Original Research Article

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Clinical study of perforations among patients at a tertiary care hospital

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ABSTRACT

Background: Non-traumatic gastrointestinal perforations have received far less attention in the recent medical literature than inflammations, tumoral or traumatic lesions of solid abdominal organs. The objective is to study perforations among patients at a tertiary care hospital.

Methods: Patients diagnosed as non-traumatic perforations of the internal organs as diagnosed by authors were planned to be included for the present study. Diagnosis was based on history, clinical examination, and required investigations. All such patients were included in the present study that was enrolled for the present study during the study period. Such 50 patients could be studied. Non-traumatic perforation with regard to age, sex, causes, clinical presentation, diagnostic modalities required was evaluated.

Results: Most common age group involved is in 3rd to 4th decade in the present study. Male preponderance (82%) was seen; with a male to female ratio was 4.6:1. The time lapse between onset of symptoms and presentation at the hospital was more than 24 hours in 24% of the study population. Abdominal pain was the most consistent symptom and was seen in 100% of the study population in the present study followed by vomiting (52%) and fever (46%). Distended abdomen was seen in 46% of study population in the present study. Tenderness was seen in all the cases and is more prominent at the site of perforation. Guarding/rigidity and absent bowel sounds were seen in 92% of the study population. Sensitivity of imaging in detecting gas under diaphragm was 72% by USG abdomen and 80% by plain radiography.

Conclusions: Risk factors for increased morbidity and mortality in the present study include older age group, delayed presentation and features of shock.

Keywords: Abdomen, Clinical study, Perforations

INTRODUCTION

Non-traumatic gastrointestinal perforations have received far less attention in the recent medical literature than inflammations, tumoral or traumatic lesions of solid abdominal organs. The first clinical description of perforated ulcer was made by Crisp in 1843.

Smoking and NSAIDS are important risk factors for perforation1. Diagnosis is clinically made and confirmed

by the presence of pneumo-peritoneum on radiographs. Non-operative management is successful in patients identified to have spontaneously sealed perforation proved by water soluble contrast gastro-duodenogram.¹

Operative management consists of time honoured practice of omental patch closure, but this can be done by laparoscopic approaches as gold standard in the future especially if perforation site is less than 10mm presenting within 24 hours of onset of pain.²

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Ileal perforation is common surgical emergency in tropical countries. It is reported to constitute the common cause of abdominal emergencies due to high incidence of enteric fever and tuberculosis in these countries. Despite the availability of modern diagnostic facilities and advances in treatment regimens, this condition is associated with a high mortality and unavoidable morbidity. This is perhaps related to the more standardized management of non-traumatic perforation with fewer controversies.

Nevertheless, the delayed diagnosis of the injury can be the cause of multiple organ failure. Current data reported by Barie et al showed that sepsis and multiple organ failure are present in 73% of such cases, with reported mortalities as high as 30%.² For these reasons, emphasis must be placed on early diagnosis and adequate management, so as to optimize results. In the last few years important advances have been made in diagnostic techniques, imaging technology, use of USG and CT as well as the selective use of laparoscopic techniques for both diagnostic and therapeutic purposes.

In the present study, diagnosis and treatment of non-traumatic perforation and the principles of management that have evolved through years was addressed.

METHODS

Present study was hospital based cross sectional study. Present study was conducted among randomly selected 50 patients presenting during the study period with non-traumatic perforations of the internal organs. Present study was carried out for a period of two years from December 2017 to November 2017. The study was carried out at wards of Department of General Surgery, Mamata Medical College and General Hospital, Khammam

Ethical issues: Authors have taken the permission from the Institutional Human Ethics Committee before the initiation of the study. Informed verbal consent from each and every patient was taken who was willing to include their particulars for the present study and authors promised to maintain their confidentiality at the same time.

Methodology

Patients diagnosed as non-traumatic perforations of the internal organs as diagnosed by authors were planned to be included for the present study. Diagnosis was based on history, clinical examination, and required investigations. All such patients were included in the present study that was enrolled for the present study during the study period. Such 50 patients could be studied.

