Study of Spectrum of Small Bowel Perforations – Management and Evaluation of Outcomes

Nisith Ranjan Mallik¹, Sandip Das Ray², Ashis Kumar Saha¹, Chhanda Das³
¹(Associate Professor, Department of General Surgery, Calcutta National Medical College, Kolkata, India)
²(Post Graduate Trainee, Department of General Surgery, Calcutta National Medical College, Kolkata, India)
³(Assistant Professor, Department of Pathology, IPGME&R, Kolkata, India)
Corresponding Author: Ashis Kumar Saha

Abstract: Gastrointestinal perforation has been a surgical problem since time immemorial. Perforation is said to occur once a pathology extends through the full thickness of hollow viscus leading to peritoneal contamination with intra luminal contents. In India, gastro duodenal perforation is the one of the commonest sites followed by enteric, appendicular, perforations. But the relative incidence of various types of perforations, the site, aetiological factors show a wide geographical variation. The aim of this study is to evaluate the current pattern of perforations, study various aetiological factors, management and overall mortality and morbidity with contributing factors. In my present study, total number of patients was 50, out of them 39 were male and 11 were female. Maximum patients were in between 41 to 50 years of age. Sex did not alter any surgical outcome in small bowel perforation. Old age patients have higher mortality rate. Most of the patients presented with diffuse pain abdomen, and fever, and clinical signs of peritonitis. Among the various operative procedures, we have employed, ileostomy had a significant higher rate of post-operative complications, However stoma can be considered as this a lifesaving procedure in a hemodynamically unstable patient. Choice of operation remains controversial. The exact procedure should be individualised and employed as per patients pre-operative condition, intra operative findings and patients overall hemodynamic condition.

Keywords – Gastrointestinal perforation, aetiological factors, hemodynamically

I. Introduction
Gastrointestinal perforation has been a surgical problem since time immemorial. Scientists have found evidence of GI perforations even in Egyptian mummies. Perforation is said to occur once a pathology extends through the full thickness of hollow viscus leading to peritoneal contamination with intra luminal contents. Perforation can occur anywhere in the gastrointestinal tract starting from oesophagus to rectum. In India, gastro duodenal perforation is the one of the commonest sites followed by enteric, appendicular, perforations. But the relative incidence of various types of perforations, the site, aetiological factors show a wide geographical variation. Ileal perforation is another common surgical emergency in the Indian subcontinent and in the tropical countries¹. It is reported to constitute the fifth common cause of abdominal emergencies due to high incidence of enteric fever and tuberculosis in the Indian subcontinent.² Despite the availability of modern diagnostic facilities and advancement in treatment regimes, this disease has an abrupt onset and a rapid downhill course with a high mortality if not treated with alacrity.³ ⁴ Various causes of small bowel perforation includes; Bacterial infection (Salmonella and tuberculosis), and Chron’s Trauma (both blunt and penetrating), viral (Cytomegalovirus), Fungal infection (Histoplasma), Parasitic (A. Lumbricoides, E vermicularis), Drugs (NSAIDS, Steroids) and Lymphoma.⁵ In a significant number of cases the cause of perforation is not known. Perforation causes gram negative aerobic and anaerobic infection leading to peritonitis⁶. Various operative procedures advocated by different authors such as: Simple closure of perforation, Resection and anastomosis, Ileostomy, Graham’s Patch Repair. Even with such a variety of procedures, small bowel perforation still has a high rate of morbidity and mortality.⁷

II. Aims & Objectives
The aim of this study is to evaluate the current pattern of perforations, study various aetiological factors, management and overall mortality and morbidity with contributing factors.

III. Materials & Methods
STUDY AREA: Department of Surgery, Calcutta National Medical College and Hospital, West Bengal.
STUDY POPULATION: Patients with perforative peritonitis due to small bowel perforation admitted from
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STUDY PERIOD: 1 Year, January 2016 to December 2016
SAMPLE SIZE: 50 patients
SAMPLE DESIGN: Non Randomized Prospective study
STUDY DESIGN : Institution based Prospective Study

PARAMETERS TO BE STUDIED:

a) Pre-operative characteristics:
   1) Demographic characteristics of the patients.
   2) Etiological factors (if any)
   3) Clinical Presentation
   4) Time interval between occurrence and surgical Intervention.
   5) Co-morbid conditions (if any)

b) Operative Characteristics:
   1) Site of Perforation
   2) Amount of Contamination of Peritoneal Cavity
   3) The method of surgical intervention chosen.

c) Post operative Characteristics:
   1) Complications like- wound infection/burst abdomen
   2) Mortality (if any)
   3) Histopathological diagnosis

OUTCOME TO BE ASSESSED BASED ON THE FOLLOWING PARAMETERS:

1) Wound infection
2) Wound dehiscence
3) Residual Intra-abdominal abscess
4) Faecal fistula
5) Death (Within 30 days of operation)

INCLUSION CRITERIA:
All patients detected with small bowel perforation during exploratory laparotomy in cases admitted in emergencies or OPD of CNMCH, Kolkata with suspected perforative peritonitis.

