

**Histopathological Findings in Gastrointestinal Perforations - A study of 100 cases**

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**Correspondence Author:** Ramandeep Kaur, Department of pathology, Govt. Medical College, Patiala, Punjab**Type of publication:** Original Research Paper**Conflicts of Interest:** Nil**Abstract**

**Introduction** There are large numbers of cases where gastrointestinal perforations occur in stomach, small gut and large gut but without histopathological examination of biopsy material, it is not possible to reach to any conclusion. There are various causes of gastrointestinal perforation. The most common cause of perforation are enteric, tuberculosis, amoebiasis and traumatic injury.

**Material & Methods** The study is done on 100 specimens received in the Govt Medical College, Department of pathology, Patiala. Gross findings and microscopic features were recorded. The tissue specimens were fixed and processed and Paraffin sectioning was done followed by Haematoxylin and Eosin staining. The sections were then examined.

**Results** Out of which 100 specimens of GI perforations were studied. Most of the samples (55) were in the form of small pieces from the margins of perforation followed by 34 resected gut specimens and 11 samples were of burst appendix. Most of the patients were males, with male to female ratio as 4:1. As far as site is concerned the most common location of perforation was ileum followed by stomach and least common were Meckel's diverticulum and rectal perforations.

**Conclusion** It was concluded that histological examination of biopsies from the perforation site plays a key role to reach to a definite diagnosis, supported by clinical presentation and serological tests.

**Keywords:** gastrointestinal perforation, tuberculosis, traumatic.

**Introduction**

Gastrointestinal (GI) perforations, a common occurrence has non-specific histopathological finding in many cases. Although there are number of causes of perforations occurring in stomach, small gut and large gut, yet in a considerable number of cases, it is not possible to reach to any conclusion after histopathological examination of biopsy material alone.<sup>[1-2]</sup> This common emergency has been a constant source of great concern to the surgeon all over the world and hence attempts have been made to evaluate various factors that lead to ulcer perforation.<sup>[3]</sup> It is largely due to ignorance of people and late reference from peripheral hospitals in india. The most familiar form of GI ulcer is peptic ulcer which affect 10 to 15 percent of the world wide human population due to Helicobacter pylori. The important cause of perforation in our country are enteric, tuberculosis and amoebiasis.<sup>[4]</sup> Rare cause of GI perforation like diverticulitis, round worm infestations, Crohn disease, faulty instrumentation, radiation therapy and perforation in hernia sac. In western countries, vascular lesion and malignancy were the common one.<sup>[5]</sup> Malignant causes of the GIT perforation involve the stomach and colon.

**Aim of the study**

To study and compare the histology of biopsy material and etiological patterns of gastrointestinal perforations.

**Material & Methods**

This prospective study was conducted on 100 gastrointestinal perforation biopsies received in the department of pathology, Government Medical College, Patiala, Punjab. Tissue sample received in the form of gut specimens and margins of GI perforations were included in the study. Inadequate sample, margins of perforation without mucosa and other layers of gut are excluded from study. The clinical data, histopathological finding and diagnosis were recorded on the pre designed performa along with relevant investigations including Widal test, X-ray, ultrasound findings and other relevant investigations. Specimens were fixed in 10% formalin, Grossly margins of GI perforations and resected gut specimens were carefully examined, dimensions and external surface were noted. All the histological sections were stained in H & E stain & mounted. All the histological sections were examined microscopically & findings were recorded and tabulated. Special stains used were Giemsa, Warthin Starry, PAS and Reticulin.

**Results**

Out of total 7106 biopsies received in department of pathology, GMC Patiala, out of which 100 specimens of GI perforations were studied. Out of which, most of the samples (55) were in the form of small pieces from the margins of perforations(55) followed by 34 resected gut specimens and 11 sample were of burst appendix. Most of the patients were males, with male to female ratio as 4:1 Most perforations occurred in the third and fourth decade. For perforation peritonitis the younger patient was 3 years chid and oldest was an 85 years old man.