Patient particulars like age, sex, clinical features like pain abdomen, vomiting, fever, abdominal tenderness, distension, guarding, rigidity, obliterations of liver dullness, inaudible bowel sounds and features suggestive of shock were recorded. Duration of these symptoms was also noted.

All patients were subjected to plain X ray and ultrasonography examination. Based on the diagnosis and location of perforation, appropriate medical and surgical management was done for all patients.

Data was analyzed using proportions.

RESULTS

Majority of the patients in the present study were in the age group of 21-40 years, with 66% of the study population (n=50). 22% of the study population was in the age group of 41-60 years.

Table 1: The age distribution of the study subjects.

Age (years)	Number	Percentage
0-20	5	10
21-40	33	66
41-60	11	22
> 60	1	2
Total	50	100

Table 2: Sex distribution of the study subjects.

Sex	Number	Percentage
Male	41	82
Female	09	18
Total	50	100

82% of the study population were males, with the rest being female. The male to female ratio was 4.6:1.

Table 3: Clinical features at presentation.

Clinical features	Number	Percentage
Pain abdomen	50	100
Vomiting	26	52
Fever	22	44
Abdominal tenderness	50	100
Distension	23	46
Guarding/rigidity	46	92
Obliteration of liver dullness	38	76
Inaudible bowel sounds	46	92
Features suggestive of shock	4	8

Pain abdomen was the consistent symptom in all the patients (100%) who presented with features of perforation. Vomiting was the second most common symptom following pain abdomen which was seen in 52% of study population. Abdominal tenderness was elicited in all the cases (100%) with site of tenderness at various locations depending on the site of perforation and duration of symptom onset. Guarding and rigidity were seen in 92% of the study population. Bowel sounds were

absent in 92% of the study population and were present in 8% of study population who had appendicular perforation. Abdominal distension was seen in 46% of study population. Liver dullness was obliterated in 76% of study population. Features suggestive of shock like hypotension, tachycardia, altered sensorium and decreased urine output were seen in 8% of study population, especially in individuals presenting after 24 hours of symptom onset.

Table 4: Duration of symptoms at presentation.

Duration (hours) Number	Percentage
0-12	32	64
12-24	6	12
24-48	11	22
> 48	1	2
Total	50	100

Pain abdomen, nausea, vomiting were seen in all the study population. Duration of symptoms before presentation to emergency department varied between hours to days. 64% of the study population presented to the emergency department within 12 hours of symptom onset. 22% of the study population presented between 24-48 hours of symptom onset. Fever, hypotension and signs of peritonitis were predominantly seen in individuals presenting after 24 hours of symptom onset.

Appendicular perforations were seen in individuals who presented to the emergency department after 24 hours of symptom onset. 64% of the study population, who presented before 12 hours of onset had either duodenal or gastric perforations. According to the findings of the present study, individuals with appendicitis presenting after 24 hours of symptom onset have an increased risk of perforation.

Table 5: Findings of plain radiography and USG abdomen.

Findings	Plain radiography	USG abdomen
Pneumo- peritoneum	80%	72%
Free fluid	-	86%

All the patients in the study population underwent plain radiographs of abdomen with Ultrasonography of abdomen and pelvis. Plain radiography and USG findings were later correlated with intraoperative findings to confirm the presence of pneumo-peritoneum. Plain radiographs showed pneumo-peritoneum in 80% of the study population whereas USG showed evidence of pneumo-peritoneum in 72% of the study population USG showed evidence of free fluid collection either localised or diffuse in 86% of study population.

Table 6: Distribution according to anatomical site of perforation.

Anatomical site	Ma	Male		Female		Total	
	Number	%	Number	%	Number	%	
Stomach	8	16	2	4	10	20	
Duodenum	21	42	3	6	24	48	
Jejunum	1	2	0	0	1	2	
Ileum	1	2	1	2	2	4	
Appendix	9	18	3	6	12	24	
Colon	1	2	0	0	1	2	

In the present study, 48% of the perforations were seen involving first part of duodenum intraoperatively, followed by appendix in 24% of study population. Gastric perforation was seen in 20% of study population. Jejunal perforation was seen in 2% of study population. Ileal perforation was seen in 4% of the study population. Colonic perforation was seen in 2% of study population.

