



AN EPIDEMIOLOGICAL STUDY OF PERFORATION PERITONITIS IN A TERTIARY CARE HOSPITAL IN WESTERN UTTAR PRADESH

General Surgery

Dr Shesh Kumar Assistant Professor, Department of General Surgery, UPUMS, Saifai, Etawah.

Dr Rajesh Kumar Associate Professor, Department of General Surgery, UPUMS, Saifai.

Dr Anil Kumar Assistant Professor, Department of General Surgery, UPUMS, Saifai.

Dr Vikilesh Kumar Sharma Consultant Surgeon.

Dr Ram Lakhan Singh Verma* Lecturer, Department of General Surgery, UPUMS, Saifai, Etawah. *Corresponding Author

ABSTRACT

Objective: To study the epidemiological profile of perforation peritonitis in a tertiary care hospital in western Uttar Pradesh.

Methods: This was a cross-sectional study. The study was conducted on 127 patients of hollow viscus perforation resulting in peritonitis. Patients admitted were examined during pre-operative period and followed during intra-operative and post-operative period. All the required data were collected like demographic, clinical and radiological examinations at pre and post-operative period.

Results: About one third of patients were between 15-30 years (31.5%) and majority of patients were males (80.3%). Ileal anatomical site of perforation was most common (43.3%). Distension was most common symptom (95.3%). REPAIR+ PROX LOOP (32.7%) and PERF AS LOOP (30.9%) surgical procedure was performed among about one third of patients for ileal perforation. Fever, seroma and infection post-operative complication was among all patients whom number of ileal perforation was >3. The mortality was higher among whom number of ileal perforation was >3 (40%) than 2-3 (25%) and 0-1 (4.8%). The duration of hospital stay was insignificantly ($p>0.05$) higher among whom number of ileal perforation was >3 (14.26 ± 4.13 days) than 2-3 (13.60 ± 3.14 days) and 0-1 (11.86 ± 2.36 days).

Conclusion: Early diagnosis, resuscitation with fluids, antibiotic, and timely surgical intervention are the most important factors deciding the fate of the patient with perforation peritonitis.

KEYWORDS

Mortality, Perforation, Complication

INTRODUCTION

Generalized peritonitis as a result of gastrointestinal perforation is a common surgical emergency in India. In spite of advances in perioperative care, antimicrobial therapy, and intensive care support, perforation peritonitis still has high morbidity and mortality.^[1]

Perforation is defined as an abnormal opening in a hollow organ or viscus. It is derived from the Latin perforatus, meaning "to bore through." The spectrum of etiology of perforation is different between developing and developed countries and there is a paucity of data from India regarding its etiology, prognostic indicators, morbidity, and mortality patterns.^[2]

Intra-abdominal infections are one of the most common clinical problems in surgical practice and range from localized to generalized peritonitis.^[3]

Of the three types of peritonitis, secondary peritonitis is most common form originating from bowel pathologies such as perforation or ischaemia.^[4]

It is one of the most common surgical emergencies in the tertiary care centres in India with most of the patients presenting late in the course of disease. The mortality rates of intra-abdominal infections significantly depend on the anatomical site of perforation which in turn influences the source of the infection. Several studies have reported a mortality rate of 3-28% in gastroduodenal perforation, 20-38% for small bowel perforation and 20-45% in cases of large bowel perforation.^[5]

The most accepted protocol of treatment for patients with secondary peritonitis due to hollow viscus perforation is resuscitation of the patient, removing the source of contamination as soon as possible along with the appropriate antimicrobial therapy.^[4]

The objective of this study was to study the epidemiological profile of perforation peritonitis in a tertiary care hospital in western Uttar Pradesh.

MATERIAL AND METHODS

This was a cross-sectional study conducted in a tertiary care hospital in western Uttar Pradesh. The study was approved by the Ethical Committee of the Institute and consent was taken from each participant before including in the study. All the participants were explained about the purpose of the study. The study was conducted on 127 patients of hollow viscus perforation resulting in peritonitis.

