



Imaging Evaluation of Upper Gastro-Intestinal Tract Malignancy

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Abstract

Aim: The aim of our study was to evaluate the role of computerized tomography and USG in detecting various findings of upper GI malignancy and validate the results with histopathological diagnosis.

Material and Method: A prospective study of 60 patients with diagnosed or suspected cases of upper GI malignancy was conducted at VIMSAR, Burla (Odisha). All the patients were subjected to USG and non-contrast and contrast enhanced CT. Endoscopy and histopathology reports were obtained.

Observation: Most patients were in the age group of 51 to 70 years with male dominance (M:F ratio 1.8). Dysphagia was the most common presenting symptom in esophageal malignancy where as weight loss and abdominal pain were the predominant in gastric malignancy. Mid esophagus was the most common site of esophageal malignancy and antrum in case of gastric malignancy. On imaging, maximum patients show wall thickening with luminal narrowing and homogenous or heterogenous mild to moderate contrast enhancement.

Conclusion: In our study, we found CECT and USG are highly helpful for detection of upper GI malignancy. CECT is more efficient for detection of lymph node spread than USG where as both modalities are equally effective for detection of distant abdominal organ metastasis. The imaging modalities are more effective to detect exophytic growth such as GIST and malignancy with diffuse involvement of stomach such as Linitis Plastica and Lymphoma which can be often missed in upper GI endoscopy.

Keywords: Upper Gastrointestinal malignancy, Imaging.

Introduction

Upper gastrointestinal tract is a common site of neoplasm especially malignant tumors. World-wide, gastric carcinoma is the second most common cancer and esophageal malignancy is the sixth leading cause of death. *Helicobacter pylori*

and dietary factors are main causes of gastric malignancy where as tobacco, alcohol and Barrett's esophagus are the major risk factors of esophageal malignancy. Majority of the malignant lesions are detected usually in advanced stage due to insidious nature of onset of symptoms and their

similarity in early stage to benign causes of dyspepsia and dysphagia.

Imaging studies play an important role in the evaluation of upper GI malignancy and provide important information regarding the local extent and any distant spread of disease.

The methods used in evaluating the upper GI malignancy are mainly upper GI endoscopy, barium study, transabdominal Ultrasonography and Contrast Enhanced CT scan. Upper GI endoscopy and barium study can detect only intraluminal and mucosal defects. Extent of invasion and lesions involving the submucosa, muscularis and serosal layers cannot be detected.

Transabdominal Ultrasound is the least invasive and cost effective imaging technique available for evaluating upper GI malignancy. Contrast enhanced CT scan of abdomen involving thin-section collimation of the esophagus and stomach with sagittal and coronal reformation improves the visualization of fine anatomic details of the upper gastrointestinal tract malignant lesions^[1], the adjacent structures as well as the distant organs.

Aims

1. To detect and evaluate ultrasonography findings of upper GI malignancy
2. To detect and evaluate CT findings of upper GI malignancy.
3. To validate the imaging diagnosis with endoscopic and pathological evaluation- FNAC/surgical biopsy wherever Possible.

Review of literature

MDCT currently remains the most commonly used examination in preoperative esophageal cancer staging because it gives information regarding the local extension and distant metastases and lymphadenopathies rapidly and noninvasively, with overall diagnostic accuracy values of 59-82%^[2].

Lymphoma and Leiomyosarcoma are rare malignant tumors that can affect the esophagus.

The treatment of esophageal carcinoma is determined by the cellular type of cancer (adenocarcinoma or squamous cell carcinoma v/s other types), the stage of the disease, the general condition of the patient and other diseases present. Adenocarcinoma of the stomach constitutes 90-95% of all gastric malignancies. The second most common gastric malignancies are lymphomas. Malignant Gastrointestinal stromal tumors and other sarcomas account for 2% of gastric neoplasms. Carcinoids (1%), adenoacanthomas (1%), and squamous cell carcinomas (1%) are the remaining tumor histologic types.^[3]

Upper GI endoscopy is the preferred diagnostic modality for evaluation of patients in whom stomach malignancy is suspected.

Transabdominal ultrasonography, endoscopic ultrasonography, in combination with computed tomography are helpful for local spread, lymph node involvement, distant metastasis and hence staging of disease.^[4]

S Singh et al^[5], in a study concluded that high resolution sonography of the fluid filled stomach is a supportive diagnostic modality and suggests itself as a supplementary diagnostic procedure to endoscopy. Heterogeneous intraluminal masses, hypoechoic wall echotexture, luminal narrowing, reduced peristalsis and circumferential wall thickening with loss of wall layering suggest a malignant lesion.

