

## NON-TRAUMATIC GASTRIC PERFORATIONS

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### ABSTRACT

#### BACKGROUND

Gastric perforation is a common surgical emergency. Majority is due to benign ulcers, but rarely it may be cancer perforation. Usually it is on the anterior surface of the stomach. Only rarely we get perforation on the posterior surface. Pre-pyloric area is a common location of stomach perforation. Surgical options like primary closure or omental patch repair are favoured in the literature as these options carry good results as well as low mortality in an emergency setting. Traditionally it is said that gastric perforation carries high incidence of malignancy so should either be resected or at least a biopsy is essential before closure.

The objectives of this study were- 1. To identify the most common location of gastric perforations. 2. To identify the total incidence of malignancy. 3. To determine the rate of malignancy in different locations. 4. To evaluate the need for intraoperative biopsy. 5. To identify the best treatment options for these patients.

#### MATERIALS AND METHODS

This is a retrospective cohort study. Patients operated for gastric perforations during the period 2013-2016 were identified and details collected from data base. The collected data was subjected to statistical analysis with the help of SPSS Version 21.0.

#### RESULTS

Results of the analysis are presented in the form of tables and graphs.

#### CONCLUSION

Most common location of gastric perforation is pre-pyloric region. Incidence of malignancy is less in pre-pyloric perforation (1.3%). Malignancy incidence is more in other locations in stomach (24%). Intra operative biopsy is essential, since malignant perforation was detected in all locations, especially in locations other than pre-pyloric region of stomach. Gastrectomy in the setting of perforated stomach carries high mortality.

#### KEYWORDS

Gastric Perforation, Pre-Pyloric Perforation, Gastric Cancer Perforation.

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#### BACKGROUND

Gastric perforation is a common surgical emergency. Majority is due to benign ulcer, rarely may it be cancer perforation. Perforation usually is on the anterior surface of the stomach. Posterior perforation is very rare. Pre-pyloric area is a common location of stomach perforation. Traditionally it is said that gastric perforation carries high incidence of malignancy.<sup>1,2</sup> Surgical options like primary closure or omental patch repair are favoured in the literature as these options carry good results as well as low mortality in an emergency setting. This study aims to identify the commonest location of stomach perforation and the rate of malignancy in the different locations.

#### Aims and Objectives

1. To identify the most common location of gastric perforations.
2. To identify the total incidence of malignancy.
3. To determine the rate of malignancy in different locations.
4. To evaluate the need for intraoperative biopsy.
5. To identify the best treatment options for these patients.

#### MATERIALS AND METHODS

This is a retrospective cohort study conducted in a tertiary care center in Kerala, India. Patients operated for gastric perforations during the period 2013-2016 are identified and details collected from data base. Those patients with history of trauma or suspected traumatic perforations, corrosive ingestion, and those without proper records were excluded. The collected data were subjected to statistical analysis with the help of SPSS software Version 21.0. Basic statistical methods like percentage analysis were employed for identification of the most common location of gastric perforations and to find out the incidence of malignancy in these locations. Comparison of location wise malignancy was done by using z-test for proportion. Comparison of morbidity

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and mortality rate of different treatment option was done by using chi square test for multiple proportions. Results of the analysis are presented in the form of tables and graphs.

**RESULTS**

Mean age of patients with pre-pyloric perforation was 53 years, was slightly higher for perforation involving other locations (58 years). Mean age of cancer perforations was 55.4 years. Males were affected more compared to females (94%). Male female ratio was 14:1. The ratio was higher in proximal perforations (17:1). (table 1).

<b>Age (Mean)</b>		
Pre-Pyloric		53 yrs.
Other Location		58 yrs.
Cancer		55.4 yrs.
<b>Sex (M:F)</b>		
Pre-Pyloric		73:5
Other Location		17:1
Cancer		5:3

**Table 1. Demographic Profile of the Patients**

Table 2 shows the location of perforation pre-pyloric being the commonest location (73%). Antrum of stomach was the next common site of perforation (17%). There were only 2 (1.9%) posterior perforations.

<b>Location</b>		<b>No. Cases</b>	<b>Percent</b>
<b>Pre-Pyloric</b>		79	73.1
<b>Other Locations</b>	Antrum	18	16.7
	GJ Perforation	3	2.8
	Junction between Fundus and Body	1	0.9
	Lesser Curve	1	0.9
	Greater Curve	1	0.9
	Body of Stomach	1	0.9
	Posterior Wall	2	1.9
	Fundus	1	0.9
	Near Cardia	1	0.9
	Total	29	26.9
<b>Total</b>		108	100

**Table 2. Location of Perforation**

Incidence of malignancy was least in pre-pyloric location. Perforations affecting other locations showed a higher incidence of malignancy (24%), (P-value =0.004). table 3.

