Journal of Cardiovascular Disease Research

ISSN: 0975-3583, 0976-2833 **VOL14, ISSUE 10, 2023**

Original research article

Study of clinico- pathological factors in gastric cancer in Bihar region

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Received: 11-07-2023. Revised:29-08-2023. Accepted:15-09-2023.

Abstract

Aim: Study of clinico- pathological factors in gastric cancer

Material and Methods: This retrospective study was carried out in the Department of Pathology for 12 months. Total 600 patients were included in this study.

Results: Of these 600 patients, 370 (61.67%) underwent distal gastrectomy, 24 (4%) proximal gastrectomy via abdomen and 145 (24.17%) via thorax, and 61 (10.16%) underwent total gastrectomy. Distal and total gastrectomy had more numbers of clearances of lymph nodes than the other operational approaches. The postoperative complications occurred in 51 patients 51/600, 8.5%.The overall mortality was 0.66% (4/600).The diameter of the neoplasm was positively correlated with the depth of infiltration and lymphatic metastasis rate while hemoglobin was the opposite. 92 (15.33%) of 600 were early gastric carcinoma (EGC) with metastasis of lymph nodes in 12 patients (12/92, 13.04%).

Conclusion: This retrospective study has shown that clinicopathological characters in gastric cancer varied with sex, location, and diameter of the tumor.

Keywords: gastric cancer, gender, location, size

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Introduction

Gastric cancer is a heterogeneous, multifactorial disease, which is known as the fifth most common cancer and the third leading cause of cancer-related death worldwide in 2018.[1 2] According to previous reports, ~0.7million people died because of gastric cancer each year,[3] and about 70% of the gastric cancer cases had high fatality, significantly higher than other cancers such as the liver and breast cancers.[4] However, the incidence and mortality of gastric carcinoma vary geographically; they were dramatically different between Western and Eastern countries.[3]

The epidemiological and clinicopathological characteristics of gastric cancer still largely remain uncertain, although some risk factors have been identified in the study. It has been reported that the survival rates were lower among smokers, alcohol drinkers, obesity and people who have the symptom of esophageal acid reflux and consume pickled, salty and smoked food.[5–6] Studies also suggested that the incidence rate of gastric cancer was highly correlated with age, especially among patients aged between 50 and 70 years old.[7–8] It has been reported that gastric carcinoma is one of the heaviest burdens of cancer-related cost, the absolute numbers of gastric cancer cases and the prognosis remain big issues in the health programmes.[9] The current most popular therapy for gastric cancer is surgery combined with chemotherapy. Surgery is the most preferred treatment for gastric carcinoma, but the survival rate of patients undergoing surgery remains very low. Previous studies have revealed that the average survival time of patients with advanced gastric cancer is <12 months [10,11] . Therefore, how to timely assess the condition, judge the prognosis risk after therapy and develop a reasonable postoperative care programme becomes a vital part of gastric cancer treatment. [12,13] Many clinico-pathological factors, including clinical stage, tumour size, infiltration depth, Lauren classification and lymph node metastasis rate, might jointly influence the prognosis in patients with gastric carcinoma.[14,15] It is important but challenging to identify the most significant and

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independent factors associated with prognosis since many factors are highly correlated. To have a systematic comprehension of gastric carcinoma and to identify independent risk factors on gastric cancer patients, we conducted the current study.

Material and methods

This retrospective study was carried out in the Department of Pathology, Shree Narayan Medical Institute and Hospital, Saharsa , Bihar, India for 12 months . 600 patient or the relatives if the patient was not in good condition.

Methodology

We analyzed the following clinicopathologic and surgical factors:

age, sex, hemoglobin, operation manners, operation time, and amount of transfusion during operation, postoperative hospital stay, postoperative complications, positive proximal margin, location of tumor, tumor size, differentiation, depth of tumor invasion, lymph nodes and lymphatic metastasis rate.

Frequency of positive lymph nodes = numbers of metastatic lymph nodes / all lymph nodes excised ×100%.

Statistical analysis

The recorded data was compiled entered in a spreadsheet computer program (Microsoft Excel 2010) and then exported to data editor page of SPSS version 20 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages, means and standard deviations. Test applied for analysis was t-test. The confidence interval and p-value were set at 95% and 5%.