DISCUSSION

In the present study, 66% of the study population was within the age group of 21-40 years. The youngest patient was 15 years old (gastric ulcer perforation) and oldest was 80 years (duodenal ulcer perforation) irrespective of the pathology of perforation. The commonest age group affected in the present study was 20-40 years, comprising

66% of the study population. Dandapet MC et al in their study of 340 cases of gastrointestinal perforation found that maximum number of patients were in the age group of 20-40 years comprising 61.17% of the study population.³ Jhobta et al their study of 504 cases of perforation peritonitis over a period of 5 years at GMCH, Chandigarh found that maximum number of patients were in the age group of less than 50 years, comprising 84% of the study population.⁴ Reddy S in his study on perforation peritonitis found that, the most common age group affected was between 20 to 40 years with 46% of study population.⁵ Similar results were seen in studies by Kemparaj T, Sarkar B and Rao M.⁶⁻⁸ This might be due to the higher incidence of peptic ulcer disease and infectious diseases like typhoid in the age group of 20-40 years.

Eighty-two % of the study population was male, with the rest being female in the present study. The male to female ratio was 4.6:1, with a male preponderance. Jhobta et al in their study on 504 patients over a period of 5 years reported a male to female ratio of 5.25:1.4 Kumar V in his study reported a male to female ratio of 2.1:1.9 Kemparaj T in his study on 369 cases of peritonitis secondary to non-traumatic perforation reported a male to female ratio of 4.6:1.6 Malik P in his prospective study of 1400 cases of perforation peritonitis over a period of 3 years from January 2011 to December 2013 had a male to female ratio 2.8:1.10 Rao M study on 65 cases of non-traumatic gastrointestinal perforation had a male to female ratio of 1.7:1.8 Rao S in his prospective study on 100 cases of perforation peritonitis reported a male to female ratio of 2.57:1.⁵ All these studies had male preponderance, similar to the present study. This is due to the influence of risk factors like consumption of alcohol and tobacco products in addition to other risk factors leading to malnutrition and infectious diseases. Among the symptoms, pain abdomen was the most consistent symptom and was seen in 100% of the study population in the present study. Vomiting was the second commonest symptom and was seen in 52% of the study population. Among the signs elicited on clinical examination, tenderness was the most consistent finding (100%). Guarding or rigidity and inaudible bowel sounds were seen in 92% of the study population. Abdominal distension was seen in 46% of study population. Liver dullness was obliterated in 76% of study population.

Jhobta et al reviewed 504 cases of gastrointestinal perforation to study the spectrum of perforation peritonitis in a tertiary care hospital over a period of 5 years. Pain abdomen was seen in 98% of the study population. Pain abdomen was associated with vomiting and fever in 59% and 25% of the cases respectively. 4 On clinical examination, features of localized peritonitis were seen in 17% of the study population, whereas features of generalized peritonitis were seen in 83% of cases. Features suggestive of shock were seen in 16% of the study population at presentation. This study differs from the present study with respect to inclusion of both traumatic and oesophageal perforations in addition to non-traumatic perforations. Rao M reviewed 65 cases of perforation which included both traumatic and nontraumatic perforation. All the patients presented with pain abdomen to the emergency room.8 Other symptoms included distension in 47.7%, vomiting in 36.9% and fever in 63.1% of the study population. On abdominal examination, tenderness was the most consistent finding seen in all the cases (100%). It was followed by guarding/rigidity (80%) and absent bowel sounds. These findings are consistent with the present study. In a prospective study on non-traumatic perforation by Sarkar B, pain abdomen was the presenting complaint in all the cases of varying severity and location of pain was dependent on the site of perforation, duration of presentation following symptom onset. Pain abdomen was associated with fever in 66.7% and vomiting in 30%

of study population. Abdominal signs included tenderness (100%), guarding/rigidity (93.33%), distension (63.33%) and absent bowel sounds (76.67%). Features of shock like hypotension, tachycardia and decreased urine output were seen in 26.67% of study population.⁷