**Table 1**

Site	No. of cases
Ileum	49

Stomach	17
Jejunum	8
Duodenum	2
Caecum	6
Colon	5
Appendix	11
Meckel’s Diverticulum	1
Rectum	1

As for as site is concerned the most common location of perforation was ileum followed by stomach and least common were Mickel’s diverticulum and rectal perforations as in table 1

**Table 2**

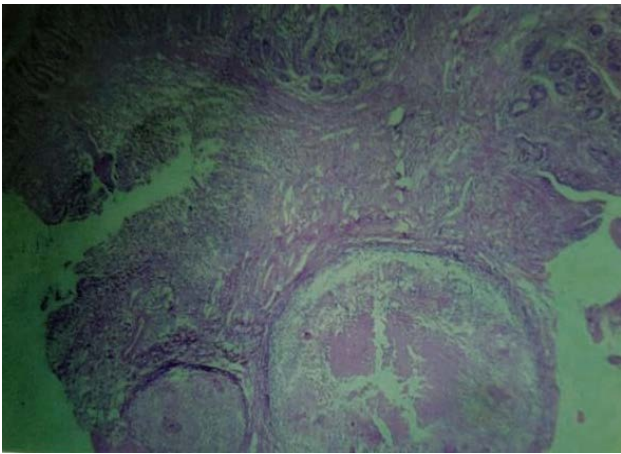
S.No.	GIT Perforations	Number
1.	Enteric	22
2.	Tuberculosis	16
3.	Peptic Ulcer	13
4.	Burst Appendix	11
5.	Traumatic	11
6.	Malignancy	7
7.	Non-Specific	6
8.	Gangrenous gut	5
9.	Diverticular Perforation	4
10.	Crohn’s disease	2
11.	Amoebic ulcer	2
12.	Actinomycosis	1

On histopathological examination, majority of cases were enteric perforation followed by tuberculosis and least common was actinomycosis as in table 2

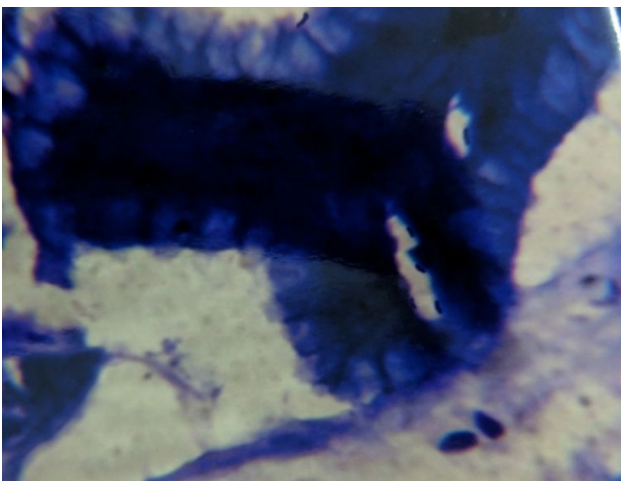
**Micrograph**



**Figure1:** Gross- stricture in ileal tuberculosis



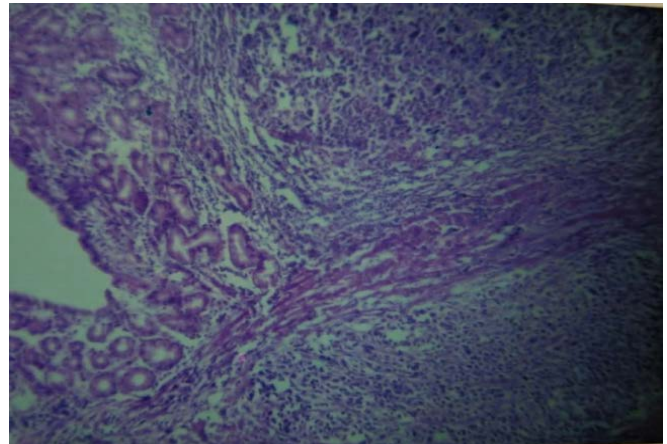
**Figure2:** Showing Tubercular granuloma  
( H&E, X100)



