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Original Research Article

Gastrointestinal perforations: a tertiary care center experience

Parimala S. Devi, Ganesh Manikantan*, Meer M. Chisthi

Department of General Surgery, Government Medical College, Trivandrum, Kerala, India

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***Correspondence:**
Dr. Ganesh Manikantan,
E-mail: ganeshsurgen@gmail.com

ABSTRACT

Background: In spite of the advances in surgical techniques and antimicrobial molecules, gastrointestinal perforations still remain highly fatal. Delay in diagnosis as well as referral is often attributed to be the cause behind the high mortality caused by this condition. The aim of the study was to elucidate the etiological factors of gastro intestinal perforation as well as postoperative outcome among patients undergoing treatment at a tertiary care centre.
Methods: This was a Descriptive study of patients admitted with gastro intestinal perforation in the General Surgical wards of Government Medical College, Trivandrum from March 2014 to February 2015. The demographic, clinical, operative and post-operative findings were entered into a structured performa and analyzed statistically.
Results: Atraumatic perforation was found to predominate over traumatic perforations. Most of the atraumatic perforations belong to the age groups between 21 and 30. Also, there is a high male predominance among these patients. Proximal gastrointestinal tract injuries predominate much more than distal ones. Increased morbidity is seen if there are associated co morbidities and risk factors including smoking and alcohol abuse. Mortality rate is highest in traumatic injuries involving colon and rectums.
Conclusions: Mortality due to perforation peritonitis is still a challenge to the surgeon and burden to the society. Early diagnosis and treatment will positively alter the outcome of a gastrointestinal perforation and can be ensured only by timely arrival of the patients to hospital and subsequently by early intervention. This in turn depends mostly on strengthening the primary care and referral services.

Keywords: Blunt abdominal injuries, Bowel perforation, Hollow viscus injury, Penetrating abdominal injuries

INTRODUCTION

Peritonitis remains one of most important infectious problems that a surgeon has to face. From the earliest of times, gastrointestinal perforations, either traumatic or non-traumatic was recognized as a universal fatal condition. In spite of the progress in antimicrobial agents and intensive care treatment, the mortality due to diffuse peritonitis still continues to be unacceptably high. The mortality in perforation peritonitis is reported to be sometimes as high as 29%.[1] Even among traumatic injuries, about one third of patients have abdominal injuries and they account for a large fraction of loss of life.[2] Also, unrecognized abdominal injury remains frequent cause of preventable death in trauma. The main stay of treatment in bowel perforation is surgery, aiming at safety to the patient, peritoneal lavage and closure of the perforation. Diagnostic delay exceeding eight hours before surgical repair is associated with increased morbidity and probably with mortality.[3]

In contradiction to non-operative management of solid visceral injury, early surgical intervention is still the prime stay of treatment in case of hollow viscus injury. Non-operative management in bowel perforation is rarely justified in modern medical practice except in the setting of a clinical trial. The 2009 updated guidelines for managing patients with intra-abdominal infection recommended rapid fluid resuscitation, early initiation of

appropriate antibiotics, as well as relevant source control procedures.[4]

With this background, this study was initiated to study the pattern of gastrointestinal perforations at Government Medical College Trivandrum which caters to a large volume of referred cases from the southern districts of Kerala. The primary objective of the study was to study the etiological factors behind gastro intestinal perforation among patients admitted at our institution, over a 1 year period. Secondary objective was to study the demographic profile of these patients and the factors influencing the outcome of these patients.

METHODS

The study was designed as a descriptive study. The study setting being the Department of General Surgery, Medical College Hospital, Trivandrum. The protocol was vetted by the Institutional Review Board and subsequently approved by the Ethics Committee of the institution. Study population included all patients who underwent surgery for gastro intestinal perforation in the specified 1 year period at our department. Study period was from March 2014 to February 2015.

Inclusion criteria

Any case of perforation of any gastrointestinal hollow viscus organ. Patients aged more than 13 years.

Exclusion criteria

Cases of oesophageal perforation or rupture, iatrogenic perforation during laparotomy and gynaecology procedures, perforation of hepato-biliary system.

After getting informed consent, the patients were recruited into the study. The following details were observed from records and clinical examination:

Apart from general data like name, age, sex, present and past history, specific details recorded included the delay in hours between admission and surgery, intra-operative findings, procedure done, post-operative complications and duration of stay in hospital.

All patients were treated according to the hospital protocols. Presence of shock indicated severity of the perforation and it was corrected with intravenous fluids before taking the patient to surgery. During laparotomy, the entire gastrointestinal tract was carefully evaluated in the setting of trauma, from the gastro-esophageal junction to the rectum at the peritoneal reflection. This included entering the lesser sac to evaluate the posterior stomach and the pancreas. Areas stained with blood that are of concern for injury were explored further with careful dissection. In most cases, the perforation was closed either by primary repair or by resection anastomosis. Abdomen was closed with drain tube inside. With postoperative wound care and appropriate antibiotics, patients were retained till they requested discharge or till suture removal.