METHODS

Patients admitted were examined during pre-operative period and followed during intra-operative and post-operative period. All the required data were collected like demographic, clinical and radiological examinations at pre and post-operative period.

The necessary and appropriate steps were taken timely during post-operative period to ameliorate the conditions which were going to add to comorbidity of patient like re-suturing of wound dehiscence, re-exploration of anastomotic leaks, management of other conditions like diabetes, hypertension and tuberculosis.

1st dressing was done on 2nd post-operative day and then repeated every day. If any seroma or collection was noted that were subjected to gram staining and AFB staining and addressed appropriately.

Patients and attendants were educated about urinary catheter care. Early drain and catheter removal were tried to avoid catheter associated infections.

When burst abdomen (rectus gap) occurred, all stitches were opened and daily aseptic dressing was done. When wound became red and adequate and adequate granulation tissue present, re-suturing with appropriate suture material was done. In case of wound dehiscence and when the wound was dirty, daily aseptic dressing was done and letting them to heal by secondary intention.

In case of patients with poor nutritional status and when there was delay in taking the patient orally, they were subjected to parenteral nutrition via central line or wide bore peripheral line until they were allowed orally. Almost all patients and especially those with poor chest conditions were subjected to early physiotherapy in form of steam inhalation, nebulization and respirometry.

Stoma care

Stoma appliance (coloplast) were used on stoma site during hospital stay. Attendants and patients both were educated about stoma care. Once midline healed and stiches were out, coloplast were replaced by colostomy kit. During application of colostomy kit, zinc oxide powder was used to prevent skin from excoriations and eczematous conditions. Patients were educated about how and when to change the appliance and paddings.

STATISTICAL ANALYSIS

Descriptive statistics such as frequencies and percentages are presented. The Chi-square test was used for comparisons. The one way analysis of variance (ANOVA) was carried out to compare the duration of hospital stay with number of ileal perforations. The p -value < 0.05 was considered significant. All the analysis was carried out on SPSS 16.0 version (Chicago, Inc., USA).

RESULTS

About one third of patients were between 15-30 years (31.5%) followed by 46-60 (28.3%), 31-45 (26.8%), <15 (7.1%) and 61-75 (6.3%) years. Majority of patients were males (80.3%) (Table-1).

Ileal perforation was most common (43.3%) and duodenal (22.8%) was second most common anatomical site of perforation (22.8%). Gastric was third most common anatomical site of perforation (20.5%). Descending colon (0.8%) was least common anatomical site of perforation (0.8%) (Fig.1).

Distension was most common symptom (95.3%) and rigidity was second most common symptom (85.8%). Absent bowel sounds was third most common symptom (81.1%). Shock was least common symptom (27.6%) (Table-2).

REPAIR+ PROXIMAL LOOP ILEOSTOMY (32.7%) and PERFORATION AS LOOP ILEOSTOMY (30.9%) surgical procedure was performed among about one third of patients for ileal perforation. RESECTION ANASTOMOSIS + PROXIMAL LOOP ILEOSTOMY and RESECTION+DOUBLE BARREL LOOP ILEOSTOMY surgical procedure was performed for ileal perforation each in 9.1% patients. REPAIR+DISTAL LOOP ILEOSTOMY and RESECTION ANASTOMOSIS surgical procedure was performed for ileal perforation each in 3.6% patients. Other surgical procedure was performed each in 1.8% patients (Table-3).

Fever, seroma and infection post-operative complication was among all patients whom number of ileal perforation was >3. Respiratory post-operative complication was higher among whom number of ileal perforation was >3 (80%) than 0-1 (45.2%) and 2-3 (37.5%), however, the difference was statistically insignificant ($p > 0.05$). The mortality was higher among whom number of ileal perforation was >3 (40%) than 2-3 (25%) and 0-1 (4.8%). There was significant ($p < 0.05$) association of seroma, infection and mortality with number of ileal perforations (Table-4).

The duration of hospital stay was insignificantly ($p > 0.05$) higher among whom number of ileal perforation was >3 (14.26±4.13 days) than 2-3 (13.60±3.14 days) and 0-1 (11.86±2.36 days) (Table-5).

