

Original Article**Ultrasonographic Finding of Gastric Carcinoma Patients in a Teaching Hospital of Bangladesh**AKM Golam KABIR¹, Mst. Nazmun NAHAR², Sheikh Mohammad NOOR-E-ALAM³,
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Abstract

Background: Ultrasonographic findings of gastric carcinoma are varied in different population in different region. **Objectives:** The purpose of the present study was to see the different ultrasonographic findings of stomach cancer patients attended at a tertiary care hospital in Dhaka city. **Methodology:** This cross-sectional study was carried in the department of Radiology and Imaging of Dhaka Medical College, Dhaka during July 2009 to June 2011 for a period of 2(two) years. Clinically suspected gastric carcinoma patients were evaluated by ultrasonography of upper abdomen and or Barium-meal x-ray evaluation. The sonographic findings were noted. Biopsy was performed by endoscopy or by surgical resection to confirm the case. **Result:** A total number of 60 gastric carcinoma patients were recruited. In all 24 patients of gastric carcinoma (100%) wall layering was completely lost. Wall thickness was increased in all the 24 cases (100%). Patients with gastric carcinoma had a wall thickness ranging from 10mm to 38mm with an average wall thickness of 24.5 mm. There was luminal narrowing and reduced peristalsis seen in all the 24 cases. Heterogeneous intraluminal masses were seen in 20 out of 24 (83.33%) cases of gastric carcinoma. Serosal involvement was seen in 17 out of 23 (70.83%) cases. **Conclusion:** Ultrasonography of gastric carcinoma shows completely lost of wall layering of stomach with increased thickness of it. [*Journal of Current and Advance Medical Research 2016;3(2):51-55*]

Keywords: Gastric carcinoma; ultrasonography; metastasis**Correspondence:** Dr. AKM GolamKabir, Assistant Professor, Department of Neuroradiology & Imaging, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; Email: polin_bd@yahoo.com ; Cell no.: +8801715084328**Funding agency:** None**Conflict of Interest:** There was no conflict of interest to any of the authors.**Cite this article as:** Kabir AKMG, Nahar MN, Noor-E-Alam SM, Kabiruzzaman M, Hossain A, Ara S. Ultrasonographic Finding of Gastric Carcinoma Patients in a Teaching Hospital of Bangladesh. J Curr Adv Med Res 2016;3(2):51-55**Contributions to authors:** AKMGK, MNN, SMNA & MK have contributed in protocol preparation up to surgical procedures as well as the report writing; furthermore, AH & SA have written the manuscript and have revised the manuscript.**Introduction**

Numerous imaging modalities have been used to diagnose gastric carcinoma. Computed tomography,

magnetic resonance imaging, and positron emission tomography have all been used with varying degrees of success¹. But these modalities are expensive and not widely available. Routine X-ray

chest, contrast examination ultrasonography, endoscopy, CT scan, MRI and bone scan are also used to see the distant metastasis².

CT and MRI are highly sensitive and accurate modality for diagnosis of gastric carcinoma as well as staging but CT have high radiation dose with introduction of invasive contrast agent which may be harmful for the patient and MRI is expensive and not available modality in country like Bangladesh. Transabdominal ultrasonography (US) is applied widely in clinical practice. When condition of patients is suitable, transabdominal US can detect lymph nodes with a diameter of 5 mm, and the normal wall of fluid-filled stomach after the patients drank water can be described as a 5-layer structure which contributes to the assessment of the depth of tumor infiltration³.

Ultrasonography is one of the modern diagnostic tool in this country which are now widely used and a cheap, available imaging modality. Currently transabdominal ultrasound performed after ingestion of water and injection of a hypotonic agent along with the use of multi-frequency transducers provides detailed and unique evaluation of the stomach⁴. As ultrasound is often used as the first imaging modality in a large variety of abdominal complaints clinically unsuspected gastric carcinoma may be imaged first by it⁵.

Therefore, transabdominal hydrosonography ranks with the initial methods used for diagnosing gastric carcinoma. Some investigators, however, recommended further studies for verification of its usefulness in the assessment of gastric carcinoma⁶. The purpose of the present study was to see the different ultrasonographic findings of stomach cancer patients attended at a tertiary care hospital in Dhaka city.