Yeh and Rabinowitz^[6] stated that ultrasonographic features of gastric tumours can be thickened gastric wall due to infiltration by tumour or a mass or A combination of two.

Worlieck et al^[7] stated that a localized carcinoma may be seen as a hypoechoic or moderately echoic circumscribed wall thickening with irregular contours and interrupted wall layering and a scirrhous carcinoma may be visualized as an extensive predominantly hypoechoic mural infiltration, partly uniform partly irregular or polypoid thickening of the wall; a lack of distensibility of the stomach wall with narrowing of the lumen or stenosis.

The stomach is the most frequent site of gastrointestinal tract involvement by non-Hodgkin lymphoma^[8].

In a series by Kessar et al^[9] of 40 patients with gastric MALT lymphoma, the most frequent finding was gastric wall thickening. Associated adenopathy or extragastric distention is uncommon^[10].

Malignant Gastrointestinal stromal tumors (GISTs) are uncommon neoplasms that arise from mesenchymal cells in the wall of the GI tract^[11].

In a study, Magibow and Balthazar found CT is most useful to detect extent of mass and invasion of adjacent structures^[12].

Material and Method

The study was carried out in the Department of Radiodiagnosis, VSS Institute of Medical Sciences and Research, Burla over a duration of 2 years from December 2015 to November 2017. It was a hospital based observational, descriptive and cross sectional study. The study included total 60 patients with suspected or diagnosed cases of upper GI malignancy belonging to different age groups referred from different departments. All patients were subjected to conventional abdominal sonography followed by high resolution sonography of the fluid filled stomach and CT scan (both NCCT and CECT). UGI endoscopy reports were obtained. Any abnormalities detected were noted and biopsy was taken from pathological and suspicious sites. Routine investigations were done in all cases. All patients were followed up for their Histopathologic reports. The main objective of USG and CT examination in the present study was: to evaluate the imaging findings in upper GI malignancy and to validate the findings with endoscopic and histopathological diagnosis.

Observation and Discussion

A total of 60 patients with diagnosed or suspected cases of upper GI malignancy were included in the study.

Patients were of age group ranged from 25 to 80 years (average 57.7 years) with the majority of patients in the age group 51-70 yrs. Out of 60 patients 39 were males (65%) and 21 females (35%). Patients with esophageal malignancy presented at a younger age (average 47.6 years) than gastric malignancy (average 59.8 years).

Dysphagia was the most common symptom in patients with esophageal malignancy followed by weight loss. Only two cases were presented with chief complain of vomiting along with dysphagia while one case of esophageal malignancy with involvement of cervical esophagus presented with neck swelling due to enlarged cervical lymphadenopathy (Table 1)

Table 1: Clinical Symptoms in Esophageal Malignancy

Sr No	Symptoms of presentation	No of cases	Percentage of cases
1	Dysphagia	10	100
2	Weight loss	07	70
3	Chest pain	03	30
4	Vomiting	02	20
5	Neck swelling	01	10

The mid and lower esophagus were most commonly involved. The CT features of esophageal malignancy were (Table 2):

1. An intraluminal mass.
2. Esophageal wall thickening or a soft tissue mass with mild to moderate enhancement on contrast study.
3. An irregular or eccentric esophageal lumen
4. Proximal dilatation with or without a fluid level.
5. Peri-esophageal fat stranding or infiltration.
6. Regional or distal lymphadenopathy. Nodal size more than 10mm were regarded as malignant nodes.
7. Distant metastasis most commonly to liver.

Table -2 CT Features of Esophageal Malignancy

Sr No	CT finding	No of cases	Percentage
1	Eccentric Wall thickening	07	70
2	Concentric wall thickening	03	30
3	Luminal/polypoid mass	07	70
4	Proximal dilatation	07	70
5	Exophytic growth	00	00
6	Mediastinal involvement	02	20
7	Regional lymph node	03	30
8	Distant Metastasis	02	20