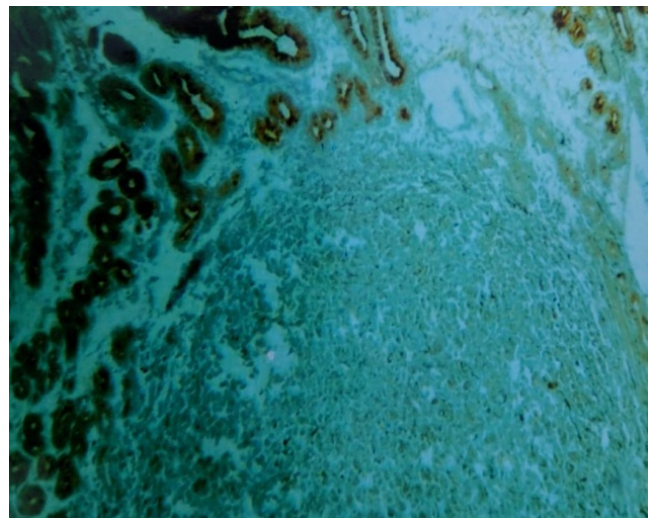
**Figure 3:** Helicobacter pylori in peptic ulcer  
( Giemsa X1000)



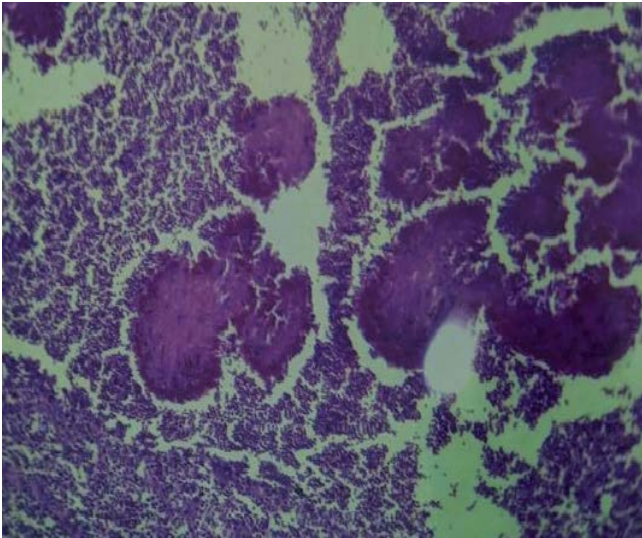
**Figure 4:** Gross showing growth in pyloric region.



**Figure 5:** Malignant lymphoid tissue with gastric mucosal glands  
(H&E X100)



**Figure 6:** Reticulin stain in NHL (X100)



**Figure 7:** Showing colonies of Actinomycetes surrounded by acute inflammatory exudates (H&E X100)

### Histopathological finding of different lesions

#### Typhoid

In this study maximum incidence was of typhoid perforations. There were 16 biopsies from the margins of perforation and 6 gut specimen.

Biopsy from the perforation site showed non-specific edematous and inflammatory changes to extensive necrosis and haemorrhage with blunting of villi. The submucosa was congested. There was seen hyperplasia and ulceration of Peyer's patches, hyperaemia, oedema and cellular proliferation and the adjacent lymph nodes show reactive hyperplasia and sinus histiocytosis.

Although histopathological examination is very important in making diagnosis of enteric fever, it has to correlated with patient's clinical presentation and serological/widal test.

#### Tuberculosis (Figure 1 &2)

It was 2<sup>nd</sup> most common cause of GI perforation. There were 8 biopsies from the margins of perforation and 8 gut specimen.

