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Original Research Article

Indicators of morbidity and mortality in acute gastrointestinal perforation

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Abstract

Introduction: Acute gastrointestinal perforation is one of the most serious and frequently encountered surgical emergencies with high morbidity and mortality. The study was conducted to assess various indicators like age, sex, duration, site, number of perforations, cause, type of surgery, associated comorbidities and postoperative complications which influence morbidity and mortality.
Methods: This study was a prospective observational longitudinal study conducted from September 2016 to august 2018.Total 96 cases were included in the study excluding below 20 years and above 80 years of age group.
Results: The site of perforation was duodenum (31.3%), Ileum (28.1%), stomach (15.6%), appendix (8.3%), caecum (6.3%), sigmoid colon (6.3%) and jejunum (4.2%). Main causes include Gastro duodenal ulcer (39.5%), malignancy (15.7%), typhoid (14.6%), trauma (10.4%) and ileo-caecal tuberculosis (7.3%). Simple closure with drainage mortality rate (12.7%), right hemi colectomy(53.8%) and Hartmann's procedure(50%).Surgical site infection is the most common post-operative complication(29.2%) followed by post- operatve pneumonia (14.6%) and renal failure(13.5%). Overall morbidity rate was 58.3% and mortality rate was 18.8%.
Conclusion: The most common site of acute gastrointestinal perforation is duodenum followed by ileum. High mortality is observed in cases presenting late due to overwhelming sepsis. Surgical site infection is associated with high morbidity whereas anastomotic leak associated with high mortality. Therefore, early diagnosis and timely surgical intervention with adequate antibiotic prophylaxis and effective management of post-operative complications can reduce the incidence of morbidity and mortality.

Keywords: Perforation, morbidity, mortality, hartmann's procedure and right Hemi colectomy

Introduction

Acute gastro intestinal perforation is a common surgical emergency in India [1] which results in generalized peritonitis. Perforation peritonitis still has high morbidity and mortality [2] despite advances in peri-operative care, antimicrobial therapy and intensive care support. It is derived from Latin word perforatus meaning "to bore through". Acute abdominal pain is most

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common symptom in the gastrointestinal system due to inflammatory and traumatic process in the stomach, small and large bowel and the pancreatic-biliary system. Perforation due to cancer and infection has high mortality rates [3] but iatrogenic perforation due to colonoscopy has a low mortality rate. Gastro intestinal perforation may be suspected based on clinical presentation or free air under diaphragm on imaging or fluid collection on abdominal ultrasonography sometimes exploration of abdomen may be needed for diagnosis. Surgery is the main modality of treatment in acute gastro intestinal perforation. Surgical management depends mainly on the underlying cause of perforation and hemodynamic status of the patient. Most commonly observed post-operative complication is surgical site infection and mortality is more recorded in cases of late presentation

To study the indicators of morbidity and mortality in acute gastro intestinal perforation, to asses various indicators like

1. Age, Sex, Duration of perforation, Cause of perforation, Single or multiple, Associated with gangrene, Type of surgery and Associated comorbid conditions like DM Type-II, hypertension, IHD,COPD, TB, malignancy.
2. Post-operative complications like anastomotic leak, wound dehiscence, burst abdomen, surgical site infections, post-operative renal failure & post-operative pneumonia/ ARDS which influence morbidity and mortality in acute gastro intestinal perforation.

Method of study

This is a prospective observational longitudinal Study conducted at Government Wenlock Hospital, Mangalore from September 2016 to August 2018. All cases of gastrointestinal perforations were included in the study. All adult patients (20-80yrs) with gastrointestinal perforation were included in the study. Paediatric patients and age of patients above 80 years were excluded in the study. All patients are subjected to clinical evaluation in the form of detailed history and physical examination, laboratory investigations (Hb, TLC, DLC, PCV, RBS, Serum Electrolytes, RFT, LFT, HIV, HbsAg), radiological investigations like chest x ray, erect x ray abdomen, USG, CECT abdomen. Period of observation is from time of onset of symptoms to the time of discharge. Analysis done by using chi-square test. Multiple factor is analysed with logistic regression. A Statistical package SPSS Version 17.0 was used to do the analysis. $p<0.05$ is considered as significant.

