

Spectrum of Gastrointestinal tract perforations in the Kumaun Area of Uttarakhand: An Observational StudyShwetabh Pradhan¹, Sanjeev Prakash², Sophiya³¹Associate Professor, Department of Surgery, Government Medical College, Haldwani, Uttarakhand, India²Associate Professor, Department of Surgery, Government Medical College, Haldwani, Uttarakhand, India³Post Graduate Resident, Government Medical College, Haldwani, Uttarakhand, India

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Conflict of interest: Nil

Abstract:**Objectives:** This study was conducted to find out the etiological factors and spectrum of gastrointestinal tract perforations in the Kumaun area of Uttarakhand.**Methods:** A detailed history, clinical examinations and relevant investigations were performed in all the cases of gastrointestinal tract perforations. A total of 50 patients of gastrointestinal tract perforations with the age group of below 80 years were enrolled in this study. The patients were studied under the following clinical parameters: abdominal pain, vomiting, distension, alteration of bowel habits, loss of appetite and weight, h/o chronic analgesic use, typhoid fever, tuberculosis, dyspnoea and duration of illness. Clinical examination was followed by hematological, biochemical and radiological investigations.**Results:** Data was analysed by using SPSS version 26 software. All data was tabulated and percentages were calculated.

Chi square test was applied. p-value was taken less than or equal to 0.05 for significant differences.

Conclusions: The present study in the Kumaun area of Uttarakhand concluded that GIT perforations are most commonly seen in the middle aged populations. The most common site for GIT perforations is Duodenum (first part). NSAID abuse and H. pylori infections are the most common etiological factors for GIT perforations followed by typhoid fever. Awareness of the etiological factors, early recognition of symptoms and timely referral of patients to a well-equipped hospital is of paramount importance for the prevention and management of gastrointestinal tract perforations.**Keywords:** Gastrointestinal Tract (GIT) Perforations, Etiological Factors, Age, Sex.This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.**Introduction**

Perforation of gastrointestinal tract (GIT) is one of the commonest encountered surgical emergency in any hospital. The condition is deadly because of a very high mortality rate. Leakage of the intestinal contents into the peritoneal cavity leads to secondary peritonitis and subsequent secondary bacterial infections lead to a rampant deterioration of the patient due to the development of septic shock and multi system organ failure (MSOF).

The fate of any perforation peritonitis patient depends on early identification, prompt resuscitation and timely referral to a tertiary care centre for proper surgical management. Delay in the diagnosis and management is absolutely fatal for the patient. The severity of bacterial contamination depends on several factors such as the site of the perforation, underlying intestinal pathology and the ability of local host defense

mechanisms to localize the infection. These factors may significantly influence the decision making during the process of optimal management and hence determine the outcome of the patients with GIT perforations [1].

Despite of advances in surgical techniques, antimicrobial therapy and intensive care unit (ICU) support, management of perforation is still challenging. In majority of cases, presentation to the hospital is delayed with well-established peritonitis with purulent /fecal contamination and varying degree of septicemia. Though the mortality rate has been reduced over years with better medical management and improved surgical techniques and measures of asepsis, mortality rate continues to lie between 10% and 36.5%. Dickson & Cole (1964) recorded 56% mortality rate in 38 cases [1]. The severity of illness, prognosis,

morbidity and mortality are directly related to the interval between perforation and resuscitation of patients along with surgical closure of defects. Spontaneous perforation of small intestine leading to fulminating peritonitis and other complications like peripheral circulatory failure, toxemia, dehydration, aspiration pneumonia, renal failure etc. determine the outcome [2]. The objective of this present study was to find out the spectrum and etiological factors of gastrointestinal tract (GIT) perforations in the Kumaun area of Uttarakhand.

Material and Methods

This present study was conducted in the department of Surgery, Dr. Susheela Tiwari Hospital, Haldwani between July 2020 to July 2022. A total of 50 admitted patients of GIT perforations were enrolled in this study. Attendants/entire subjects signed an informed consent approved by the institutional ethical committee.

A detailed history, clinical examination and relevant investigations were performed in all the cases of GIT perforations. Data was collected by using random sampling methods irrespective of the age and sex.

The following points were taken into consideration.

- Presenting signs and symptoms like abdominal pain, vomiting, distension, alteration of bowel habits, h/o chronic analgesic abuse, typhoid fever, tuberculosis, dyspnea and duration of illness.
- Physical examination included general built, and appearance, presence of anemia, dehydration, icterus, distension, liver dullness, guarding /rigidity, hepatosplenomegaly, free fluid in the abdomen.
- Findings on P/R examination and other abnormalities.

- A thorough clinical examination was followed by hematological, biochemical and radiological investigations.