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Results

Table 1 Comparison of operation manner with numbers of lymph nodes, time for operation, amount of blood transfusion during operation, hospitalization days and complications ($\bar{x} \pm s_x$)

Manners of operation	N(600)	Numbers lymph nodes	Time for operation (hours)	Amount of blood transfusion (mL)	Hospitalization stays (days)	Complication (%)
Distal gastrectomy	370	10.4 ± 0.2*	3.1± 0.02	406.3 ± 14.7*	15.4 ± 0.9	8.8
Proximal gastrectomy via abdomen	24	8.4 ± 0.3	4.1± 0.1*	616.4 ± 41.1*	17.6 ± 1.7	16*
Proximal gastrectomy via thorax	145	8.1± 0.1	3.1 ± 0.01	755.1 ± 18.3	14.8± 0.8	1.3
Total gastrectomy	61	12.6 ± 0.4*	4.2 ± 0.2*	742.2 ± 44.9	18.6 ± 1.5	11.6
p-value		<0.0001	<0.0001	<0.0001	>0.05	<0.001

*Compared with other operative approaches

Table 2 Comparison of depth of infiltration with age, diameter, hemoglobin, and lymphatic metastasis rate ($\bar{x} \pm s_x$)

Depth of invasion	N (600)	Age (yrs)	Diameter (cm)	Hemoglobin(g / L)	Lymphatic metastasis rate (%)
pT1(m)	63	50.7 ± 1.1	2.1 ± 0.3	12.3 ± 0.4	3.1 ± 0.6
pT1(ms)	33	54.9± 1.4*	2.4 ± 0.5	11.6± 0.5*	4.0 ± 1.1
pT2	37	55.7 ± 1.3*	2.9 ± 0.4	11.5 ± 0.2*	8.9 ± 1.4*
pT3	42	56.4 ± 1.2*	4.1 ± 0.4*	11.7 ± 0.2*	18.1 ± 2.6*
pT4	425	57.1± 0.2*	5.1 ± 0.2*	11.4 ± 0.2*	34.7 ± 1.3*

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p-value	<0.003	<0.0001	<0.001	<0.0001

Compared with pT1 (m).

Table 3 Comparison of differentiation with age, diameter, hemoglobin and lymphatic metastasis rate ($\bar{x} \pm s_x$)

Differentiation	N (600)	Age (yrs)	Diameter (cm)	Hemoglobin (g / L)	Lymphatic metastasis rate (%)
I	49	60.2± 1.2	3.3± 0.3	10.9 ± 0.5	10.1 ± 3.1*
II	91	58.1 ± 0.6	3.9 ± 0.4	11.4 ± 0.2	24.4 ± 2.1
III	145	58.8 ± 0.4	4.1 ± 0.1	11.1 ± 0.4	20.9 ± 1.6
IV	315	52.7 ± 0.2*	4.7 ± 0.1*	11.6 ± 0.1*	30.9 ± 1.1*
p-value		< 0.0001	= 0.003	= 0.01	< 0.0001

*Compared with other groups

Table 4 Comparison of tumor site with age, diameter, hemoglobin and positive lymph node rate ($\bar{x} \pm s_x$)

Location of tumor	N (600)	Age (yrs)	Diameter (cm)	Hemoglobin (g / L)	Lymphatic metastasis rate (%)
Pylorus	19	52.7± 2.6	3.6 ± 0.5	12.3 ± 0.9	13.6± 3.1
Antrum	192	55.8 ± 0.3*	4.8 ± 0.3	12.1 ± 0.4	25.8 ± 1.3
Incisura	181	54.8 ± 0.3	3.0± 0.2	12.1± 0.1	20.9 ± 1.6
Corpus	39	55.7 ± 1.3	5.9 ± 0.4*	11.5 ± 0.2	35.8 ± 3.9*
Fundus	169	58.2 ± 0.4*	5.1 ± 0.3*	12.6 ± 0.1	33.4 ± 1.6*
p-value		< 0.0001	< 0.0001	> 0.005	< 0.001

*Compared with other locations.