DISCUSSION

Perforation peritonitis is one of the most common surgical emergencies in developing nations like India.^[6] In this study, among 127 patients, 80.3% of them were males and 19.7% of them were females. All studies related to perforation peritonitis showed a male preponderance, although the male-to-female ratio varies from 1.34:1 to 7:1.^[7,5] A possible reason for this finding may be smoking and alcohol intake which is more frequent among men, thus increasing the risk of perforation.

In this study, about one third of patients were between 15-30 years (31.5%) followed by 46-60 (28.3%), 31-45 (26.8%), <15 (7.1%) and 61-75 (6.3%) years. Almost similar observations were found by Jhobta et al^[2], Gupta et al^[8] and Ramakrishnaiah et al^[5]. This finding is in contrast to studies in the Western countries where perforation primarily occurs in the elderly.^[9] This is related due to the difference in the etiology. The Western literature suggests that foreign body, ischemia, radiotherapy, diverticula, Crohn's disease, etc. are the main causes of perforation, which are more commonly seen in elderly

patients. In contrast to this, infection is the most common cause for perforations in developing countries. This includes acid peptic ulcer disease related to *Helicobacter pylori* infection, typhoid fever, and tuberculosis, which are quite common in young.^[10,11]

This study found that distension was most common symptom (95.3%) and rigidity was second most common symptom (85.8%). Absent bowel sounds was third most common symptom (81.1%). Shock was least common symptom (27.6%). In the study by Meena et al^[1], abdominal pain was noted in all patients presenting with perforation followed by distension in 99% and constipation in 95%. Vomiting was significantly more common in appendicular and strangulation type. Diarrhea was significantly more common in appendicular type, while fever was significantly more commonly observed in appendicular and enteric perforations. Pain abdomen was the universal presenting symptom in other studies on perforation.^[8,5] Jhobta et al^[2] found abdominal pain in 98%, while Afridi et al^[12] reported a similar history in 78% patients. Clinical presentation of the patients varied according to the site and cause of perforation.

In this study, ileal anatomical site of perforation was most common (43.3%) and duodenal (22.8%) was second most common anatomical site of perforation (22.8%). Gastric was third most common anatomical site of perforation (20.5%). Descend colon (0.8%) was least common anatomical site of perforation (0.8%). In the study by Meena et al^[1], gastroduodenal type [205 (46.4%)] was the most common site, followed by small bowel (41%), appendix (8.1%), and large bowel (4.5%). The findings of this study regarding site of perforation was almost similar observations were noted by Jhobta et al^[2] in their study on 504 patients. In contrast, in developed Western countries, lower gastrointestinal tract perforation peritonitis has been reported to be more common.^[13,14]

In this study, a variety of operative procedures for ileal perforation were adopted depending on the patients' general condition, peritoneal contamination, site of perforation, gut viability, and surgeon's decision. REPAIR+ PROXIMAL LOOP ILEOSTOMY (32.7%) and PERFORATION AS LOOP ILEOSTOMY (30.9%) surgical procedure was performed among about one third of patients for ileal perforation. In the study by Meena et al^[1], the most commonly executed operative procedure was simple closure in 63.8% cases of the perforation, resection anastomosis in 7.2%, stoma in 17.4%, appendicectomy in 7.9%, and definitive procedure in 3.6%. Jhobta et al^[2] performed simple closure being the most commonly executed operative procedure in 60% patients.

This study found that fever, seroma and infection post-operative complication was among all patients whom number of ileal perforation was >3. Meena et al^[1] reported that lung infection was the most commonly observed postoperative complication followed by wound infection. Afridi et al^[12] found wound infection to be the most common complication in 42% patients.

