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Research Article

Association of hyperlipidemia with lymph node metastasis in early gastric carcinoma

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ABSTRACT

Background: The aim of this study was to see association between pre-operative serum lipid profile and the nodal status of early gastric carcinoma.
Methods: It was a retrospective study. Seventy newly diagnosed patients of early gastric carcinoma admitted in the department of general surgery in a tertiary care teaching hospital over a duration of two years, were included in the study. Fasting serum level of total cholesterol and triglyceride were estimated in patients who were proven to have early gastric carcinoma on histopathological examination (HPE).
Results: Forty six (65.71%) patients had deranged lipid profile. Of these 38 were males and 8 were females. The study showed that 17 male patients had lipid levels in normal range and of these 10 (58.82%) patients had lymph node involvement; while remaining 7 (41.18%) did not have lymph node involvement. Remaining 38 male patients had elevated lipid levels of whom 30 (78.95%) patients had lymph node involvement, while remaining 8 patients did not have lymph node involvement. Eight female patients had elevated lipid levels and suffered from gastric carcinoma, of which 5 (62.5%) had lymph node involvement and rest 3 (37.5%) had no lymph node involvement.
Conclusions: Deranged serum lipid levels favour the development of lymph node metastasis in patients with early gastric carcinoma.

Keywords: Gastric, Carcinoma, Deranged lipid, Lymph node

INTRODUCTION

There has been a decline in the incidence of gastric carcinoma worldwide and this has been attributed to improved food hygiene, sanitation, and food preservation techniques, but still gastric carcinoma is the fourth most common carcinoma in the world.[1] Japan and Korea are the leading countries.[2,3]

Incidence of gastric carcinoma in India is overall less as compared to the rest of the world. However, this is not seen in certain parts of India.[4] Age range for gastric carcinoma is 35-55 years in the South India and 45-55 years in the North India. The Age-Adjusted Rate (AAR) of gastric carcinoma among urban registries in India is (3.0-13.2) compared to the worldwide AAR (4.1-95.5).[4-7]

Invasion and metastasis are the biologic hallmarks of the malignant tumor.[8] Hypercholesterolemia and hypertriglyceridemia helps in metastasis of tumor cells by promoting invasion of blood vessels and lymphatic channels. Several studies have found positive association between hyperlipidemia and several carcinoma such as prostate carcinoma,[9] ovarian carcinoma,[10] breast carcinoma,[11] and colon carcinoma.[12]

The aim of this study was to see association between pre-operative serum lipid profile and the nodal status of early gastric carcinoma.

METHODS

It was a retrospective study. Seventy newly diagnosed patients of early gastric carcinoma admitted in the department of general surgery in a tertiary care teaching hospital over a duration of two years, were included in the study. Ethical clearance was taken from the institutional ethics committee. Written informed consent was taken from the patients. Patients who had already received treatment for gastric carcinoma in any form, moribund patients and those who refused consent were excluded from the study.

Detailed history and clinical examination was done. Suspected patients were subjected to upper gastro-intestinal endoscopy and biopsy was taken from the lesion. If possible Fine Needle Aspiration Cytology (FNAC)/Biopsy of enlarged lymph node and abdominal mass was done. Early gastric carcinoma was defined as involvement of mucosa and/or submucosa with or without lymph-nodes involvement on histopathological examination.

Fasting serum level of total cholesterol and triglyceride were estimated in patients who were proven to have early gastric carcinoma on HPE. Five ml. of venous blood was collected from the forearm in Ethylene Diamine Tetraacetic Acid (EDTA) vial in patients. In order to maintain accuracy of the test results, fasting upto 12 hours prior to the test was advised, because consumption of a fatty or cholesterol rich diet could have given fallacious results. Samples were sent to the pathology department on the same day at 2-4°C. CHOD-PAP method was used for estimation of serum total cholesterol and GPO-PAP method was used for estimation of serum triglyceride levels. Deranged lipid profile was defined as total cholesterol (TC ≥220 mg/dl) and triglyceride (TG ≥150 mg/dl).

Other than routine haematological investigations, ultrasound whole abdomen with pelvis was done. Contrast Enhanced Computerized Tomography (CECT) scan of whole abdomen was done in patients who could afford, for staging purposes.

Patients underwent gastrectomy with lymphadenectomy (D_1/D_2 resection), and resected specimen was sent to pathology department for HPE to look for the lymph nodes involvement.

Data was collected on a standardized proforma and later entered into MS excel data sheet. Data was analysed using SPSS software version 16.0 with the help from biostatistician.