Diagnosis was confirmed by free gas under the diaphragm on chest X ray PA view erect. In case of diagnostic dilemma a non-contrast CT scan (NCCT abdomen) was used to pick up free gas. Prompt initial resuscitation was done by i.v. fluids with or without inotropic support (as per the hemodynamic status of patient), iv antibiotics, analgesics, antipyretics, antiemetics and other specific medicines customized to the requirement of the patient. Ryle's tube insertion and foley's catheterization was done and the patient was prepared for exploratory laparotomy. On exploration the site of perforation was noted and repair was done after taking ulcer edge biopsy as per recommended norms and the clinical condition of the patient. H. pylori testing with rapid urease test was done on biopsy specimen in addition to routine biopsy reporting for gastro-duodenal perforation specimens.

Statistical Analysis

Data was analysed by using SPSS version 26 software. All data was tabulated and percentage was calculated. Chi square test was applied. p-value was taken less than or equal to 0.05 for significant differences.

Observations

We studied 50 patients admitted to the surgical emergency of Dr. Susheela Tiwari Hospital, Haldwani with the diagnosis of GIT perforation. Patients with age group upto 80 years were enrolled in this study. Majority of patients belonged to the age group of 31-40 years. In this study, most of the patients were males (45 males and 5 females). The male and female ratio was 9:1.

Table 1: Age incidence

Age (Years)	No. of patients	Percentage
0 – 10	2	4%
11 – 20	3	6%
21 – 30	12	24%
31 – 40	15	30%
41 – 50	10	20%
51 – 60	4	8%
61 – 70	2	4%
71 – 80	2	4%
Total	50	100%

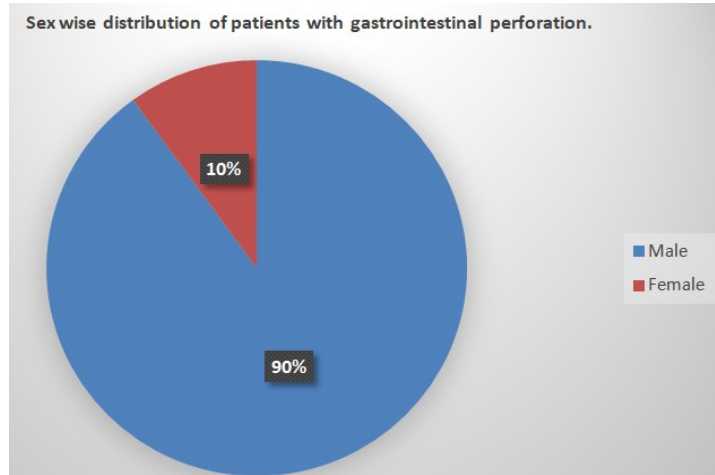


Figure 1: Sex Incidence

Statistical Analysis-Chi square test was applied for significance level (p=0.05) and 7 degrees of freedom, the critical chi square value is 14.067. On comparing with the calculated chi square statistics (0) with the critical value 14.067 we found that the calculated value is less than the critical value. Thus, there is no significant association between the age group and number of patients based on chi square test.

Table 2: Site Incidence

Site	No. of patients	Percentage of patients
Ileum	15	30%
Gastric	05	10%
Duodenum(D1)	20	40%
Jejunum	02	4%
Colon	08	16%
Total	50	100%

The above table 2 shows Duodenum 20 (40%) as the most common site of GIT perforation overall, followed by ileum 15(30%), colon (including appendicular perforations) 08(16%), stomach 05(10%) and jejunum 02(04%) respectively.

Table 3: Etiological Factors of gastrointestinal perforation

Etiological factors	No. of patients	Percentage of patients
Enteric fever	10	20%
NSAIDs abuse & H. pylori infection	25	50%
Traumatic	02	04%
Nonspecific Inflammation	08	16%
Tubercular	05	10%
Total	50	100%

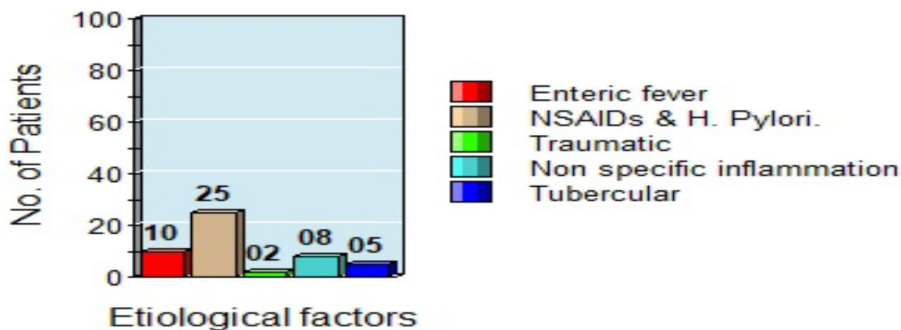


Figure 2:

The above table shows that NSAIDs and H. pylori infection 25(50%) is the most common cause of GIT perforations overall followed by

enteric fever 10 (20%), nonspecific inflammation 08(16%), tuberculosis 05(10%) and trauma 02 (04%) respectively.