The mortality was higher among whom number of ileal perforation was >3 (40%) than 2-3 (25%) and 0-1 (4.8%) in this study. In the study by Meena et al^[1], mortality rate was 14.7%. Jhobta et al^[2] reported an overall mortality rate of 10%, while Memon et al^[15] in their study noted the mortality rate of 16.7%. In the present study, the duration of hospital stay was insignificantly ($p > 0.05$) higher among whom number of ileal perforation was >3 (14.26±4.13 days) than 2-3 (13.60±3.14 days) and 0-1 (11.86±2.36 days) Meena et al^[1] found that the mean hospital stay was 8.8 days with a standard deviation of 3.74 days. The maximum duration of stay was 29 days.

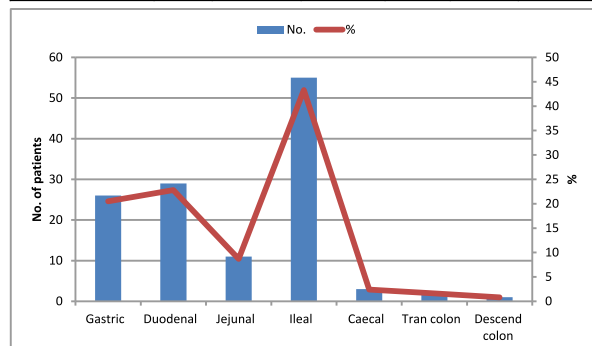
One of the limitations of this study was small sample size and there was no follow-up. The studies with larger sample size along with follow-up are required to have more robust findings.

CONCLUSION

In developing countries like India, the etiology and site of perforation continues to be different from developed countries where lower gastrointestinal tract perforations predominate. The important factors clearly deciding the fate of the patient with perforation peritonitis are early diagnosis, resuscitation with fluids and electrolyte balance, timely surgical intervention, appropriate use of antibiotics, and eliminating the source of infection. Since the most important factor associated with perforation in developing countries is infection, early diagnosis and treatment can reduce the incidence further.

Table-1: Age and sex distribution of patients

Age in years	Male		Female		Total	
	No.	%	No.	%	No.	%
<15	7	77.8	2	22.2	9	7.1
15-30	32	80.0	8	20.0	40	31.5
31-45	27	79.4	7	20.6	34	26.8
46-60	29	80.6	7	19.4	36	28.3
61-75	7	87.5	1	12.5	8	6.3
Total	102	80.3	25	19.7	127	100.0

**Fig.1: Distribution of patients according to anatomical site of perforation****Table-2: Distribution of patients according to pre-operative sign and symptoms**

Sign and symptoms#	No. (n=127)	%
Pain	101	79.5
Fever	86	67.7
Diarrhea	45	35.4
Vomiting	45	35.4
Absent flatus/ motion	82	64.6
Distension	121	95.3
Guarding	97	76.4
Rigidity	109	85.8
Absent bowel sounds	103	81.1
Tachycardia	62	48.8
Shock	35	27.6

#Multiple response

Table-3: Distribution of surgical procedure used for ileal perforation

Surgical procedure used for ileal perforation	No. (n=55)	%
PERFORATION AS LOOP ILEOSTOMY	17	30.9
REPAIR+ PROXIMAL LOOP ILEOSTOMY	18	32.7
RA+PROXIMAL LOOP ILEOSTOMY	5	9.1
REPAIR+DISTAL LOOP ILEOSTOMY	2	3.6
PERFORATION AS DOUBLE BARREL LOOP ILEOSTOMY	1	1.8
RESECTION ANASTOMOSIS(RA)	2	3.6
RESECTION+DOUBLE BARREL ILEOSTOMY	5	9.1
RESECTION+END ILEOSTOMY	1	1.8
ILEOTRANSVERSE ANASTOMOSIS+ PROXIMAL LOOP ILEOSTOMY	1	1.8
ILEOASCENDING ANASTOMOSIS +PROXIMAL LOOP ILEOSTOMY	1	1.8
RT HEMICOLECTOMY +PROXIMAL LOOP ILEOSTOMY	1	1.8
RA OF ILEAL PERFORATION+PRIMARY REPAIR OF COLON PERFORATION+DISTAL LOOP ILEOSTOMY	1	1.8

Table-4: Comparison of no. of ileal perforations with post-operative complications and mortality