Grossly, the tiny biopsies were inconclusive. Gut specimens showed transverse ulcers, fibrosis, thickening of wall, stricture formation and enlarged mesenteric

lymph nodes in 5 cases. Histological sections showed aggregation of epithelioid cells and multinucleated Langhans's and foreign body type of giant cells forming granulomas with caseation necrosis. There was present ulceration of mucosa and submucosa and fibrosis of muscularis propria.

Lymph nodes showed tubercular lesions with caseation necrosis, epithelioid cells, multinucleated Langhans's type of giant cells and lymphocytes.

Out of 16 cases, 14 cases were either on antitubercular therapy or had completed the course of treatment in the past.

#### Peptic Ulcer (Figure 3)

Peptic ulcer perforations were 13 cases in the form of small biopsies taken from margins of perforations and majority were present in the lesser curvature of stomach and pyloric antrum. Histologically, peptic ulcer showed greater destruction of muscular coat than that of mucosa. There were present areas of granulation tissue and evidence of endarteritis obliterans in the arteries. Margins of ulcer perforation showed epithelial proliferation and down growth of glandular tissues. Giemsa stain was done for H. Pylori and came out to be positive in 7% cases.

#### Traumatic

There were 11 cases of traumatic perforation out of which 6 were received as margins of perforations and 5 were gut loop specimen. 8 cases were road side accidents, 2 cases of fall from height and 1 case was hit by a bull.

Biopsy from site of perforation showed areas of massive haemorrhages, non specific chronic and acute inflammation with marked congestion of blood vessels.

#### Appendicular perforation

Burst appendix constituted 11 % of cases.

Grossly Appendix was swollen with areas of haemorrhages and whitish necrotic areas covered with fibrinous exudates.

Microscopic examination revealed appendicular lumen filled with necrotic material, inflammatory cells and haemorrhages. In some cases, haemorrhagic ulceration of the mucosa with gangrenous necrosis through the wall seen extending to the serosa.

#### **Malignancy (Figure 4,5 and 6)**

Malignant GI perforations constituted 7 cases. A tiny paper mounted biopsy from growth stomach showed well differentiated adenocarcinoma. Biopsy from growth in pylorus region showed large cell Non Hodgkin's lymphoma and Reticulin stain confirmed the diagnosis. Part of sigmoid colon resected from 40 years male showed a small perforation near the growth. Microscopically showed features of well differentiated adenocarcinoma (mucin secreting).

#### **Actinomycosis (Figure 7)**

1 case of actinomycosis was observed in this study. Resected part of ileum show multiple perforations. The mucosa was thinned out and atrophic at places with focal areas of haemorrhages and necrosis. Multiple pieces taken from areas of perforation showed suppurative lesions. There was present acute inflammation with abscess formation having "Ray fungus" (granules of actinomyces) amidst the suppurative areas. Features suggested abdominal actinomycosis leading to multiple gut perforations.

#### **Inflammatory Bowel Disease**

2 cases of Crohn's disease were diagnosed. Grossly, a specimen of small gut showed skip areas of alternate healthy and edematous gut in the whole of ileum. A perforation was seen one and half feet away from the ileocaecal junction. Microscopically, the biopsy showed intense chronic inflammatory infiltrate present in all layers of gut. Non ceasting granuloma, areas of fibrosis and congestion of blood vessels were appreciated.

#### **Diverticular Perforations**

4 cases of diverticular perforations were seen. Grossly in 60 years male there were seen multiple out pouching in whole of jejunum with two small perforations two and half feet away from jejunum. Microscopically, the section showed a thin wall composed of flattened, atrophic mucosa with compressed sub mucosa and absent muscularis propria. There was present acute on chronic inflammation, necrotic tissue debris, areas of haemorrhages and marked congestion of blood vessels.

#### **Non specific perforation**

6 cases were of non specific perforation. The biopsy specimen were from margins of perforation, they were tiny and many of them did not show mucosal lining. Microscopically, sections from biopsy showed non specific inflammatory infiltrate with areas of necrosis, congestion of blood vessels and haemorrhages.