Data was recorded into a structured performa and subsequently entered into Microsoft Excel sheet. All the statistical analyses were performed using Statistical Package for Social Sciences (SPSS Inc., Chicago, Illinois, USA). Data is presented as mean ± standard deviation and proportions as appropriate. Descriptive analysis was used for the study. The case with a p value of less than 0.05 was considered to be statistically significant.

RESULTS

During the study period of 12 months from March 2014 to February 2015, we covered 152 cases of gastrointestinal perforations which satisfied the inclusion criteria. Males contributed to 90.8% and females 9.2% of the total cases studied. Study covered age groups above 13 years of age, with minimum age among all cases studied being 14 years and maximum age 81 years. Maximum patients belonged to age group between 20 to 30, that is, 44%. Minimum incidence belongs to less than 20 years which accounted for 6% patients only. In this study, mean age was 44.71, median age was 44.00, and the standard deviation was 16.047.

In one year of gastrointestinal perforation study, 33.6% were traumatic and remaining 66.4% were atraumatic perforations. Among those with traumatic perforation, 35.3% patients had blunt trauma with perforation and 64.7% had penetrating injury with perforation. Road traffic accidents accounted for majority of blunt trauma perforations followed by assault and fall from height. Among the penetrating perforations, majority were homicidal - 81%, followed by road traffic accidents - 14% and occupational injuries in remaining 5% of the total case. There were no self-inflicted perforations in our study.

Penetrating injuries were most commonly noted in stomach, especially the anterior wall of stomach. This was followed by small bowel, the most common site being jejunum, followed by duodenum. Most of the small bowel injuries were associated with mesentric tear and were primarily repaired.

In this study, blunt injuries were common in small bowel followed by stomach and large bowel. Also, proximal jejunum and distal ileum were the more prone small bowel sites for perforation.

Colonic injuries occurred less frequently than small intestinal injuries. Among the large bowel, transverse colon was the commonest site for perforation. Among the traumatic perforations, including penetrating and blunt, 50.0% were seen in the stomach, 36.9% in the ileum, 10.0% in the colon and 3.1% in duodenum (Figure 1).

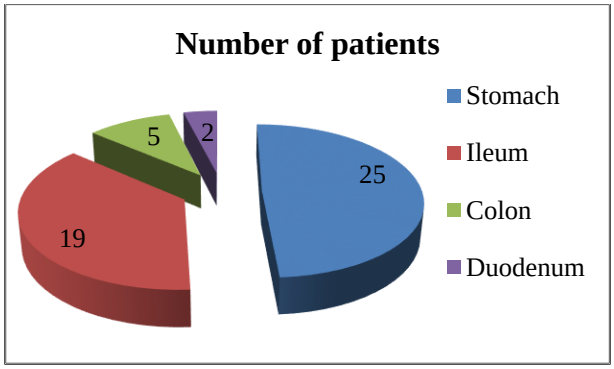

Figure 1: Site of traumatic perforations in the gastrointestinal tract.

Of all the atraumatic cases, 70.9% had peptic ulcer disease, 1.8% were due to tuberculous perforation, 18.2% were appendicular perforation while another 9.1% patients had underlying malignancy. Among the peptic ulcer perforations, gastric perforations were the commonest anatomical site (77.72%) followed by duodenal (22.28%) perforations. Among the atraumatic perforations, stomach was the organ having highest percentage of perforation - 62.8%, followed by appendicular perforation - 19.0%, duodenal peroration - 8.6%, ileum perforation - 3.8%, and the least being caecum perforation - 2.9% and sigmoid perforation - 2.9% (Figure 2). When all the gastrointestinal perforations are considered together, stomach had the highest rate of perforation which was contributed by penetrating injury among the traumatic perforation and by peptic ulcer perforation among the non-traumatic perforation.

In our study, 64% were chronic smokers, 52% were chronic alcoholics and 54% gave history of chronic analgesic (NSAID) usage. In the study, only 10 patients had malignancy. Out of these, 5 were cases of colonic malignancy with perforation, 1 had carcinoma stomach with perforation, while 4 had malignancy in the ileo caecal region. In this study 7 patients who had malignancy gave a history of chronic use of NSAIDS also.

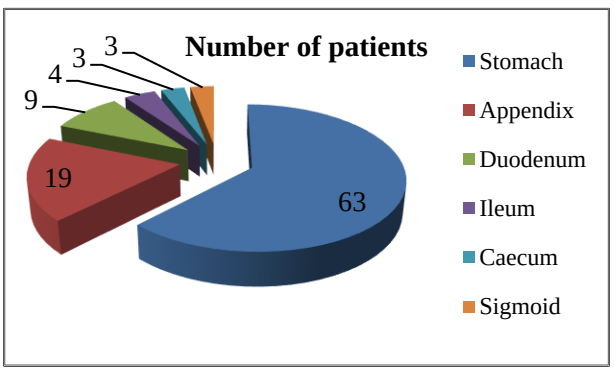

Figure 2: Site of atraumatic perforations in the gastrointestinal tract.