Results

Table 1: Duration of perforation

Duration	Total	Outcome			
		Expired		Improved	
		Count	Row N %	Count	Row N %
1 - 2days	43	3	7.0%	40	93.0%
3 - 5days	35	10	28.6%	25	71.4%
6 - 10days	18	5	27.8%	13	72.2%
Total	96	18	18.8%	78	81.3%

53 patients were presented late in this study that is between 3-10 days. During 3-5 days (28.6%) and 7-10 days (2.8%) were expired which is more when compared with first 2 days (7.0%)

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Table 2: Site of perforation

Site	Total	Outcome			
		Expired		Improved	
		Count	Row N %	Count	Row N %
Appendix	8	0	.0%	8	100%
Caecum	6	4	66.7%	2	33.3%
Duodenum	30	3	10.0%	27	90.0%
Gastric	15	2	13.3%	13	86.7%
Ileum	27	6	22.2%	21	77.8%
Jejunum	4	0	.0%	4	100.0%
Sigmoid colon	6	3	50.0%	3	50.0%
Total	96	18	18.8%	78	81.3%

Highest number of perforations noted in the duodenum followed by ileum, stomach, appendix and others as seen above. Mortality is more in caecal (66.7%) and sigmoid colon perforation (50.0%) when compared with stomach (13.3%) and duodenum (10.0%).

Table 3: Cause of perforation

Cause of perforation	Total	Outcome			
		Expired		Improved	
		Count	Row %	Count	Row %
Appendicitis	8	0	0%	8	100.0%
Carcinoma caecum	6	2	33.3%	4	66.7%
Carcinoma rectosigmoid	6	3	50%	3	50%
Duodenal ulcer	25	3	12.0%	22	88.0%
Gastric cancer	3	1	33.3%	2	66.7%
Gastric ulcer	13	1	7.7%	12	92.3%
Iatrogenic	2	1	50.0%	1	50.0%
Ileo-caecal tuberculosis	7	5	71.4%	2	28.6%
Non specific	2	0	0%	2	100.0%
Trauma	10	0	0%	10	100.0%
Typhoid	14	2	14.3%	12	85.7%
Total	96	18	18.8%	78	81.3%

Gastro duodenal ulcer perforation patients have less mortality when compared with caecal carcinoma (33.3%), recto sigmoid carcinoma (50%) and ileo-caecal tuberculosis (71.4%). Trauma and appendicular perforation have zero mortality in this study.

Table 4: Anastomotic Leak

Surgical site infections	Total	Outcome			
		Expired		Improved	
		Count	Row N %	Count	Row N %
Present	28	15	53.6%	13	46.4%
Absent	68	3	4.4%	65	95.6%
Total	96	18	18.8%	78	81.3%

Surgical site infections

Among 28 cases of surgical site infections death rate is 53.6% in patients who has SSI whereas without SSI death rate is 4.4% which is highly significant(p=0.000).Odds ratio for SSI is found to be 25.0 in our study.

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Table 5: Post-operative pneumonia/ARDS

Post-Operative Pneumonia/ARDS	Total	Outcome			
		Expired		Improved	
		Count	Row N %	Count	Row N %
Absent	82	12	14.6%	70	85.4%
ARDS	5	3	60.0%	2	40.0%
Pneumonia	9	3	33.3%	6	66.7%
Total	96	18	18.8%	78	81.3%

60% mortality in ARDS and 33.3% mortality in pneumonia when compared in patients without pneumonia (p=0.021).There is 4.4 times high risk for mortality and morbidity in these patients as analyzed in this study.