Methodology

This cross-sectional study was carried in the department of Radiology and Imaging of Dhaka Medical College, Dhaka. About 76 patients was referred to Radiology and Imaging Department by indoor and outdoor Surgery department of Dhaka Medical College Hospital, Dhaka as a clinically suspected gastric carcinoma for ultrasonography of upper abdomen and or Ba-meal x-ray evaluation, during the period of July 2009 to June 2011. Detailed clinical history and relevant points in clinical examination and investigations were noted. The patients were then subjected to dotransabdominal hydrosonography of the stomach

at the department of Radiology and Imaging, Dhaka Medical College Hospital, Dhaka. The sonographic findings were noted. The extent of tumour infiltration and metastasis was assessed in all patients with suspected gastric malignancy. Ultrasound examinations were performed using real time image units (Toshiba400, Siemens-G20, Logic-A 200) and transducer frequency varied between 3.5-7.5 MHz as required for proper visualization. Patients were taken up for examination in empty stomach after overnight fasting and in cases of gastric outlet obstruction, after Ryle's tube aspiration. 20mg Hyoscine N butyl bromide (Butapan) was injected intravenously to achieve optimal distension and to suppress gastric peristalsis. Patients were examined usually in the supine position. For optimum visualization of lesions at different locations sitting position and left or right lateral decubitus position were also chosen if required. The aim of the procedure was to remove air from the segment of the stomach under investigation by appropriate positioning. Scanning was done in longitudinal, transverse and left subcostal oblique planes. The appearance of each disorder on US scans was analyzed in terms of wall thickness, wall stratification, the most thickened layer and the echogenicity of the most thickened layer. Wall thickness was measured by means of the internal software-driven caliper on the transverse view of the most thickened lesion. Diagnosis of gastric carcinoma was based on localized or circumscribed wall thickening more than 5 mm, in the distal antrum more than 8 mm, hypoechoic wall echotexture, loss of normal wall stratification, luminal narrowing, absent or reduced peristalsis, heterogeneous intraluminal mass or polypoidal projection, breached serosa with exogastric extension and multiple responses⁷. Transabdominal ultrasound was considered positive only if firstly, the above features were visualized unequivocally; secondly, its dimensions could be measured; and thirdly, photographic documentation could be recorded.

Results

This cross-sectional study was done on 60 purposively selected patients whose age ranged from 31 to 80 years. All patients who attended in the Department of Radiology and Imaging, Dhaka Medical College, Dhaka, Bangladesh having clinically suspected gastric carcinoma during the period from July 2009 to June 2011 were enrolled. Hydrosonography of stomach was done and compared with that of histopathological findings after endoscopy or surgical excision.

Table 1: Age distribution of study population (n=60)

Age Group	Gastric Carcinoma		Total
	Present	Absent	
31 to 40	1(3.7%)	1(3.0%)	2(3.3%)
41 to 50	4(14.8%)	2(6.1%)	6(10.0%)
51 to 60	9(33.3%)	13(39.4%)	22(36.7%)
61 to 70	10(37.1%)	15(45.4%)	25(41.7%)
71 to 80	3(11.1)	2(6.1%)	5(8.3%)
Total	27(100.0%)	33(100.0%)	60(100.0%)

Among 60 patients included in this study the age ranged between 31-80 years. Among the 27 patients confirmed as gastric carcinoma by histopathological examination, the age ranged between 31-80 years with the highest number of patients in the age group 61-70 years (Table 1).

Table 2: Ultrasonographic findings of gastric carcinoma (n=24).

Characteristics	Frequency	Percentage
Wall layering:		
Preserved	0	0.0
Partially lost	0	0.0
Completely lost	24	100.0
Wall thickness:		
Normal	0	0
Increased	24	100
Wall echotexture:		
Normal	0	0.0
Hypoechoic	24	100.0
Hyperechoic	0	0.0
Lumen:		
Normal	0	0.0
Narrow	24	100.0
Peristalsis:		
Normal	0	0.0
Reduced/Absent	24	100.0
Intraluminal mass:		
Present	20	83.3
Absent	04	16.7
Serosa:		
Intact	07	29.2
Breached	17	70.8

In all 24 patients of gastric carcinoma (100%) wall layering was completely lost. Wall thickness was increased in all the 24 cases (100%). Patients with gastric carcinoma had a wall thickness ranging from 10mm to 38mm with an average wall thickness of 24.5 mm. There was luminal narrowing and

reduced peristalsis seen in all the 24 cases. Heterogeneous intraluminal masses were seen in 20 out of 24 (83.33%) cases of gastric carcinoma. Serosal involvement was seen in 17 out of 23 (70.83%) cases (Table 2).

