



Gall bladder Carcinoma: A Review of Common Ultrasound Findings in a High Incidence Region

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Abstract

Gall bladder carcinoma (GBC) is a debilitating and one of the commonest malignancies especially twice more common among women in the GBC belt of north India. Due to its late inconspicuous presentation and advanced stage at initial diagnosis it has one of the poorest prognoses among the malignancies and has a mean survival of 6 months. An early diagnosis is rare and ultrasound diagnosis is difficult and at times unreliable due to subjective discrepancies. Studies have identified striking geographic differences where inordinately high occurrence in north Indians living in the Gangetic belt yet low elsewhere especially in the south and western India. Incidence of GBC in women in northern India is as high as 9 per 1,00,000 per year as compared to 1 per 1,00,000 per year in southern India. Female sex, oily fried foods, long intervals between meals, congenital biliary tract anomalies and a genetic predisposition represent important risk factors. GBC are most commonly associated with cholelithiasis and chronic inflammation from biliary tract and parasitic infections Environmental triggers. Mortality rate is very high with 5 year survival rate at 5%. Recent advances in operative treatment shows promising results, making it even more essential to detect a GBC early on in the spectrum of the disease. : Due to late presentation the commonest finding was an infiltrating mass which carried a bad prognosis requiring some form of screening mechanism for early detection of GBC.

Keywords: gall bladder carcinoma, geographic difference, cholelithiasis, incidence, ultrasound.

Introduction

The commonest biliary tract malignancy in the world¹ is GBC which surprisingly shows drastic geographic variation within India, where it was once thought to be rare². This idea was supported by the very low AAR (Age Adjusted Rate) of 1.01 for males and 2.3 for females for 1,00,000 population³. But in reality

the incidence in women in Delhi and Bhopal is as high as 6.6 and 5.2 respectively, much higher than 0.6 in Chennai, and 0.8 in Bangalore in the south. In Delhi, GBC (incidence rate 6.6) was the fourth most common cancer (following cervix, breast, and ovary; incidence rates being 30.1, 28.3, and 8.7, resp.) and the most common gastrointestinal cancer in women

(commoner than oesophagus 4.6, stomach 2.4, and colon 2.0)². Based on the Adyar Cancer Registry report from Chennai, pooled information from 19 hospitals within the city (both public and corporate hospitals), the prevalence figure of GBC was 0.52 % amongst men and 0.66 % amongst women. Majority of patients were in the 5th to 7th decade. Kamrup district in Assam has the highest AARs in both sexes (14/1,00,000 women; 7.4/1,00,000 men) and Aurangabad in Maharashtra has the least incidence (0.1/1,00,000 women; 0.3/1,00,000 among men)⁴. It was found that the incidence remains high even in immigrants who are from the GBC belt and a similar low incidence seen in immigrants from the southern states. Heavy metals mostly in water sources act as a nidus for gall stone formation especially in the ganga riverine system in the Indian state of Bihar nicknamed the death valley for its record high cases of GBC. In a collaborative study at the Mahaveer Cancer Sansthan in Patna, Bihar State, between 2001 and 2002, which included 2 17 174 cases with malignancy from 105 centres in India (1, 03,081 in 2001 and 1, 14,093 cases in 2002), cancer of the gall bladder accounted for 9.6 % of all cancers in females and was the third leading site of cancer

Common risk factors for GBC are gallstones and a history of chronic cholecystitis, repetitive infection salmonella typhi carrier state female sex, oily fried foods, long intervals between meals, congenital biliary tract anomalies and a genetic predisposition. Others risk factors include choledochal cysts, anomalous pancreaticobiliary duct junctions, and gallbladder polyps > 1 cm in size. Gallbladder carcinoma has a peak incidence in the sixth and seventh decades of life and is three to five times more predominant in females⁵.

The definitive cause is not deciphered but it is well known that gallstones are strongly associated with GBC. It is quite possible that given their similar profile, patients with GBC and those with gallstones share many of the risk factors. It should be remembered that India is a vast populous country with diverse cultures habits and food practices and the

immigrants retain the incidence rates similar to the native Indian rates⁶.

Gallbladder carcinoma may appear at any of the imaging techniques as a mass completely occupying or replacing the gallbladder lumen, focal or diffuse asymmetric gallbladder wall thickening, or an intraluminal polypoid lesion⁵.

The ease by which this tumor invades the liver and surrounding structures including the biliary tree contributes to its high mortality. The median survival is 6 months, indicating that the majority of patients present with advanced disease.

Despite the widespread use of modern imaging techniques, early diagnosis is rare because there are no specific signs and symptoms, and many gallbladder carcinomas are not diagnosed preoperatively.

Materials and method

50 cases were selected from a number of suspected GBC detected in ultrasound were followed up post op and confirmed with HPE and their initial ultrasound appearance was analysed and reviewed. The ultrasound showed gallbladder wall thickening (>4mm) in 8 cases, intraluminal mass in 4, scleroatrophic gallbladder in 2, and mass replacing the gallbladder in one.