Table 6: P Value of various indicators and its significance

	Chi square/Fishers exact test p	
Age (yrs.)	0.742	
Sex	0.483	
Duration (days)	0.029	
Site	0.007	HS
Single/Multiple	0.326	
Associated gangrene of bowel	0.007	HS
Cause	0.004	HS
Surgery type	0.001	HS
DM	0.088	
HTN / IHD	0.763	
HTN / IHD	0.112	
COPD/TB	0.007	HS
COPD/TB	0.001	HS
Malignancy	0.022	sig
Anastomotic leak	0.007	HS
Wound dehiscence	0.030	sig
Wound dehiscence	0.041	sig
Surgical site infections	0.000	HS
Post op renal failure	0.000	HS
Post op pneumonia / ARDS	0.012	sig
Post op pneumonia / ARDS	0.021	sig
Morbidity	0.003	HS

Discussion

There were 15 cases of gastric perforations among which 12 patients had benign ulcer perforations and malignant ulcer perforation is noted in the 3 patients. Biopsy was done for all gastric ulcer perforations. Duodenal ulcer perforations are the most common etiology in this study with 30 patients out of 96 cases. All patients with duodenal ulcer underwent exploratory laparotomy and simple closure with interrupted vicryl sutures and Graham's omental patch repair was done. 3 patients expired one with diabetes presenting late and having pneumonia, another with sepsis and ARDS and the other with renal failure. Ileum perforations accounts for 28.1% of total 96 cases, 2nd most common after duodenal perforations in this study. Various causes like typhoid 4, 5 ileo-caecal tuberculosis, carcinoma caecum, trauma 8, iatrogenic and nonspecific ileal perforation also noted in this study. Typhoid (14 cases) is the most common condition associated with ileal perforation in this study. All patients underwent exploratory laparotomy for typhoid with ileal perforation simple closure was done whereas associated with gangrene resection and anastomosis was done. Right Hemicolectomy was done for ileo-caecal tuberculosis 6, 7 and carcinoma

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caecum. 6 patients expired with ileal perforation whereas 21 were improved. The effectiveness of surgical management in typhoid perforations study was done by Saxe L.N. *et al* (2005). Total 191 typhoid patients were included in the study. Exploratory laparotomy was done in 112 patients among them 18 expired with persistent typhoid sepsis with a mortality rate of 16%. By the above study they concluded that primary repair of typhoid perforation is safe and effective. Appendicular perforations were 8 in number and no mortality registered among them. Post operatively pneumonia is recorded in 2 cases. Hypertension in one case and diabetes in 2 patients. All cases underwent appendectomy. Total 6 perforations noted in the caecum of which 4 are due to malignancy and 2 are due to ileo caecal tuberculosis. Two expired patients are having malignancy and two have tuberculosis. One has ischemic heart disease and one died with ARDS. Burst abdomen is seen in two cases. Anastomotic leak is observed in 3 patients of caecal perforation among which all three expired. All patients underwent right hemi colectomy. Surgical site infection is noted in 4 cases of caecal perforation.

Conclusion

Most common site of gastrointestinal perforation is duodenum followed by ileum and stomach as a result of high incidence of peptic ulcer disease and infections (typhoid & tuberculosis) in India High mortality is observed in cases presenting late due to overwhelming sepsis. A patient having gastrointestinal perforation with associated gangrene of the bowel then outcome of the patient is poor. Peptic ulcer disease and appendicular and traumatic perforations have good outcome whereas ileo-caecal tuberculosis and malignant caecal and recto sigmoid colon carcinoma patients have high morbidity and mortality. Most commonly done procedure for gastrointestinal perforation is simple closure with drainage which has less complications whereas right hemi colectomy and Hartmann's procedure was less commonly done but post-operative complications are high and associated with high morbidity. In diabetes patients morbidity is high but in hypertension data is not sufficient to predict outcome. Tuberculosis patients have high morbidity and mortality association in our study. Anastomotic leak9 and wound dehiscence/Burst abdomen patients have associated with high mortality. Post-operative pneumonia/ARDS and post-operative renal failure has high incidence of mortality. Surgical site infection is the leading post-operative complication associated with high morbidity in acute gastro intestinal perforation. In our study mortality rate is 18.8% and morbidity rate is 58.3%. In order to reduce morbidity and mortality rate in acute gastrointestinal perforations the following salient points should kept in mind like early diagnosis of perforation, adequate antibiotic prophylaxis to prevent sepsis, appropriate surgery at appropriate time, identification of comorbid conditions and post-operative complications and effective management of post-operative complications.

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