Discussion

In this cross sectional study the age incidence high in between 61 to 70 years range and is about 41.67% which is corresponds to most of the previous study⁸⁻⁹. However in a study age distribution is differ and showed that 50-60 years range incidence is higher¹⁰. As in this country, patients are from low socioeconomic condition and come to hospital at end stage so the presentation is late. In this study male presentation is more than female because female are neglected and present lately or not at all, however the study mostly agreed with other study done in Asian population¹¹⁻¹².

All patients of gastric carcinoma diagnosed correctly by ultrasound showed complete loss of wall stratification and hypoechoic wall echotexture. Luminal narrowing and reduced peristalsis was also observed in all the 23(100%) cases. There was increase in wall thickness in all cases of gastric carcinoma ranging from 10 mm to 38 mm with an average wall thickness of 24.5 mm. Heterogeneous intraluminal masses were seen in 19 out of 23 cases (82.60%).

The findings of this study are in concordance with that of Yeh and Rabinowitz¹² who stated that ultrasonographic features of gastric tumours can be divided into three main categories like (a) thickened gastric wall due to infiltration by tumour, (b) a mass and (c) a combination of the two. The sonographic features seen were also in agreement with that of Worlieck et al¹¹ who 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 scirrhus 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. Complete disruption of wall layering and presence of heterogeneous intraluminal masses favoured the diagnosis of malignancy.

Transabdominalhydrosonography underestimated the intraluminal extent in 2 cases. On sonography, the involvement of the lower dorsal oesophagus

was not identified in one case owing to the inability to visualize it on sonography while in the other the involvement of the fundus was not identified. This was related to the poor visualization of the fundus in this case; the fundus being a difficult area to evaluate on sonography because of overlying ribs.

In two cases of gastric carcinoma diffuse circumferential wall thickening was seen on sonography. Endoscopy interpreted one case as normal. Owing to the diffuse wall thickening seen on sonography a repeat endoscopy was undertaken. A repeat endoscopic biopsy revealed it to be a case of scirrhus carcinoma. This may be attributed to the well-known difficulty of endoscopy in diagnosing these tumours as the overlying mucosa appears normal, its diagnostic yield is higher in exophytic lesions than in infiltrative lesions. Another case of diffuse circumferential wall thickening was diagnosed as gastric lymphoma¹¹.

Trans-abdominal-hydrosonography failed to detect involvement of duodenum seen at operation in two patients. Correct diagnosis was made by trans-abdominal-hydrosonography preoperatively in 2 of 4 patients with duodenum invasion. It was necessary to fill duodenum by drinking water for the assessment of duodenum. Because tumour caused gastric lumen obstruction, duodenum was not filled adequately and not visualized clearly, leading to misdiagnosis of duodenum invasion. During surgery transverse colon was found to be invaded in three patients. Of them, correct diagnosis was made by trans-abdominal-hydrosonography only in 1 patient where complete circumference of transverse colon was markedly invaded. In two others undetected by trans-abdominal-hydrosonography, transverse colon was slightly invaded and bowel gases interfered severely.

Thus, though sonography misdiagnosed or under diagnosed the presence and exogastric extent of gastric carcinoma in a few cases, it did provide accurate diagnosis and a rough estimate of its extent in the majority of the cases. The possible reasons for misdiagnosis or under diagnosis were as follows like (1) the procedure did not practice adequately, because the investigator had limited experience of this procedure; the transducers that were available and used in this study had frequencies up to 7.5MHz. So resolution more than this limit was not technically possible; location of gastric carcinoma also affected the diagnosis. Trans-abdominal-hydrosonography may fail to guarantee a correct diagnosis for carcinoma locating in gastric fundus or cardia. Four cases of gastric carcinoma not diagnosed by trans-abdominal-hydrosonography in

this study were located in the above locations. (4) Location of the involved organs and size of the metastases also affects the diagnosis of exogastric extension. For example, It is difficult to clearly visualize the hilum of the spleen and the tail of the pancreas by trans-abdominal-hydrosonography. Invasions of the tail of pancreas (1 patient) and hilum of the spleen (1 patient) were not detected with trans-abdominal-hydrosonography in this study. Very small metastases were also undetected by trans-abdominal-hydrosonography. Moreover, this study involved only a limited number of patients. A larger study population could have given more precise results regarding diagnostic validity of this method.

Conclusion

In conclusion ultrasonography among the patients of gastric carcinoma shows completely lost of wall layering of stomach and wall thickness is increased in all cases. Furthermore, there is a luminal narrowing and has reduced peristalsis seen in all cases. Heterogeneous intraluminal masses are seen majority cases.

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