There was no significant association between mortality and delay in treatment in atraumatic perforation. However in traumatic perforation, delay in surgery lead to mortality in 4 patients in this study. All of them were brought to the casualty after 6 hours of the onset of injury. Complications noted in our study included wound site infections, respiratory infections and catheter related infections. Among these wound site infections were found to be more common.

In a total of 152 patients included in the study, 14 died post operatively. Among the 14 patients who expired, 9 had traumatic perforation while 5 had non-traumatic perforaions. Out of the 5 cases of non-traumatic perforation deaths, 3 were due to perforation associated with malignancy and 2 were due to associated co-morbidities and delay in presentation of peptic ulcer perforation. There was no death in perforation associated with tuberculosis and appendicitis in this study.

DISCUSSION

This study attempted to detail out the various factors behind gastrointestinal perforations from a tertiary care setting. Among the traumatic perforations, male to female ratio is 9:1 in the present study. And this ratio is compared well with other studies and is supported by results of study by McFarlane et al, who found a ratio of 10:1 male to female.[5] Another two studies conducted in Kenyatta National Hospital showed a still higher male to female ratio of 11.5:1 and 12.7:1 respectively.[6,7] In our study, the high incidence among males was probably due to associated risk factors which includes habits like smoking and alcohol intake.

In this present study the ratio of penetrating to blunt abdominal injuries is 3:1. This has been supported by results of study by Exadaktylos et al in South Africa who found the proportion to be 80% penetrating and 20% blunt.[8] Another study by Edino and his group also found that the pattern of abdominal injuries is more often penetrating than blunt.[9] The small intestine was the most commonly injured in blunt injury in the other studies also.[10-12] The proximal jejunum and distal ileum were the more prone small bowel sites for perforation in similar studies.[13,14]

According to most studies, mesenteric injuries do occur more frequently in combination with small bowel injuries. Similar results were noted in the present study also. Colonic injuries occurred less frequently than small intestinal injuries. This has also been reported in other studies.[15-17] The main reason for less large bowel injuries are its location and the lack of redundancy, which prevents formation of closed loops. Among the large bowel, transverse colon is the common site with the reason being its free mobility and superficial location.

Most studies in the west suggest a predominance of duodenal perforations. One study records that 52%

perforations were duodenal while only 10% were gastric. There may be various factors responsible for site predilection of peptic ulcer perforation which includes genetic, dietary and environmental. Results from this present study are comparable to the results of study by Dakubo et al who showed that there were 88% duodenal, 7.1% prepyloric, and 4.9% type 1 gastric ulcer perforations.[18]

In the study, only 10 patients had malignancy, which is comparatively higher when compared to a study by Rodolfo et al where only 2 patients had malignancy.[19] A study by Correia and colleagues concluded that chronic use of NSAIDs in patients of malignancies exposes them to an increased risk of perforation.[20] In this study there was a complication rate of 12.5%, which is comparable well with study by Stewart et al, wherein the complication rate noted was 16%.[21] The reviewed studies show that complications depend on type of injury, organ injured and duration prior to surgery. The overall mortality accounts in our study was 9.2% which is comparable to studies by and Jhobta et al where it was 10%.[22] Delay in seeking medical attention and co-morbidities increases the mortality and morbidity. According to binary logistic regression analysis, patients who presented with shock and uremia with blood urea more than 40 were significant predictors of mortality.

Among the traumatic perforations, patients with multiple visceral injuries with shock and delay in presentation to casualty contributed to the mortality. Sixty percent of the total traumatic perforation mortality was accounted for by blunt abdominal injury. Mortality was found to relate to the causative agent: that is, type of injury (blunt>penetrating); as well as delays in appropriate intervention: that is, time taken from injury to admission, and from admission to surgery. Mortality rate is higher in patient involving colonic origin of sepsis, probably because faecal peritonitis formed an important factor in determining the mortality.

The findings of a study on 362 critically ill patients suggested that, in patients undergoing emergency GI surgery, cancer-related peritonitis, preoperative anaemia, and preoperative hypoalbuminemia are associated with highest hospital mortality.[23]

To conclude, proximal bowel is injured much more commonly than distal bowel by perforations. Gastrointestinal perforations show increased morbidity in patients with associated risk factors including smoking, chronic NSAID intake and alcohol abuse. Mortality rate is higher in traumatic perforation patients involving colonic injuries and also when there is significant delay in detection and treatment.

The relatively high morbidity and mortality from bowel perforations can be alleviated to the best possible level by reducing the time gap from diagnosis to intervention. To an extent, this can be achieved by timely detection of the perforation and prompt referral. A high index of suspicion is necessary to avoid diagnostic delays that can lead to severe complications and death. These will be the most important measures to improve the overall outcome from gastrointestinal perforations.

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