RESULTS

In this study 55 (78.57%) patients were male and 15 (21.43%) were female, with Male:Female ratio being 3.6:1. Thirty one (44.28%) patients were of age group 51-60 years.

Minimum prevalence was noted for the age group of <30 years and >80 years with percentages being 4.28 and 1.42 respectively. Twenty seven (38.57%), 24 (34.2%), and 19 (27.14%) belonged to low, middle and high socio economics status (according to Kuppuswamy scale[13]) respectively. Fifty three (75.71%) patients were non-vegetarian.

'Loss of appetite' was the presenting symptom in 53 (75.71%), followed by 'sense of fullness' in 47 (67.114%), vomiting in 42 (60%), weight loss in 40 (57.14%) and abdominal mass in 30 (42.86%) patients.

Only 2 (2.85%) and 7 (10%) patients respectively had hematemisis and malena as the presenting complaint. On clinical examination anemia was the most common finding, in 69 (98.57%), followed by palpable epigastric mass 42 (60%), ascites 32 (45.71%), and jaundice in 15 (21.43%) patients. Intra-abdominal lymph nodes were palpable in 13 (18.57%) patients, while Virchow's (left supraclavicular lymph node) node was palpable in 2 (2.86%) patients only.

On upper GI endoscopy 'ulceroproliferative' type of growth was the most common finding, seen in 38 (54.29%) followed by 'ulcerative' growth 17 (24.29%) and 'proliferative' growth in 15(21.42%) respectively.

On ultrasound 49 (70%) patients showed lymph node involvement, 37 (52.86%) ascites and 13 (18.57%) hepatic metastases.

On laparotomy majority 49 (70%) had regional lymph node involvement. Greater omentum was the most common adjacent organ involved in 31 (44.28%) patients.

Forty six (65.71%) patients had deranged lipid profile. Of these 38 were males and 8 were females. The study showed that 17 male patients had lipid levels in normal range and of these 10 (58.82%) patients had lymph node involvement; while remaining 7 (41.18%) did not have lymph node involvement. Remaining 38 male patients had elevated lipid levels of whom 30 (78.95%) patients had lymph node involvement, while remaining 8 patients did not have lymph node involvement. Eight female patients had elevated lipid levels and suffered from gastric carcinoma, of which 5 (62.5%) had lymph node involvement and rest 3 (37.5%) had no lymph node involvement (Table 1).

Table 1: Lymph node involvement based on lipid level.

Lipid level	Male (n=55)					Female (n=15)				
	L.N. involved		L.N. not involved		Total	L.N. involved		L.N. not involved		Total
	Cases	%	Cases	%		Cases	%	Cases	%	
Normal	10	58.82	7	41.18	17	4	57.1	3	42.86	7
Elevated	30	78.95	8	21.05	38	5	62.5	3	37.5	8
Total	40	72.73	15	27.27	55	9	60.0	6	40.0	15

DISCUSSION

Review of literature was done using PubMed online search. To the best of our knowledge no such studies have been done in India. There had been one study in Japan by J. Kitayama, K. Hatano, et al.[14] which showed that hyperlipidemia is related with lymph node metastasis in patients with gastric carcinoma.

Prevalence of hypercholesterolemia in India is 28% in urban population as compared to 22% in rural population.[15] In this study 65.71% had elevated serum levels of lipid and 34.29% had normal lipid levels and incidence of elevated lipid level in male was 69.09% whereas in female it was 53.33%. Lymph node metastasis with normal lipid levels were seen in 58.33%, whereas 76.09% of cases had lymph node metastasis with elevated lipid levels. In the study done by J. Kitayama, K. Hatano, et al.[14] hyper cholesterolemia and hyper triglyceridemia were detected in 22.7% of cases. However, the occurrence of nodal metastasis in men with high lipid level was three times greater than with normal lipid level (17.2%).

CONCLUSION

Deranged serum lipid levels favour the development of lymph node metastasis in patients with early gastric carcinoma. Thus, estimation of serum lipid levels should be included routinely in pre-operative work up of patients with gastric carcinoma.

Limitations

More studies with variable sample sizes need to be done. More elaborate analysis of other components of lipid profile like Low Density Lipid (LDL), Very Low Density Lipid (VLDL), chylomicron and their effects on early gastric carcinoma need to be done.

Directions for future research

Since there is a positive association between deranged lipid profile and lymph node metastatic status in early gastric carcinoma, a reduction in serum lipid levels with dietary and/or pharmacological management, might be of benefit in preventing or reducing nodal metastasis in gastric carcinoma.

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