Table 5 Comparison of sex with tumor location, differentiation, depth of invasion and positive lymph node rate ($\bar{x} \pm s_x$)

Gender	Location (%)	Differentiation (%)	Depth of invasion (%)	Frequency of metastatic

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										lymph node (%)	
	Proximal	Middle	Distal	Well	Middle	bad	pT1	pT2	pT3	<35	>35
Male	35	21	44	20	24	56	12	7	81	66	34
Female	51	9	40	12	18	70	12	8	80	59	41
		<0.001	<0.001					>0.05	=0.01	<0.001	

Table 6 Multi-factors analysis of lymphatic metastasis in gastric patients

Related factors	Regression coefficient	Standard error	Standard regression coefficient	*P*
Constant	-22.4	7.3		0.001
Age	-0.006131	0.071	-0.20	0.431
Sex	-6.466	2.029	-0.088	0.001
Tumor location	2.297	0.699	0.081	0.002
Diameter of tumor	2.379	0.479	0.151	0.0001
Depth of invasion	7.031	0.799	0.291	0.0001
Differentiation	3.699	1.133	0.089	0.001

Discussion

Gastric cancer remains one of most common causes of death. Although the etiology of gastric cancer is still unclear, but studies have shown that many factors are associated with the development, metastasis of gastric cancer, and recurrence after operation.[16-18] Recent studies suggest that infection with *Helicobacter pylori* may play an important role in the development of gastric cancer.[19,20] It has been proposed that *Helicobacter pylori* infection may produce acute and chronic gastritis, intestinal metaplasia, dysplasia, and eventually resulting in gastric cancer. Some abnormal expression in gene is involved in carcinogenesis of gastric cancer such as matrix

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metalloproteinases gene, *p*53 gene and dinucleotide repeat sequence gene. Abnormal contents of some trace elements may also be one of the risk factors in gastric cancer.[21-24]

Early gastric cancer (EGC) has been considered to be a form of gastric malignancy with a relatively good long-term prognosis compared to that of advanced gastric cancer because of rare metastasis in lymph nodes.[25,26] In Japan, EGC is diagnosed in 30%-50%, due to partly at least the extensive use of endoscopy and mass screening programs.[27,28] In this study, the proportion of EGC diagnosed in all patients is 92 (15.33%) similar to the proportion in the United States and Europe.[29,30] In recent years, endoscopic treatment has become increasingly popular as an alternative to surgical treatment of patients with EGA in hope of offering superior quality of life (QOL).[31] However, because of presence of metastasis in 10%-20% and skip metastasis of lymph nodes, whether the rationale for a standard resection with systematic lymphadenectomy is necessary is still a controversial issue.[32]

Different operative approaches were carried out according to the different locations of the tumor. In our study, the number of lymph nodes excised was the largest in total gastrectomy, followed by distal gastrectomy which may be related to the resection of all or most parts of omentum. The number of lymph nodes excised in proximal gastrectomy via a trans abdomen was similar to via transthorax. There was shorter time for operation and lower frequency of complication in proximal gastrectomy via transthorax while lower blood transfusion in proximal gastrectomy via trans abdomen. The postoperative hospitalization stay and the positive resection margin were same between them. The complications varied among different operations: gastric retention was common in distal gastrectomy while thorax effusion and infection of lung were mainly found in total gastrectomy.

Although the overall incidence of gastric cancer has remained stable in the West, there is well- documented shift from distal to proximal lesion. The clinical relevance of this shift is that the overall prognosis for patients with proximal gastric cancer is worse than for those

ISSN: 0975-3583, 0976-2833 VOL14, ISSUE 10, 2023

with distal tumor. This difference in survival may be attributed to a variety of factors, ranging from an increased biologic aggressiveness of proximal tumors to an advanced stage of presentation [33,34]. In study, a higher frequency of positive lymph nodes was found in gastric cancer located on corpus and the fundus which may be associated with the larger diameter of the tumor in corpus and the fundus. In tumors with larger diameters there were worse differentiation, deeper infiltration, and higher frequency of positive lymph nodes. Apparently, the prognosis will be worse in these patients. The present results also show that the more proximal lesions, bad differentiation, and the higher >35% frequency of positive lymph nodes can be found in female than in male. The numbers of metastatic lymph nodes play an important role in the long-term outcome after curative resection [35,36]. Thus it is suggested that extended lymphadenectomy should be performed in advanced gastric cancer [37] . Our multivariate analysis indicated that among six clinicopathologic variables (age, sex, location of tumor, tumor diameter, depth of invasion and differentiation), the depth of invasion was the most important factor influencing metastasis of lymph node.

Conclusion

This retrospective study has shown that clinicopathological characters in gastric cancer varied with sex, location, and diameter of the tumor. The depth of invasion plays a very important role in metastasis of lymph node. The prognosis in female with gastric cancer may be worse than in man. Because metastasis of lymph nodes may occur even in patients with EGC, radical gastrectomy with lymphadenectomy may be necessary in all stages of gastric cancer.

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