EXCLUSION CRITERIA:
Patients presenting with perforative peritonitis (suspected small bowel perforation) and admitted but undergoing conservative management due to not being fit for surgery or have improved clinically prior to surgery or patient with other hollow viscus perforation.

STUDY TECHNIQUE
Patients admitted with Perforative Peritonitis from emergency or OPD of Dept of General Surgery, CNMCH and detected as small bowel perforation during explorative laparotomy in emergency settings will be included in the study. All the pre operative and operative characteristics will be noted down. Tissue from the margin of perforation will be sent for histopathological examination. Outcomes will be evaluated by noting down all the postoperative characteristics using charts and tables and statistical representation of data using appropriate methods.

PLAN FOR ANALYSIS OF DATA:
Through tabulation of data, graphical depiction using appropriate charts and tables and use of appropriate statistical methods. (The statistical software SPSS version 20 has been used for the analysis)

IV. Results & Analysis

In the present study of 50 patients, maximum was from the age group of 41-50 years (36%), minimum was from the age group of 61-70 years (2%). Maximum was male patients 39(78%). 27 patients (54%) presented at the emergency within 48 hrs of perforation and 23 patients (46%) presented after 48 hrs of perforation. Out of 50 patients in this study 30 patients had an history of acid Peptic Disorder, 7 patients had a history of tuberculosis, 6 patients had history of trauma, 4 patients were suffering from typhoid and 3 patients had other causes. In the present study out of 50 patients, 48 (96%) complained of Pain abdomen, 27 patients (54%) complained of Vomiting and 28 patients(56%) complained of abdominal distension. And 24(48%) patients complained of constipation. Out of 50 patients after Straight X ray abdomen on erect posture showing
both domes of diaphragm, it was revealed that 36 (72%) patients had signs of Pneumo peritoneum, only 01(2%) patient was suffering from Diabetes. On laparotomy it was seen that 18(36%) patients had Grade 2 peritonitis, 16(32%) patients had Grade 1 peritonitis, 11(22%) had Grade 3 peritonitis and 5(10%) patients had Grade 4 peritonitis and 44(88%) patients had single perforation. Out of 50 patients admitted for perforative peritonitis, 31 (62%) had duodenal perforations, 01(2%) patient had Jejunal perforation and the rest 18(36%) had ilial perforations, 11(22%) patients had non-viable bowel, 09(18%) patients underwent resection and anastomosis, 09(18%) patients underwent Ileostomy and the rest 32(64%) patients were treated by Grahams Patch repair, 14 (28%) developed wound infections and 05(10%) patients developed wound dehiscence, 03(6%) developed Anastomatic leak. Mortality was at the rate of 8% (04 patients), after histopathological examination, 07 (14%) patients were found to be Tuberculous in origin, 04(08%) were Enteric in origin and the rest 39(78%) were chronic inflammation etc.

V. Discussion

In this study, as majority of patients presented within 48 hours after onset of symptoms so maximum patients did not develop fever. Pain abdomen is a constant symptom amongst the patients. 96% patient (480out of 50) presented with pain abdomen. In a study by V Patil et al. out of 60 patients 53 presented with pain abdomen (88%)[13]. In this study, 27 (54%) patients presented within 48 hours and 23 patients presented after 48 hours. In a study by Rajasekara Ganappa Babu et al. among 192 patients, 147 patients (76.56%) presented early (<48 hours). This result is in concordance with my study[24]. In my present study, the patients who presented late, developed significantly more wound dehiscence. 4 out of total 5 cases of wound dehiscence presented after 48 hrs of perforation. This data is supported by the study by Malik AM et al on 40 patients[15].

The present study amongst 50 patients, the incidence of various causes are Acid Peptic Disorder -30 patients, Tuberculosis: 7 patients, Trauma: 6 patients, Typhoid: 4 patients, Others: 3 patients. Peptic ulcer perforation in the 1st part of duodenum is one of the most common sites[13]. However, there are studies which shows typhoid as the most common cause of ileal perforation in developing countries. But some other studies have shown that there is a decreasing trend of typhoid ileal perforation. This is explained by improvement in hygiene and sanitation, and early diagnosis and better antibiotics. A study by Ghulam Shabir Shaikh, Saira Fatima, Shahida Shaikh on 60 patients shows decreasing trend of typhoid ileal perforation. They have concluded —Although the incidence of post typhoid ileal perforation with all its dreadful complications has decreased after the introduction of quinolones, it still possesses a major threat for a surgical setup[17]. However, many patient cohort and time frame is required to confirm this decreasing trend.

