set up, i.e., developing world.

METHODS

Present study was a retrospective study, conducted at Lok Nayak Hospital, New Delhi, by analyzing the case records of 246 consecutive patients admitted to the emergency services of our hospital, who were subsequently managed (underwent exploratory laparotomy) for perforation peritonitis from January 2012 to December 2015. The patient group was assessed with regards to clinical features at the time of presentation, co-morbidities, investigations (routine blood work and radiology), intra-operative findings, post-operative course and histopathology examination reports. Exploratory

laparotomy was performed on all the 246 patients after resuscitation and stabilization followed by establishing a working diagnosis of perforation peritonitis. On exploration, the intra-operative findings were noted, the cause ascertained and managed accordingly, thorough normal saline peritoneal washes were given and intra-peritoneal tube drains were kept. In the immediate post-operative period, the patients were kept on nil per orally, intravenous broad-spectrum antibiotics and fluids were instituted and vitals were monitored carefully. Orals were started on the appearance of bowel sounds, patients were discharged as per their general condition and the advice and acumen of the treating surgeon.

RESULTS

A total of 246 patient's records were analyzed retrospectively. The mean age of the study group was 38.6 years with an age range of 13-76 years. The male: female ratio was 2:1, respectively. The commonest presenting complaint was severe pain abdomen (99%) followed by fever, nausea and vomiting, altered bowel habits and abdominal distension in 42%, 37%, 30% and 29% respectively. Twelve percent of the patients in the study group had given a history of NSAID intake in the immediate past, preceding the onset of symptoms of perforation peritonitis. It was found that 18% of the cases in the present study group had a pre-existing co-morbidity, commonest being respiratory ailments followed by hypertension, diabetes, chronic renal disease and malignancy.

Gastro-duodenal ulcers were the commonest cause of perforation peritonitis with 121 (49.2%) patients of the study group affected. Amongst these duodenum and stomach were perforated in 99 and 22 patients, respectively. Perforated appendicitis, typhoid, trauma (penetrating as well as blunt), tuberculosis, malignancy, bowel strangulation, amoebic caecal perforation, diverticulitis with perforation and unknown aetiology were the other causes of perforation peritonitis in the present study in the decreasing order of frequency with 40 (16.2%), 26 (10.6%), 21 (8.5%), 18 (7.3%), 7 (2.8%), 5 (2%), 3 (1.2%), 3 (1.2%) and 2 (0.8%) cases respectively (Table 1).

As with the site of perforation duodenum, ileum, appendix, stomach, jejunum, sigmoid colon, caecum, transverse colon, rectum and multiple sites were the sites affected in order of decreasing frequency with 99 (40.2%), 47 (19%), 40 (16%), 24 (9.8%), 13 (5.3%), 7 (2.9%), 5 (2%), 5 (2%), 3 (1.2%) and 3 (1.2%) number of patients respectively.

Majority of cases of gastro-duodenal ulcers (acid peptic disease) were managed by Celan Jones repair (119 cases) whilst a few required a primary repair (trauma stomach - 2 cases) and some were managed by primary repair of the duodenal perforation alone with retrograde duodenostomy and feeding jejunostomy (giant duodenal perforation - 2 cases).

An appendectomy via exploratory laparotomy was done for appendicular perforation peritonitis. Enteric perforations were mainly managed by primary repair (23 cases) whilst three patients required resection anastomosis due to bigger size of the perforation and unhealthy surrounding bowel.

Table 1: Etiology of present study

Etiology	Number	Location	Number
Gastro-duodenal Ulcers	121	Duodenum	99
		Stomach	22
Appendicitis	40	Appendix	40
Typhoid	26	Ileum	26
Trauma	21	Jejunum	11
		Transverse colon	05
		Multiple sites	03
		Stomach	02
Tuberculosis	18	Ileum	18
Malignancy	07	Sigmoid colon	04
		Rectum	02
		Cecum	01
Bowel Strangulation	05	Ileum	03
		Jejunum	02
Amoebiasis	03	Cecum	03
Diverticulitis	03	Sigmoid colon	02
		Rectum	01
Unknown	02	Sigmoid colon	01
		Cecum	01

Majority of the trauma cases were managed by primary repair (12 cases), six patients required resection anastomosis due to mesenteric injuries, two had transverse colostomies with primary repair of distal perforations in view of faecal contamination and multiple perforations in the distal colon and rectum and one patient required a formal right hemicolectomy with ileo-transverse colon anastomosis in view of multiple perforations in caecum and ascending colon.

