International Surgery Journal
Bhaskar S et al. Int Surg J. 2019 Sep;6(9):3347-3352
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20194077

Original Research Article

Incidence of malignancy in gastric/antral perforation

Sumit Bhaskar[1]*, Priyanka Kumari[1], Sweta[2], Dipendra K. Sinha[1]

[1]Department of Surgery, [2]Department of Obstetics and Gynaecology, Rajendra Institute of Medical Sciences, RIMS, Ranchi, Jharkhand, India

Received: 28 May 2019
Revised: 19 August 2019
Accepted: 20 August 2019

***Correspondence:**
Dr. Sumit Bhaskar,
E-mail: Sumitbhaskar8@gmail.com

ABSTRACT

Background: Gastrointestinal perforation is one of the most commonly encountered cases in emergency department. Acute perforation of the stomach and duodenum causes significant morbidity and mortality. These perforations occur more commonly as a complication of peptic ulcer disease but in a few cases gastric cancer also present as gastric/antral perforation. Previously it was reported that approximately 10-16% of all gastric are caused by malignancy/gastric cancer. To study the incidence of malignancy in gastric perforation in present time, a study was carried out at our institute including all cases of gastric/antral perforations that presented to emergency department over a period of two years.
Methods: Cases of gastric/antral perforation that presented to our emergency were included in study. Biopsy from the margin of perforation was taken and sent for histopathological examination. Results obtained were further analysed with respect to total no. of cases, age, sex, personal habits and histopathological type.
Results: Out of total 60 cases that were included in study, biopsy report of 5 cases came to positive of malignancy.
Conclusions: The incidence of malignancy in gastric/antral perforation was found to be 8% in our study which shows a decline in this region as compared to incidence in the world.

Keywords: Incidence, Malignancy, Gastric perforation

INTRODUCTION

Gastrointestinal perforation is one of the most commonly encountered cases in emergency department.Acute perforations of the stomach and duodenum continue to cause significant morbidity and mortality.

These perforation occur more commonly as complications of peptic ulcer disease but in few cases gastric cancer also present as gastric perforation.[1] Amongst the petic ulcer disease, duodenal ulcers have a more common tendency to perforate as compared to gastric ulcers. There has been a significant reduction in cases of peptic ulcer disease owing to introduction of PPI's and drugs against H.Pylori.[2] Gastric ulcer is considered uncommon disease, being 6 -30 times less common than duodenal ulcer. Gastric ulcers are mostly malignant ulcers which have a strong tendency to perforate. All gastric ulcers especially giant ulcers are considered malignant unless proved otherwise.

Incidence of Gastric cancer has been declining at about 1% per year owing to significant reduction in risk factor.[2,3] Worldwide Gastric cancer is the fourth most common cancer and the second leading cause of cancer related death.[4] Spontaneous perforation of Gastric cancer is rare occurrence resulting in acute abdominal syndrome due to spilled gastric contents and the consequent peritonitis and carries fatal outcome.[5] Perforation is a rare condition representing less than 1% of gastric cancer

cases in the reports of previous years and upto 6% in reports dated before 1980.[6-8]

It has been reported that about 10-16% of all gastric perforations are caused by gastric cancer.[9] The 3 most common primary gastric neoplasms are adenocarcinoma (95%), lymphoma (4%) and malignant GIST (1%). other rare primary malignancies include carcinoid, angiosarcoma, carcinosarcoma, and squamous cell carcinoma. Occasionally the stomach is the site of haematogenous metastasis from other sites (e.g. melanoma or breast). More commonly malignant tumours from adjacent organs invade the stomach by direct extension (e.g. colon or pancreas) or by peritoneal seeding (e.g., ovary).[10]

There is a world wide variation in the incidence of gastric malignancy. A high incidence of gastric cancer has been reported from Southeast Asia, most commonly from Japan, China, and South Korea and this has been attributed to the consumption of preserved food containing carcinogenic nitrates.[11,12]

Gastric cancer used to be the leading cause of cancer deaths in the world until the 1980's when it was overtaken by lung cancer. The worldwide incidence of gastric cancer has declined rapidly over the recent few decades. Part of the decline may be due to recognition of certain risk factors such as *H. pylori* and certain other dietary and environmental risks.[13] However the decline clearly began before the discovery of *H. pylori.*

The decline first began in countries with low incidence of of gastric cancer such as United States (beginning in 1930's), while the decline in countries with high incidence like Japan was slower.[14] In United Kingdom, there was a consistent decline in incidence of gastric cancer in both men and women. In China, the decline was less dramatic than other countries. Here, despite an overall decrease in gastric cancer incidence, an increase has been observed in the oldest and the youngest group, and a less remarkable decline in women as compared to men. Of note is that the age of onset of developing gastric cancer in Chinese population is younger than in the West.[14] The risk factor for non cardia gastric cancer includes male gender, non-white race and older age.