#### **Gangrenous Gut**

Gangrenous Gut constituted 5% of all cases in the present study. It was seen secondary to conditions like systemic vasculitits, surgical accidents, obstructed hernia, volvulus, strictures and in some cases no definite basis for vascular insufficiency could be identified.

Microscopically, Sections from the gangrenous gut with perforation showed areas of extensive necrosis and haemorrhage. Acute and chronic inflammatory infiltrate was evident in the viable margins and adjacent to the affected areas. At places, there was complete mucosal necrosis and acellular scaffolding of lamina propria.

#### **Amoebic ulcer perforation**

2 cases of amoebic ulcer perforations were seen. A gut specimen of 50 years male had multiple ulcers in caecum and ascending colon. Microscopically, specimen showed bands of fibrosis and mature adipose tissue infiltrated by lymphocytes, numerous macrophages, plasma cells and few foreign body type of giant cells. At the periphery, necrotic tissue debris, acute inflammatory infiltrate,

congestions of blood vessels and haemorrhages were prominent. In another focus, many macrophages with vacuolated cytoplasm, appearing to be trophozoites of amoebae, were present.

PAS stain of the section confirmed amoebic trophozoites.

### Discussion

The present study of 100 cases of GI perforations were compared with other studies as follows:

In this study enteric perforation was commonest cause of GI perforations which was similar to study done by Baid and Jain et al<sup>[6]</sup> male to female ratio of present study was 6:1 which is comparable by studies done by Vaidyanathan<sup>[7]</sup> (9:1).maximum number of patients were in the 3<sup>rd</sup> and 4<sup>th</sup> decade of life which is similar with studies done by Singh & Singh<sup>[8]</sup>, Vaidyanathan<sup>[7]</sup> and Baid and Jain<sup>[6]</sup> et al showed maximum incidence in 2<sup>nd</sup> & 3<sup>rd</sup> decades.

The incidence of tubercular perforations was 16% in present study which was comparable with the study done by Bhansali<sup>[9]</sup> (7%) and Baid and Jain<sup>[6]</sup>(11%).

The third most common cause of GI perforation was peptic ulcers which accounted for 13% cases which is similar with studies done by Sinha et al<sup>[10]</sup>(12%), Mishra<sup>[11]</sup> (16%)

The fourth common cause of git perforation was trauma in present study (11%) which is similar to studies done by Davis<sup>[12]</sup> and Divincenti<sup>[13]</sup>(15%).

The appendicular cases in present study was 11% which was similar with study done by Swadia<sup>[14]</sup> (15.65%) and Desa<sup>[15]</sup> (18.01%) .There were 7 % cases of perforation due to malignancy seen which is similar to study done by Menda<sup>[16]</sup> (4.7%) and Goligher & Smiddy<sup>[17]</sup> (17.4%) Non specific perforation were seen in 6% of cases which is similar with the studies done by Baid and Jain<sup>[6]</sup>(7.4%), Nair<sup>[18]</sup> (2%) and Menda<sup>[16]</sup> (4.7%). Menda<sup>[16]</sup>, Huttmen<sup>[19]</sup> and Parulkar<sup>[20]</sup> noted 4.7%, 16.5% and 2.5%

cases which is similar to present study which show 4% cases. In the present study, 2% cases were of crohn's disease which is similar to study done by Blair and Hayes.<sup>[21]</sup> 2% cases were seen in amoebic ulcer perforation which is compared with study done by Chen<sup>[22]</sup> (6%). Perforation due to actinomycosis accounted for 1 case in this study. Isik et al<sup>[23]</sup> reported abdominal actinomycosis in 20% cases. No case of abdominal actinomycosis with GI perforation has been documented in literature.

### Conclusion

It is to be concluded that histological examination of biopsies from the perforation site plays a key role in cinching to definite diagnosis, supported by clinical presentation and serological tests.

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