Discussion

The present study was undertaken to discuss and analyse the possible factors like etiology, age, sex and site of perforation etc. A total of 50 cases of GIT perforations were admitted in the surgical wards of Dr. Susheela Tiwari hospital, Haldwani, Uttarakhand. All the cases were assessed and risk factors were evaluated for GIT perforation.

In this present study most of the patients with GIT perforation 15(30%) were of the age group 31 to 40 years. This result was slightly different than the study of Dickson and Cole (peak incidence was around 20 to 25 years) [1].

In this study, GIT perforation occurred predominantly in males (45 males and 05 females) with M: F = 9: 1. This result matches with the studies of Gupta S, et al 10.5:1 [3].

Lau & Leow (1997) [4] have indicated that perforation of peptic ulcers was clinically recognized by 1799 but first successful surgical management of gastric ulcer perforation was reported by Ludwig Hesner in Germany in 1892. In 1894, Henry Percy Dean from London was the first surgeon to report successful repair of the perforated duodenal ulcer. Contrast to common causes of small bowel perforations in the developing countries, small bowel perforations is rare in oriental countries apart from enteric fever and nonspecific ulcers.

The other reported cause of such perforations from these countries includes Crohn's disease, Bechet's disease, radiation enteritis, adhesions, ischemic enteritis, SLE and rarely intestinal tuberculosis (TB). Free perforations are a rare complications of Crohn's disease and their incidence is reportedly highest from Japan, where it ranges from approximately 3% to 10%. These perforations are usually solitary and occur mainly in ileum. However, they can be multiple and can occur at any site in the small or large bowel. Non-specific ileal perforations are closely followed by small bowel perforations occurring in intestinal tuberculosis, mostly these are seen proximal to the strictures in terminal ileum. Free tubercular perforations are rare.

The diagnosis of perforated tubercular peritonitis is usually not one that is made pre-operatively because of non-specific clinical features and absence of chest tuberculosis findings on chest X ray. Even if present, unless histopathological and culture confirmation is available, the diagnosis is not confirmed. The recommended treatment after source control is multi drug anti-tubercular treatment.

Heikkinen (1974) [5] described about the possible mechanism with which radiotherapy causes intestinal perforation. According to them, impaired blood flow and inflammation are important in this respect. Huttunen et. al. (1977)

[6] published a report of 24 patients with non-traumatic small bowel perforation. In their series, the most common cause of perforation was vascular strangulation related to post-operative adhesions and recognized that etiological factors like typhoid fever are lacking in their series.

Out of the total 238 operated cases of terminal ileum, there were 68 deaths due to above said complications (Archampong, 1969) [7]. The mode of treatment depends largely on the etiology of perforation making timely and correct etiological diagnosis vital and directly affecting the morbidity and mortality rate. However, precise diagnosis is sometimes difficult pre-operatively and a formal exploratory laparotomy becomes necessary in all cases.

In this study the most common site of perforation overall was duodenum 20(40%), second most common site was ileum 15(30%), other sites were colon including appendicular perforations 8(16%), stomach 5(10%) and jejunum 2(4%) respectively.

This study result is different with the study of Khanna et al [8] (108 out of 204 cases were of typhoid etiology), but matches with several other previous studies (Jhobta et al, Vagholkar, Gupta et al, Sharma et al [9,10,11,12]. In their studies, like this study, peptic ulcer perforations were the most common etiology and typhoid perforations were 2nd most common etiology).

The study conducted in 1970 by Sepaha et al. [13] found 60 cases of enteric perforation.

The trends of cause and site of perforation have changed. Previously the most common site for GIT perforation was terminal ileum secondary to typhoid fever which usually occurred in the third week of illness. But now perforations of gastro duodenum are the most common forms of GIT perforations. (Sinmen HP, Heinzelmann M, Largiader F 1991) [14]. The result of this shift is because of early diagnosis and effective management of typhoid fever and increasing analgesic abuse and increased H. pylori infection globally.

Butler et al [2] reviewed 15980 cases of typhoid fever in world's literature and reported an overall 2.8% perforation rate. These usually arise on background of enteric fever, when the ulcerated peyer's patches in anti-mesenteric border of terminal ileum perforates to give frank peritonitis.

These typhoid ileal perforations have a high mortality rate (upto 60%). Aggressive resuscitation, antibiotics and early surgery has reduced the mortality rate and the complications in the subset of small bowel perforations.

Conclusions

This present study in the Kumaun area of Uttarakhand concluded that GIT perforations were most commonly seen in the middle aged populations.

The most common site for GIT perforations was Duodenum (first part). NSAIDs abuse and H. pylori infections were the most common etiological factors for GIT perforations followed by typhoid fever.

Awareness of the etiological factors, early recognition of symptoms and timely referral of patients to a well-equipped hospital is of paramount importance for the prevention and management of GIT perforations.

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