Amongst the eighteen patients suffering with abdominal tuberculosis (confirmed on histopathology examination later), eight patients required an ileostomy (dense adhesions with multiple perforations in the distal ileum with faecal peritonitis) with primary repair of perforations distal to ileostomy, six were managed with resection anastomosis of the ileum (ileal perforation proximal to an ileal stricture) and four underwent limited resection of distal ileum and caecum with ileo- ascending

colonic anastomosis (due to distal ileal perforation with ileo-caecal involvement).

Three out of the four sigmoid malignancies were managed with resection and anastomosis based on oncologic principles and the fourth patient had a Hartmann's procedure. Both the rectal malignancies were managed with a limited resection and Hartmann's procedure. One patient with caecal malignancy had right hemicolectomy based on oncologic principles with ileo-transverse colon anastomosis. The diagnosis of all malignancy cases was confirmed by histopathological examination.

Bowel strangulation was managed by resection and anastomosis of the involved bowel in four cases, whilst the fifth patient had resection with end ileostomy and mucous fistula. Amoebic caecal perforations were managed by limited resection of the terminal ileum, caecum and a part of ascending colon followed by primary ileo-ascending colon anastomosis.

Diverticular perforations were managed by limited resection and primary anastomosis. Two cases of unknown aetiologies (histopathology reports showed non-specific inflammation) were managed by sigmoidectomy (sigmoid perforation) and right hemi-colectomy (cecal perforation).

We had 20 mortalities in our study group. Gastroduodenal ulcers caused 13 deaths followed by tuberculosis, typhoid and malignancy causing 4, 2 and 1 deaths respectively

DISCUSSION

Perforation peritonitis is one of the commonest surgical emergency encountered by surgeons in the emergency department all over the developing world. Most commonly it affects the younger age group in the tropical countries (mean age in the present study group was 38.6 years) as compared to western world.[5-7] Most of the cases present late to the hospital with well-established generalized peritonitis having gross purulent or fecal contamination and varying degrees of septicemia. It is possible to make the diagnosis of peritonitis clinically in almost all the cases due to typical signs and symptoms.[8]

In stark contrast to the data available from the developed countries, where distal gastro-intestinal tract perforations are common, proximal gastro-intestinal perforations are the commonest site of perforations in our setup.[9-11]

The etiology of perforation peritonitis shows a marked variation in the developing and the developed world. The present study showed that the most common cause of perforation peritonitis was gastro-duodenal ulcers.

It is in stark contrast to Noon et al, from Texas who reported that penetrating trauma was the commonest cause followed by appendicitis and peptic ulcer.[12] Malignancy has also been reported as the cause in 15-20% of cases in studies from the west whereas it was only 2.8% in the present study.[13,14]

We had 20 deaths (8.13%) within four weeks from the date of performing the surgery. Mortality rates range from 6-27%.[15] Our mortality rates are similar to those found by Crawford E and Ellis H, septicemia being the most common incriminating factor.[16]

We found that an early and aggressive management strategy aimed at adequate preoperative resuscitation with intra-venous fluids followed by correction of electrolyte imbalance, instituting broad spectrum intra-venous antibiotics and early surgical intervention to address the cause and source of infection in order to stop further contamination of the peritoneal cavity are very important for minimizing the morbidity and mortality of perforation peritonitis leading to a favourable outcome.

CONCLUSION

As regards to the developed world, the spectrum of perforation peritonitis in India is different, although the management principles remain the same. Perforated gastro-duodenal ulcers, appendicitis and typhoid are the causes in a majority of patients. Aggressive and early fluid and electrolyte correction followed by prompt surgical intervention to address the cause under the cover of broad spectrum antibiotics are the cornerstones in achieving a favourable and good outcome.

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Author Rajandeep Singh Bali designed the study, wrote the protocol and wrote the first draft of the manuscript and was working at Lok Nayak Hospital as resident from November 2011 to April 2015. Authors Ashok Kumar Sharma and Rajesh Kumar Soni managed the literature searches, analyses of the study. All authors read and approved the final manuscript.

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