The incidence of gastric cancer in India is overall less as compared to worldwide incidence. Worldwide and more so in the developed World, there has been a decline in the incidence of gastric cancer and this has been attributed to improved food hygiene, sanitation and food preserving techniques.[14]

However this declining trend has not been seen in certain parts of India. The regional variation in incidence and presentation can be ascertained by the fact that gastric cancer in South Indian males has been reported to be more common and occurring a decade before their North Indian counterparts.[15-17] The incidence of gastric cancer in Mizoram has been reported highest in India. Hospital based data from Mizoram suggests gastric cancer to be the most common cancer accounting for 30% of cancer cases.[18,19]

Differences in some dietary pattern and use of tobacco and alcohol have been considered as potential risk factors. Consumption of high temperature food was found to be independent risk factor. Smoking ($P<0.01$) and alcohol ($p<0.05$) were significantly associated with gastric cancer.[20-22] The epidemiology of gastric cancer suggests that it is not a single disease or caused by single factor, but a combination of genetic, socio –cultural and environmental factors.

The most common site of tumour was the body of stomach (40.7%) followed by pylorus (35.5%). *H. pylori* has been found to associated with distal but not the proximal gastric cancer and due to PPI's and drugs against *H. pylori*, the incidence of distal gastric cancer has gone down but the incidence of proximal gastric cancer has increased.[23,24]

The symptoms of perforated gastric cancer are generally similar to perforations in peptic ulcer disease and often are manifestation of advanced stage at the time of diagnosis. Surgical management of Perforated Gastric Cancer can be performed employing a one stage or two stage technique. The first stage treats the life threatening peritonitis followed by second definitive procedure.[25,26] The short term outcome in these patients is often poor due to septic complication from the perforation and may be further contributed by any concurrent resection surgery.

The long term outcome in these patients may also be unfavourable due to likely advanced stage of the gastric malignancy and the possibility of tumour seeding of the peritoneal cavity through the perforation.

An observational study was carried out in our institute with the following aim and objectives (i) To study the incidence of malignancy in gastric (antral) perforation (ii) to compare the incidence found in present scenario with the previously reported incidence and (iii) Making an observation on the incidence of gastric cancer in gastric perforations and its relations with age, sex, personal habits and the recent trend in distribution.

METHODS

Study design

The present work comprises of observation on 60 patients of gastric (antral) perforation who presented to our emergency department at R.I.M.S., Ranchi. These cases were first resuscitated and then operated/ managed surgically.

Study material

Biopsy taken from the margin of gastric (antral) perforation during the operation, it was sent for histopathology and examination.

Study place and period

The study was carried at Rajendra Institute of Medical Sciences,(RIMS) Ranchi, Jharkhand over a period of 2 years.from 2015 to 2017.

Ethical approval

Obtained from Department of Ethics committee and Institutional ethics committee RIMS Ranchi.

Selection criteria of the patients

Inclusion criteria

Patients of gastrointestinal perforation who were found to be gastric (antral) perforations.

Exclusion criteria

Patients of gastrointestinal perforations who were found to be cases other than gastric (antral) perforation such as duodenal/ jejunal/ ileal perforation or perforations of the large gut and patients of traumatic intestinal perforations.

Procedure

The cases which presented to emergency department with features of intestinal perforations, a provisional diagnosis was made and it was confirmed by radiology and ultrasonography. Gas under diaphragm in X–ray abdomen in erect posture and ultrasonographic evidence of free fluid in peritoneal cavity of patients presenting with acute abdomen were undertaken to confirm the diagnosis. Patient is resuscitated and correction of electrolyte abnormality is done. Meanwhile history taking and clinical examination done. These patients were evaluated for operative management and operation was performed with surgical correction of the perforation and if obvious growth or gastric cancer was found to be present appropriate surgery (resection of tumour and/or gastrojejunostomy) was done along with the surgical correction of the perforation accordingly.

During the operation biopsy was taken from margin of the perforation if site of perforation were gastric (antral) or pre –pyloric and was sent for histopatholgy and examination and reports of these cases were used for the study.

The patients were kept under observation during the post-operative period and were on follow up after discharge from hospital.

RESULTS

Incidence of malignancy in gastric (antral) perforation is 8% in our study (Table 1).