From the present study, it is found that as the severity or grading of peritonitis is directly proportionate with incidence of complication. In my study feculent (grade 4) peritonitis patients developed significant wound infection, 5 cases of wound infection had grade 4 peritonitis, 8 cases had grade 3 peritonitis. This result is consistent with two studies by Garg Ramneesh et al where it is shown that the 50 patients who developed wound dehiscence, 88% of the wounds was severely contaminated. Same is supported by a previous study by Haley et al.[18].

In this study 50% patient with multiple perforation developed wound infection. A study by Rauf A Wani et al with 44 patients shows adverse outcome with the patient with >1 perforations. 36 patients had single and 8 patients (18%) had more than one perforation. The same is supported by a previous study by Haley et al[19].

In my present study, I have used three types of surgical procedures in the management of Small Bowel Perforation. They are Graham’s Patch Repair— done in 32 patients, Resection and anastomosis (Either ileal resection /Ileo colonic resection) Done in 09 cases, Exteriorisation of gut i.e. Ileostomy—Done in 09 cases. We have found that post-operative wound infection and wound dehiscence developed in 14(28%) cases and 5(10%) cases respectively. There was no significant difference in outcome with respect to mortality.

The current study shows slightly improved mortality rates (7.8%) in comparison to previous studies carried out in India. This may possibly be attributed to a number of factors. Over the past few years, improvements have been noted in antibiotic therapy given in the perioperative period. There is also a greater accessibility to intensive care and the referral system from primary to tertiary care has strengthened. Also, the primary diseases causing the ileal perforation such as typhoid and tuberculosis are now being detected earlier and being treated more effectively than before. The authors found that stomal complications like skin excoriation were worse with the three patients who underwent a primary exteriorization of the perforation. This procedure has its own controversies as many authors believe that a diversion ileostomy is a much better option[23]. However, there are studies which show that post operative wound infection and wound dehiscence developed in 14(28%) cases and 5(10%) cases respectively. There was no significant difference in outcome with respect to mortality.

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ileostomy closure has been attempted during the primary hospital stay with good results. However, in our setting where majority of the patients present in sepsis, a longer recupera period is advisable so as to minimize further complications during reversal. So, we can conclude that no procedure is best. Operative procedure is to be individualised as per patients physiological, hemodynamic condition, and intraoperative findings. Ileostomy remains the better option in cases of hemodynamically unstable and patient with complications though he wound infection rate is more but this is a lifesaving procedure. A study by Beniwal et al. with 102 cases showed that overall mortality is 51%. Most common complication was wound infection (23%), faecal fistula (16%), wound dehiscence (6%), bleeding diathesis (5.5%), and skin excoriation around ileostomy (5.7%). He also observed in the same study that Mortality rates of repair of perforation, primary ileostomy, repair with I-T (bypass ileo-transverse bypass), omental patch repair and resection anastomosis were 6.5%, 12.8%, and 33% respectively. Eggleston and Santoshi compared primary closure with closure plus ileo-transverse anastomosis. patients have been treated for typhoid perforation of the bowel. Forty-three of these have been treated by closure of the perforation, and 42 by end-to-side ileotransverse anastomosis. Although there was no difference in mortality, postoperative morbidity.

VI. Conclusion

In my present study, total number of patients was 50, out of them 39 were male and 11 were female. Maximum patients were in between 41 to 50 years of age. Sex did not alter any surgical outcome in small bowel perforation. Old age patients have higher mortality rate. Most of the patients presented with diffusive pain abdomen, and fever, and clinical signs of peritonitis. A good number of patients presented early in this study. There is a decreasing trend of ileal perforation. Ileal perforation as a complication of typhoid fever has a decreasing trend due to early diagnosis, improved sanitation and better antibiotic use. Grade of peritonitis has a significant influence on surgical outcome post operatively. Patients with Grade 3 or 4 peritonitis before operation have more statistically significant morbidity and mortality. Most of the patients presented with single perforation. This study shows that increased number of perforations is associated with a significantly higher mortality and morbidity rate. Among the various operative procedures, we have employed, ileostomy had a significant higher rate of post-operative complications. However stoma can be considered as this a lifesaving procedure in a hemodynamically unstable patient. Choice of operation remains controversial. The exact procedure should be individualised and employed as per patients pre-operative condition, intraoperative findings and patients overall hemodynamic condition. The present study was conducted among 50 patients of small bowel perforation from January 2016 to December 2016. Gastro duodenal perforation is the commonest cause of small bowel perforation in this study. Tubercular ileal perforation is the major cause of ileal perforation as observed in the present study and there is a decreasing trend of typhoid ileal perforation. Surgical outcome and management of ileal perforation depends upon time of presentation, pre-operative condition of patients, intra-operative findings. However, more number of patients and longer time frame is required to establish this changing aetiological trend.

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