<b>Location</b>	<b>Total Number</b>	<b>Cancer Cases</b>	
		<b>Number</b>	<b>Percent</b>
Pre-Pyloric	79	1	1.3
Other Locations	18	7	24.1

**Z-value = 2.843\*\*;** **p-value = 0.004**

**Table 3. Location Wise Incidence of Malignancy**

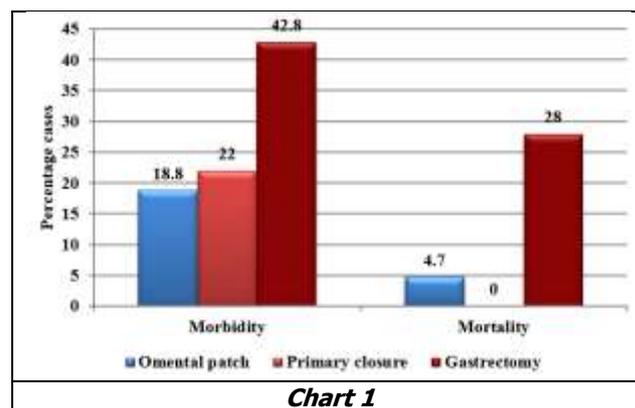
Omental patch repair was the commonest procedure performed, (84 patients, 77.8%). Primary closure in 9 patients (8.3%) and Gastrectomy in 14 patients (13%) summarized in table 4. Morbidity and mortality were significantly higher in those who underwent gastrectomy. Results of various treatment options summarized in table 5. Chart 1.

<b>Treatment Options</b>	<b>Pre-Pyloric Perforation</b>		<b>Other Locations</b>		<b>Total</b>	
	<b>No.</b>	<b>%</b>	<b>No.</b>	<b>%</b>	<b>No</b>	<b>%</b>
Omental Patch	74	93.7	10	34.5	84	77.8
Falciform Ligament Patch	1	1.3		0.0	1	0.9
Distal Gastrectomy	3	3.8	11	37.9	14	13.0
Primary Closure	1	1.3	8	27.6	9	8.3
<b>Total</b>	<b>79</b>	<b>100</b>	<b>29</b>	<b>100</b>	<b>108</b>	<b>100</b>

**Table 4. Treatment Options Followed**

<b>Treatment Option</b>	<b>Numbers (n)</b>	<b>Morbidity (%)</b>	<b>Mortality (%)</b>
Omental Patch	85	18.8	4.7
Primary Closure	9	22.0	0
Gastrectomy	14	42.8	28
p-value		0.134	0.005

**Table 5. Results of Treatment Options**



**DISCUSSION**

Gastric perforations are very common emergencies of medicine. Usual causes are; Peptic ulcer, cancer of stomach,<sup>3,4,5,6</sup> trauma, corrosives or medications. Perforated peptic ulcer is the commonest cause.<sup>7</sup> gastric cancer perforation causes 10-16% of the cases.<sup>7,8</sup> Gastric ulcer perforation occur in older patients, when compared to duodenal ulcer. Recently there is a marked increase in the mean age of patients.<sup>9,10,11</sup> Peptic ulcer perforation is more common in men.<sup>11,12</sup> Pre-pyloric location is the common perforation site in some studies.<sup>13</sup>

Mean age was 53 years for pre-pyloric ulcer patients, 58 years for perforations located in other locations and 55.4 years for cancer perforations. Majority were males with male

female ratio highest for pre-pyloric perforation (73:5). For cancer perforations the ratio was smaller (5:3). Common site of perforation in our study is pre-pyloric location (81%). Nineteen percent had perforations in other proximal locations.