Table 1: Incidence of malignancy in gastric (antral) perforation as reported by histopathology.

Histopathology report	No. of cases	%
Benign	55	92
Malignant	5	8
Total	60	100

Table 2: Incidence of malignancy in gastric perforation in different age groups.

Age group (yrs)	No. of gastric perforation cases	No. of malignant cases
00 -20	6	Nil
21 -40	9	Nil
41 -50	12	1
51 -60	15	2
61 -70	12	2
71 -80	6	Nil
Total	60	5

Table 3: Sex incidence.

Sex	No. of gastric perforation cases	No. of malignancy positive cases
Male	56	4
Female	4	1
Total	60	5

Table 4: Incidence of gastric cancer in perforation in relation to personal habit.

Personal habit	No. of gastric perforation cases	Malignancy positive cases
Smoking	9	1
Alcohol	3	Nil
Tobacco chewing (khaini)	24	2
Addiction to both alcohol and smoking	28	2
Non-addict	17	Nil

From Table 2 it can be seen that maximum number of gastric cancer cases that presented as perforation belonged to the age group 51-60 yrs and 61-70 yrs followed by 41-50 yrs. Whereas no cases of gastric malignancy presented as perforation in the age group <40 yrs and >70 yrs.

In the age group 61 -70 years, 2 out of 12 cases of gastric perforation are malignant, hence incidence in this age group is 17% (highest), followed by age group 51-60 yrs

(incidence=13%) and age goup 41-50yrs (incidence=33%).

More no. of cases of gastric malignancy presented with perforation in Males of different age groups (4 positive cases of 56 presenting cases) as compared to females in different age groups (1 positive case out of 4 presenting cases).

5 cases of malignancy were found in gastric perforation of which 80% were male and rest 20% female patients (Table 3).

Out of 60 patients studied 17 cases (28.33%) were not having any addiction to either of tobacco, alcohol or smoking and no cases of malignancy were found in these cases of perforation.

Malignancy in perforation were found to be maximally associated with addiction to both alcohol and smoking, 2 cases were found to be malignant in 28 cases who were addicted to both alcohol and smoking followed by 2 cases who were found to be malignant associated exclusive to tobacco chewing and 1 case found malignant in 9 cases who only smoked (Table 4).

Amongst the various types of gastric cancer that perforates, in our study HPE showed that adenocarcima were maximally associated (80%) with perforation, followed by malignant GIST in 20% cases (Table 5) (Figure 1).

Table 5: Microscopic finding of malignancy in perforation.

Diagnosis	No. of cases	%
Adenocarcinoma	4	80
Gastric lymphoma	Nil	Nil
Malignant GIST	1	20
Squamous cell carcinoma	Nil	Nil
Carcinoid tumour	Nil	Nil
Total	5	100

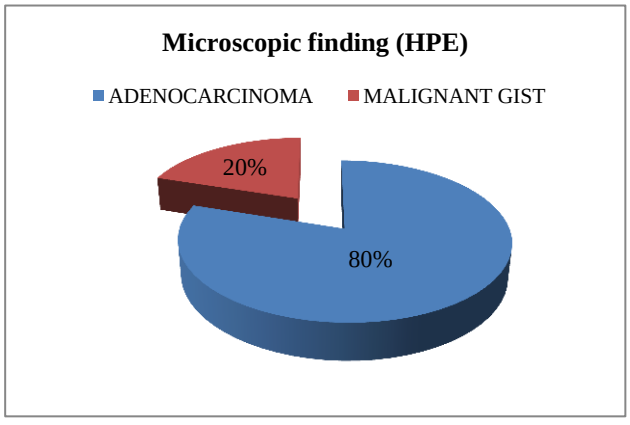

Figure 1: Incidence of histological types of gastric cancer in gastric perforation.

DISCUSSION

In the present study, 60 cases of gastric (antral) perforations were observed for the incidence of malignancy, and this incidence was further evaluated with respect to age of presentation, sex ratio, relations to different personal habit and the incidence in relation to histopatholical types. The incidence of malignancy in our study was found to be 8%,which is lower than the worldwide incidence of 10-16%.[9,10] This reflects the declining trend seen in presentation of gastric carcinoma and its complication. This declining trend seen in our study is due to better food hygiene and sanitation and food preservation techniques and PPI's and drugs against *H. pylori*.