Duration of symptoms before presentation to emergency department varied between hours to days in the present study. 76% of the study population presented to the emergency department within 24 hours of symptom onset. 24% of the study population presented after 24 hours of symptom onset. Features suggestive of shock were predominantly seen in individuals presenting after 24 hours of symptom onset. 58.3% of appendicular perforations (out of 12 cases) were seen in individuals who presented to the emergency department after 24 hours of symptom onset. According to the findings of the present study, late presentation especially after 24 hours of symptom onset was associated with increased postoperative morbidity and mortality. Shrestha K studied 260 operated patients of perforation peritonitis retrospectively in terms of clinical presentation, duration, operative findings and postoperative morbidity and mortality over a period of three years. 46.1% of study population presented within 24 hours of onset of symptoms. 11 Rest of the patients presented after 24 hours of onset of symptoms. Morbidity rate in this study was 57.7% and delayed presentation to the emergency department was considered as one of the factors responsible for the increased morbidity in this study. Kumar V studied 31 cases of non-traumatic perforation over a period of 3 years. 42% of the patients presented before 24 hours of symptom onset. The author in this study concluded that, prolonged perforation-operation interval was associated with increased morbidity and mortality.9 227 cases of perforation peritonitis were studied between December 2013 and November 2016 by Vyas AK to evaluate the clinical presentation and outcomes following surgery. 64% of the study population presented after 24 hours of symptom onset. 12 A largest single centre study on perforation peritonitis was carried out by Malik P over 1400 cases between January 2011 and December 2013. 62% of study population presented after 24 hours of symptom onset. Mortality rate was 7.2% in his study.10 Reason behind increased mortality rate in this study was attributed to delayed presentation to hospital from the time of symptom onset.

Plain radiographs showed pneumo-peritoneum in 80% of the study population whereas USG showed evidence of pneumo-peritoneum in 72% of the study population in the present study. USG showed evidence of free fluid collection either localised or generalised in 86% of study population. In a study by SC Chen, plain radiography findings and USG abdomen findings were correlated with intraoperative findings to evaluate the sensitivity. Out of 125 patients who had undergone laparotomy, 121 patients had hollow-viscous perforation. Sensitivity of USG abdomen was more (93%) when compared to plain

radiography (79%).¹³ Shadydy et al, studied 72 patients with suspected perforation between March 1998 and August 2000.¹⁴

All patients were subjected to ultrasonography, upright chest radiography and left lateral decubitus abdominal radiography examination. The sensitivities of plain radiography and USG abdomen in detecting pneumoperitoneum were 75% and 90% respectively in his study. Romero et al study had similar findings suggesting USG abdomen had more sensitivity when compared to plain radiography in detection of pneumo-peritoneum. But in the present study, the sensitivity of plain radiography was better than USG abdomen (80% vs. 72%). This discrepancy may be due to the fact that, findings in the USG abdomen are operator dependent.

In the present study, 48% of the perforations were seen involving first part of duodenum intraoperatively, followed by appendix in 24% of study population. Gastric perforation was seen in 20% of study population. Colonic and jejuna perforations were seen in 2% of study population. Ileal perforation was seen in 4% of the study population. Jhobta et al reported duodenal perforation (57%) as the most common cause of perforation based on the findings of his study. Ileal (15%) and appendicular (12%) perforations were the second and third most common causes of non-traumatic perforation. Jejunal (3%) perforations were the least common perforation in his study. Shrestha K study had different findings when compared to other studies.

Duodenal (31.92%) perforation followed by ileal (26.92%) and appendicular (23.1%) perforations were the most common causes of perforation peritonitis in her study. Jejunal perforations were not encountered in her study. Kumar V reported an incidence of 29.3% for duodenal perforation in his study comprising 31 subjects with non-traumatic perforation. Ileal, gastric and appendicular perforation had similar incidence of 16.1%.

This study differed from the present study in terms of more number of colonic perforations with an incidence of 19.2%. Studies by Pandian and Vyas AK had more number of duodenal perforations when compared to other sites with an incidence of 45%. ^{12,16} Incidence of gastric perforation was 20% in the study by Pandian which is similar to the present study.

CONCLUSION

Risk factors for increased morbidity and mortality in the present study include older age group, delayed presentation and features of shock.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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