In one study the common location was lesser curvature. Anterior Wall of the stomach is involved. Posterior perforation of a gastric ulcer is a rare condition. There are fewer than 30 cases reported in the literature. Wong and colleagues (2003) reviewed nine patients with posterior perforations.<sup>14</sup> Clinical presentation of posterior gastric perforation is less dramatic than that of the more common anterior perforations and is characterized by late presentation. And because of the late presentation and missed diagnosis at laparotomy, posterior perforation is usually associated with high mortality.<sup>15,16</sup>

Incidence of malignancy was lowest in pre-pyloric perforations (1.2%). Rate of malignancy in other locations was 24%. Another study, in 8646 patients, Pre-pyloric ulcer was not associated with a significant excess risk of malignancy, standardized incidence ratio, 1.2.<sup>14</sup>

Spontaneous perforation of gastric cancer is a rare complication with fatal outcomes, which occurs in 0.56 to 3.9% of all cases of gastric cancer.<sup>17</sup> It is difficult to preoperatively distinguish perforated gastric cancer from ulcer perforation, because the symptoms are similar. Only one-third of all the perforated gastric cancer cases are diagnosed preoperatively, and the diagnosis of gastric cancer is usually made only during the postoperative pathologic examination.<sup>18,8</sup>

Ergul et al. claim that if a patient is over 60 years old, malignancy should be considered. Therefore, gastric perforation should raise suspicions of malignancy, particularly in elderly patients.<sup>1</sup> They also suggest that, an ulcer diameter (with oedema) more than 6 cm, a perforation diameter more than 0.5 cm, a symptom duration of more than 20 h, and a white blood cell count less than 15.103/ $\mu$ L, he might have a gastric carcinoma.<sup>1</sup> Gastric cancer perforation frequently occurs at the advanced stage.<sup>19</sup> 64% to 88% in stage III/IV disease.<sup>20,21</sup> Perforation can also occur at the early disease stages.<sup>22</sup> Adachi et al. reported 155 cases of perforated gastric cancer, and in this group, 19% had stage I and 12% had stage II cancer.<sup>23</sup> The incidence of perforated gastric carcinoma being Stage I/II disease is low (0~36%).<sup>20,21,23</sup>

There is a report of T1 lesion presenting with perforation. An excavated gastric ulcer type has been known to harbour malignancy at its edges, and the depth of excavation makes the ulcer prone to perforation, Ischemia and infection has also been reported to surround gastric malignancy, and has been hypothesized as a possible explanation for perforation of early gastric cancer.<sup>24</sup>

Almost all perforated gastric ulcers can be effectively managed by laparotomy and omental patch repair. Initial biopsy and follow-up endoscopy with repeat biopsy is essential to avoid missing an underlying malignancy.<sup>25</sup> Some authors suggest Omental patch closure and ulcer excision as effective as gastrectomy in the management of perforated

gastric ulcer.<sup>26</sup> In Japan, some report a higher number (up to 60%) of perforated peptic ulcer patients treated by gastric resections rather than primary suture,<sup>27</sup> possibly based on tradition and the much higher incidence of gastric neoplasia in Japan.

In our series the most common surgical treatment performed was omental patch repair (78.7%) and 9% underwent primary closure. Both procedures had low morbidity and mortality. 14 of our patients had gastrectomy because of suspicion of carcinoma or large friable ulcers. Mortality rate was 28%, morbidity was 42.8% in these patients.

Many reports suggest that when treated appropriately with a curative intent, the perforated gastric cancer, in stage I/II/III, survival and prognosis is similar to those operated in an elective setting.<sup>28,29,30</sup> The only factor influencing long-term survival in either setting is the underlying stage of malignancy. Gastric cancer patients presenting with a gastric perforation demonstrate improved overall survival with an R0 resection; however, implementation of this management technique is complicated by infrequent preoperative gastric cancer diagnosis, and inability to perform an oncologic resection due to patient instability and intra-abdominal contamination.

Aggressive surgical treatment, including an initial emergency procedure for containing peritonitis and radical surgery for gastric cancer, may benefit perforated gastric cancer patients in terms of both the immediate and oncologic outcomes.<sup>31</sup> Others argue that At the time of perforation radical gastrectomy with lymphadenectomy is mostly not advised, either because a diagnosis of gastric cancer is not confirmed or because the patient's condition does not allow extended surgery, And suggested to consider a two-stage procedure.<sup>32</sup>

A non-operative strategy is often successful, in selected patients.<sup>33</sup> One randomized controlled study suggests an initial period of non-operative treatment with careful observation may be safely allowed except in patients over 70 years old, and that the use of such an observation period can obviate the need for emergency surgery in more than 70 percent of patients.<sup>34</sup>

## CONCLUSION

Most common location of gastric perforation is pre-pyloric region. Pre-pyloric perforation has very low incidence of malignancy compared to other locations (1.3% vs. 24%). Biopsy is essential, since malignant perforation was detected in all locations. Gastrectomy in the setting of perforated stomach carries high mortality.

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