In relation to age group,our study shows that the age group 61 -70 yrs has the highest incidence of malignancy in perforation (17%), followed by the age group 51-60 yrs (13%) and by 41-50 yrs (8.33%).whereas no cases of perforation were found to be malignant in age group, <40 yrs and >71 yrs. The incidence of gastric cancer increases in older age groups and so their perforations. The mean age of perforation of gastric cancer is 65 yrs according to various literatures. Ergul et al claimed that if patient is over 60 yrs of age, malignancy should be considered.[27] So gastric perforation should raise suspicion of malignancy, particularly in elderly patients. In our study the age group that presented with maximum cases of perforated gastric cancer is also 61-70 yrs similar to the worldwide incidence but in our study there is a rise in cases in younger age group 41-50 and 51-60 yrs age group presenting as perforation of gastric cancer. This shift to younger age group is owing to change in environment and risk factors.

80% of male and 20% female cases of perforation are due to malignancy. Various studies done worldwide shows incidence of male sex is much higher as compared to female sex in cases presenting as perforated gastric cancer.[28,29]

Addiction to both alcohol and smoking has the highest incidence in cases of gastric perforation due to malignancy followed by cases who are addicted to tobacco chewing and addicted to smoking. Alcohol and smoking are significant risk factors for gastric cancer and similar result is seen in cases of perforated gastric cancer. In a study from Hyderabad alcohol ($p<0.05$) and smoking ($p<0.01$) were significantly associated with gastric cancer. In addition to smoking, tobacco chewing, a habit more prevalently seen in cases in our study, has been seen to be associated with perforated gastric cancer. Nayak et al recorded incidence of smoking with gastric cancer to be 62% and incidence of tobacco chewing to gastric cancer to be 22%. This clearly defines that tobacco in any form being it smoking or chewing has direct influence on gastric malignancy and perforated gastric cancer.

Amongst the various histologic types, adenocarcinoma has been maximally associated (80%) with perforation of gastric cancer followed by malignant GIST in 20% cases in our study. The most common gastric neoplasm are Adenocarcinoma (95%), gastric lymphoma (4%), nad Malignant GIST (1%). A similar incidence is seen in cases of perforated gastric cancer. Incidence of adenocarcinoma in gastric (antral) perforation is 80%, consistent to the previous study whereas in 20% cases, malignant GIST has been seen to be associated with perforation which is more than the previous reported study results.[29-31]