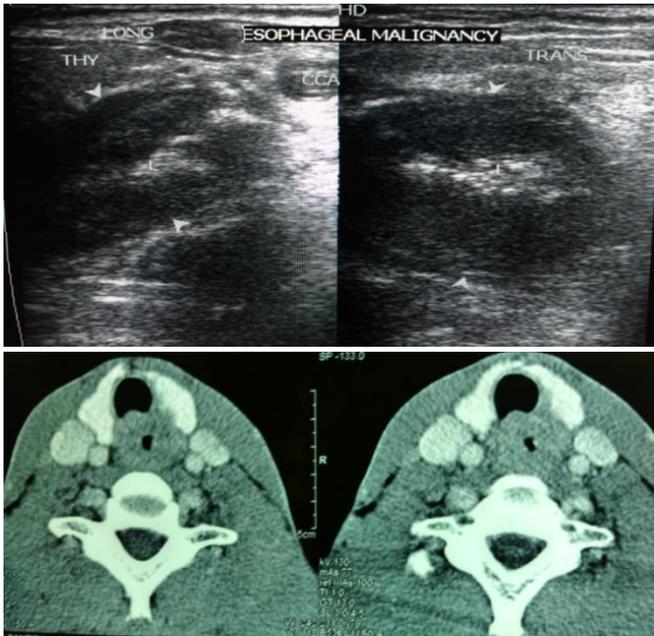


Fig 1- USG and CECT showing a case of upper third Esophageal Carcinoma

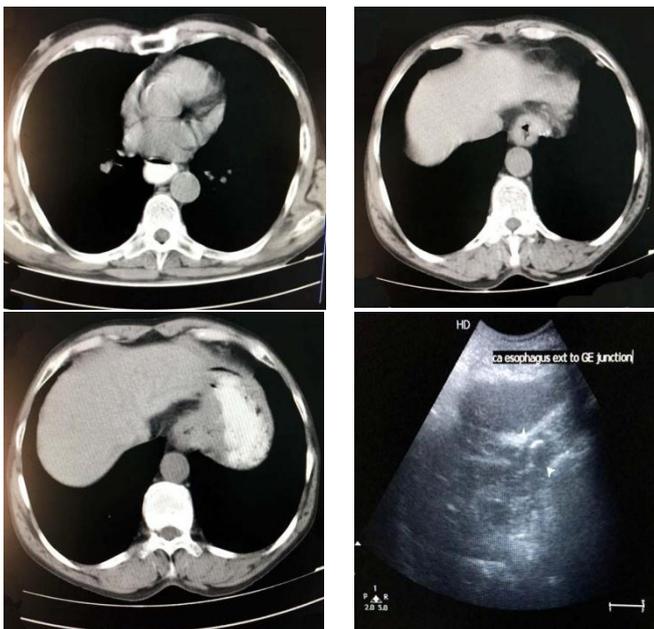


Fig 2 USG and CECT show a case of Lower esophageal carcinoma extending to gastroesophageal junction and lesser curvature of stomach. Weight loss was the most common symptom of presentation (86%) in gastric malignancy followed by abdominal pain (54%). Only 6 patients (12%) presented with palpable abdominal mass which includes two cases of malignant GIST and one case of lymphoma. 14 cases (28%) were presented with vomiting due to gastric outlet obstruction (Table 3).

Table 3 Clinical symptoms in gastric malignancy (Total no of cases 50)

Sr No	Symptoms of presentation	No of cases	Percentage of cases
1	Vomiting	14	28
2	Weight loss	43	86
3	Abdominal pain	27	54
4	Abdominal mass	06	12
5	Dyspepsia	12	24

Antrum (82%) was the most common site of involvement in gastric malignancy with contiguous spread to body and pyloric canal. In 7 cases (16.7%) which include a case of lymphoma and two cases of linitis plastica, there was diffuse involvement of body. In our study endoscopy was beneficial for diagnosis of gastric malignancy in 46 patients (92%) out of 50. In 4 cases the endoscopy reports were normal. These include one patient with linitis plastica, one patient with lymphoma (There was diffuse thickening of wall with intact mucosa in both the cases) and two cases of GIST (exophytic growth). Hence Scirrhus carcinoma (Linitis plastica) is better diagnosed by imaging and may be missed on endoscopy. On the other hand USG and CECT were able to diagnose 44 and 46 cases of gastric malignancy respectively (88% and 92%). The undiagnosed cases in imaging show malignant ulcers in endoscopy involving the mucosa and submucosa(early gastric carcinoma). Hence neither USG nor CT can be used to diagnose early gastric carcinoma effectively.