Post-operative complication ns#	No. of ileal perforations						p-value ¹
	0-1 (n=42)		2-3 (n=8)		>3 (n=5)		
	No.	%	No.	%	No.	%	
Fever	22	52.4	4	50.0	5	100.0	0.11

Respiratory	19	45.2	3	37.5	4	80.0	0.28
Seroma	20	47.6	6	75.0	5	100.0	0.04*
Infection	12	28.6	5	62.5	5	100.0	0.003*
Dehiscence	7	16.7	3	37.5	3	60.0	0.06
Burst	2	4.8	0	0.0	0	0.0	0.72
Mortality	2	4.8	2	25.0	2	40.0	0.02*

¹Chi-square test, #Multiple response, *Significant**Table-5: Comparison of no. of ileal perforations with duration of hospital stay**

No. of ileal perforations	Hospital stay in days (Mean±SD)
0-1	11.86±2.36
2-3	13.60±3.14
>3	14.26±4.13
p-value ¹	0.09

¹ANOVA test**REFERENCES**

- Meena LN, Jain S, Bajji P. Gastrointestinal perforation peritonitis in India: A study of 442 cases. Saudi Surg J 2017;5:116-21.
- Jhobta RS, Attri AK, Kaushik R, Sharma R, Jhobta A. Spectrum of perforation peritonitis in India – Review of 504 consecutive cases. World J Emerg Surg 2006;1:26.
- Santos SG, Serufo JC, Silva RAP, Marra BA, Reis CMF, Hamdan JS, et al. Microbiologic profile of intra-abdominal infections at Belo Horizonte, Brazil. Am J Infect Control. 2003;31:135-43.
- Jang JY, Lee SH, Shim H, Choi JY, Young D, Lee JG. Epidemiology and microbiology of secondary peritonitis caused by viscus perforation: a single-center retrospective study. Surg Infect. 2015;16:436-42.
- Ramakrishnaiah VP, Chandrakasan C, Dharanipragadha K, Sistla S, Krishnamachari S. Community acquired secondary bacterial peritonitis in a tertiary hospital of south India: an audit with special reference to peritoneal fluid culture. Trop Gastroenterol. 2012;33(4):275-81.
- Ramakrishnan K, Salinas RC. Peptic ulcer disease. Am Fam Physician 2007;76:1005-12.
- Mahajan G, Kotru M, Sharma R, Sharma S. Usefulness of histopathological examination in nontraumatic perforation of small intestine. J Gastrointestinal Surg 2011;15:1837-41.
- Gupta SK, Gupta R, Singh G, Gupta S. Perforation peritonitis: A two year experience. JK Sci 2010;12:141-4.
- Svanes C, Salvesen H, Espehaug B, Søreide O, Svanes K. A multifactorial analysis of factors related to lethality after treatment of perforated gastroduodenal ulcer 1935-1985. Ann Surg 1989;209:418-23.
- Wani RA, Parray FQ, Bhat NA, Wani MA, Bhat TH, Farzana F. Nontraumatic terminal ileal perforation. World J Emerg Surg 2006;1:7.
- Sharma MP, Bhatia V. Abdominal tuberculosis. Indian J Med Res 2004;120:305-15.
- Afridi SP, Malik F, Ur-Rahman S, Shamim S, Samo KA. Spectrum of perforation peritonitis in Pakistan: 300 cases Eastern experience. World J Emerg Surg 2008;3:31.
- Washington BC, Villalba MR, Lauter CB, Colville J, Starnes R. Cefamandole-erythromycin-heparin peritoneal irrigation: An adjunct to the surgical treatment of diffuse bacterial peritonitis. Surgery 1983;94:576-81.
- Nomikos IN, Katsouyanni K, Papaioannou AN. Washing with or without chloramphenicol in the treatment of peritonitis: A prospective, clinical trial. Surgery 1986;99:20-5.
- Memon AA, Siddiqui FG, Abro AH, Agha AH, Lubna S, Memon AS. An audit of secondary peritonitis at a tertiary care university hospital of Sindh, Pakistan. World J Emerg Surg 2012;7:6.