CONCLUSION

With this study, which was carried out in the Department of Surgery, Rajendra Institute of Medical Sciences, Ranchi over a duration of 2 years, we came to a conclusion that**,** incidence of malignancy in gastric (antral) perforation in this study is 8%, which is lower than the incidence in the world, and showing a decling trend in this region as compared to world. The age group associated with incidence of malignancy in perforation ranged from 4th to 6th decade, with maximum incidence found in the age group 61-70 years. Consistent with the incidence in world. Incidence is also seen in young age group of 41-50 years, which is probably due to increased incidence of risk factors in this age group. Male to female ratio was found to be in 4:1 in this region. Among risk factors addiction to both smoking and alcohol has the maximum incidence followed by tobacco chewing and smoking. Whereas non-addict cases were not associated with perforated gastric cancer. The histological type of gastric cancer which is maximally related with perforation is adenocarcinoma in 80% cases followed by malignant GIST in 20% cases, requiring adequate surgical approach to deal with this situation.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Adesunekami AR, Badnus TA, Ogundoin O. Causes an determinants of outcome of intestinal perforation in semi urben community. Ann Coll Surg. Hong Kong. 2000;7(4):116–23.
2. Norman SW, Christopher JKB, O'Connell PR. Bailey and Love's Short practice of Surgery. 26th edition. 2013.
3. Ozmen MM, Zulfikaroglu B, Kece C, Aslar AK, Ozalp N, Koc M. Factors influencing mortality in spontaneous gastric tumour perforation. J Int Med Res. 2002;30(2):180-4.
4. Onnate–Ocana LF, Mendez Cruz G, Hernandez Ramos R, Becker M, Carillo JF, Herrera Goepfert R, et al. Experience in Surgical morbidity in patients with gastric carcinoma. Gastric Cancer. 2007;10(4):215-20.
5. Ozmen MM, Zulfikaroglu B, Kece C, Aslar AK, Ozalp N, Koc M, et al. Factors influencing mortality in spontaneous gastric tumour perforation. J Int Med Res. 2002:30(2):180-4.
6. Adachi Y, Mori M, Maehara Y, Matsumata T, Okudaira Y, Sugimachi K. Surgical reports of perforated gastric carcinoma: an analysis of 155 Japanese patients. Am J Gastroinerol. 1997;92(3):516-8.
7. Stechenberg L, Bunch RH, Anderson MC. The Surgical Therapy for perforated gastric cancer. Am Surg. 1981;47:208-10.
8. McNealy RW, Hedin RF. Perforation in gastric carcinoma. J Am Coll Surg. 1938;67:818-23.
9. Kennedy TL. Gastric Carcinoma and Acute perforation. Brit Med J. 1951;2:1489.
10. Brunicardi FC, Andersen DK, Billiar TR, Dunn DL, Hunter JG, Matthews JB, et al. Schwartz's Priciples of Surgery. 10th edition. McGraw-Hill Education.
11. Parkin DM, Pisani P, Ferlay J. Estimates of The Worldwide Incidence of 25 major cancers in 1990. Int Cancer. 1999;80:827.
12. Nomura A, Stemmermann G, Chyou P. Gastric cancer among the Japanese in Hawaii. Jpn J Cancer Res. 1995;86:916.
13. Williams NS, Bulstrode CJK, O'Connell PR (eds). Bailey and Love's Short Practice of Surgery. 26th edition. Boca Raton, FL: CRC Press; 2013: 1517.
14. Parkin DM , Pisani P, Ferlay J. Estimates of The Worldwide Incidence of 25 major cancers in 1990. Int Cancer. 1999;80:827.
15. Mohandas KM, Nagral A. Epidemiology of digestive tract cancers in India II. Stomach and Gastrointestinal lymphomas. Ind J Gastroenterol. 1998;17:24.
16. Malhotra SL. Geographical distribution of gastrointestinal cancers in India with special reference to causation. Gut. 1967;8:361-72.
17. Sumathi B, Ramalingam S, Navaneethan U, Jayanthi V. Risk Factors for gastric acncer in South India. Singapore Med J. 2009:50:147-51.
18. Phukan RK , Zomawia E, Hazarika NC, Baruah D, Mahanta J. High prevalence of stomach cancer among the people of Mizoram, India Curr Sci. 2004:87:285-6.
19. Phukan RK, Zomawia E, Narain K, Hazarika NC, Mhanta J. Tobacco use and stomach cancer in Mizoram, India. Cancer Epidemiological Markers Prey. 2005;14:1892-6.
20. Chow W, Swanson C, Liowska J. Relation of gastric cancer in relation to consumption of cigarettes, alcohol, tea and coffeein warsaw Poland. Int J Cancer. 1999;81:871.
21. Ye W, Ekstrom A, Hansson L. Tobacco, Alcohol and the risk of gastric cancer by sub type and histologic type. Int J Cancer. 2000;83:223.
22. Zaridze D, Borisowa E, Maximovitch D. Alcohol consumption, smoking and risk of gastric cancer:

case control study from Moscow, Russia. Cancer Causes Control. 2000;11:363.
23. Huang JQ, Sridhar S, Hunt RH. Meta-analysis of the relationship between Helicobacter pylori seropositivity and gastric cancer. Gastroenterology. 1998;114:1169.
24. Uemura N, Okamoto S, Yamamoto S. Helicobacter pylori infection and development of gastric cancer. N Eng J Med. 2001;345-784.
25. Gertsch P, Yip SKH, Chow LWC, Lauder IJ. Free perforation of gastric carcinoma. Results of surgical treatment. Arch Surg. 1995;130:177-81.
26. Lehnert T, Buhl K, Dueckm, HInz U, Herfarth C. Two staged radical gastrectomy for perforated gastric cancer. Eur J Surg Oncol. 2000;26:780-4.
27. Ergul F, Gozetlik FO. Emergency spontaneous gastric gastric perforations: ulcus versus cancer. Langenbecks Arch Surg. 2009;394(4):643-6.
28. Kandel BP, Singh Y, Singh KP, Khakurel M. Gastric cancer perforation: experience from a tertiary care hospital. J Nepal Med Assoc. 2013;52(191):489-93.
29. Roviello F. "Perforated gastric carcinoma, a report of 10 cases and review of literature". World J Surgical Oncol. 2006;4:19.
30. Tan KK, Quek TL, Wong N, Li KK, Lim KH. Emergency surgery for perforated gastric malignancy: an institutional experience and review of literature. J Gastrointestinal Oncol. 2011;2(1):13-8.
31. Ignjatovic N, Stojanov D. Perforation of gastric cancer, what should the surgeon do. Bosn J Basic Med Sci. 2016;16(3):222-6.

Cite this article as: Bhaskar S, Kumari P, Sweta, Sinha DK. Incidence of malignancy in gastric /antral perforation. Int Surg J 2019;6:3347-52.