On USG all patients with gastric carcinoma showed a complete loss of wall stratification. The wall echotexture was hypoechoic with heterogeneous areas in the majority of cases. Luminal narrowing was observed in 41 cases(82%). There was no luminal narrowing in lymphoma (Diffuse hypoechoic wall thickening without luminal narrowing) and GIST (Exophytic mass). There was increase in wall thickness in all cases ranging from 10 mm to 26 mm with an average wall thickness of 16.4 mm. Heterogeneous intraluminal masses were seen in 19 cases and two cases of GIST show exophytic growth from the wall.

CT features of gastric malignancy were [99]

1. Focal or diffuse wall thickening with or without ulceration and wall enhancement.
2. Eccentric or circumferential gastric wall thickening with or without Gastric Outlet Obstruction.
3. Intraluminal polypoid mass or exophytic mass with mild to moderate enhancement.
4. Contiguous spread to adjacent structures.
5. Regional lymph node involvement.
6. Distant metastasis.

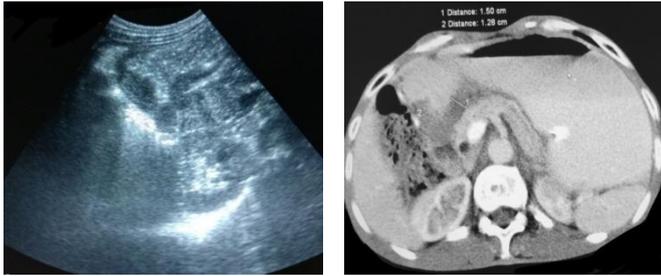


Fig 3 – USG and CECT show A case of gastric carcinoma involving antropyloric region.

CECT is more effective than USG for detection of Regional lymph node involvement and extra-gastric spread while USG and CECT are equally effective in detection of liver metastasis (Table 5)

Table -4 : CT Features Of Gastric Malignancy

Sr No	CT finding	No of cases	Percentage
1	Focal wall thickening	39	78
2	Diffuse wall thickening	07	14
3	Polypoid mass	20	40
4	Exophytic mass	02	04
5	Contiguous spread	09	18

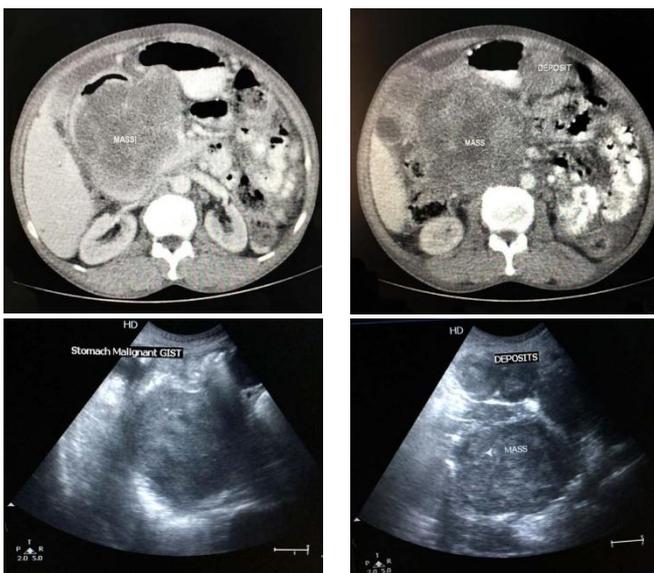


Fig 4 – CECT and USG show a case of malignant stomach GIST with peritoneal deposits.



Fig 5 – USG and CECT show a case of gastric lymphoma

Table-5 Nodal Involvement and Distant Metastasis

	USG		CT	
	No of cases	percentage	No of cases	Percentage
Nodal involvement	33	66	37	74
Distant metastasis	5	10	5	10

Conclusion

In our study, we found CECT with oral and IV contrast is highly effective for detection of primary lesion in upper GI malignancy, regional and distal lymphatic spread and distant metastasis. High resolution Transabdominal USG with water filled stomach is also effective for evaluation of gastric malignancy. USG with linear high frequency probe can also evaluate cervical esophagus and GE junction involvement in esophageal malignancy.

CECT is more efficient for detection of lymph node spread than USG where as both modalities are equally effective for detection of distant abdominal organ metastasis.

The imaging modalities are more effective to detect exophytic growth such as GIST and malignancy with diffuse involvement of stomach such as Linitis Plastica and Lymphoma which can be often missed in upper GI endoscopy.

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