The ultrasonographic findings were: a polypoid (fungating) mass protruding into the gallbladder lumen in 45%, abnormal thickening of the gallbladder wall in 18%, and a mass in the gallbladder invading adjacent organs in 18% of cases. Approximately 80% was diagnosed preoperatively by ultrasonography.



Intraluminal soft tissue mass with loss of adjacent fat plane

Results

Of the 50 cases included in the study, 35 were women and 15 were men. The mean age was 55 (ranging from 35–68). They presented with associated risk factors of: cholelithiasis in 13 cases, a smoking habit in 2 cases, and obesity in 3 cases.

In terms of clinical history, the most usual reason for consultation was abdominal pain that was present in 11 cases, although 2 patients had no discomfort. Clinical symptoms were: fever (4 cases), weight loss (4 cases), jaundice (3 cases) and abdominal swelling (one case). Ultrasound imaging supported the diagnosis of acute cholecystitis preoperatively in seven cases, 4 cases of suspected gallbladder cancer prior to surgery and another 4 were diagnosed with simple cases of cholelithiasis.

With regard to the histology, the most frequent tumour in our study was adenocarcinoma, recorded in 12 cases, one case of anaplastic carcinoma and another of a lymphoepithelioma-like carcinoma. In one case the pathological report only refers to gallbladder metastases.

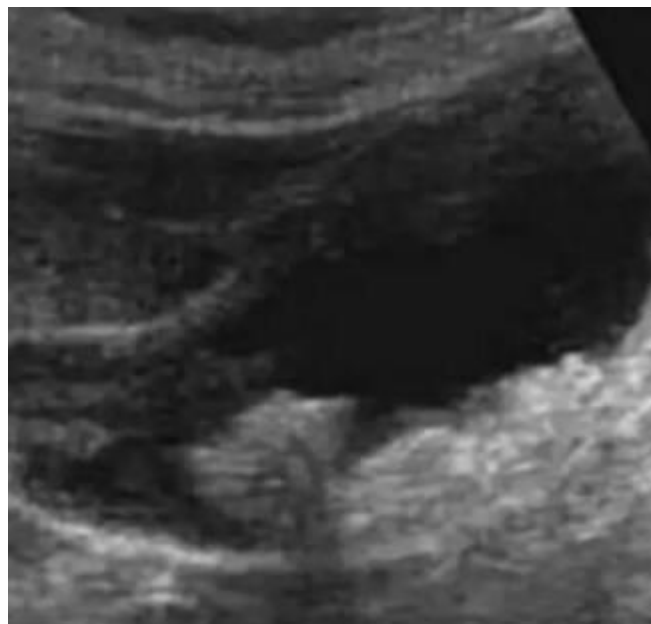
Discussion

Gallbladder adenocarcinomas present in one of three morphologies:

1. intraluminal mass
2. diffuse mural thickening
3. mass replacing the gallbladder
 - presumably the end result of progression from either 1 or 2

Literature reviews and various studies of patients with gallbladder cancer the majority of gallbladder carcinomas are diffusely infiltrating lesions, whereas the remaining gallbladder carcinomas exhibit intraluminal mass⁶. It is difficult to diagnose cases of early stage of GBC because the presentation of early GBC is wall thickening which is more commonly found in acute and chronic inflammatory conditions of the gallbladder. The vague nature of symptoms and the non specific nature of early findings causes patients to be diagnosed late when the lesion has infiltrated into the adjacent liver which is due to the anatomical characteristic of the GB wall having a

narrow lamina propria and only a single muscle layer⁵. If the lesion has infiltrated into the adjacent liver segments 4 and 5 it is still considered resectable with adequate segmentectomy of the involved liver or bowel.



Intraluminal mass closely associated with a calculus

The most common imaging finding in this study was an infiltrating mass seen replacing the normal gb in 28 cases, which were differentiated from other neoplastic process arising from elsewhere. The most common differential being The closest differential diagnosis of mass is replacing the GB would be happy to cellular carcinoma which is differentiated on triphasic CT whole abdomen by early filling in arterial phase and complete workout on delayed contrast films around 16 patients showed intraluminal mass which was seen within the GB which was the second most frequent pattern these patients are in distinct from other benign lesions such as cholesterol polyps or benign adenomas this pattern is associated with early stage of disease and warrants further invasive investigations thirdly around 6 patients showed indistinct irregular focal wall thickening this finding is subjective to observer variation and the quality of machine used with poor reproducibility most cases of malignant wall thickening or often missed an ultrasound



Echogenic calculus with strong posterior shadow

Conclusion

Due to its non-specificity and comparability to other benign diseases, gallbladder cancer is diagnosed at an advanced stage. Ultrasound diagnosis is limited; only localized and irregular wall thickening, together with gallbladder lithiasis appears to be significant in the early stages, whilst the image of mass occupying the gallbladder is associated with more advanced stages of the disease.

Since ultrasound scan is the initial diagnostic procedure and the most effective in assessing gallbladder disease, it is important to consider the findings from this scan as a guide towards a probable neoplastic disease of vesicular origin.

References

1. Lazcano-Ponce EC, Miquel JF, Muñoz N, et al. Epidemiology and molecular pathology of gallbladder cancer. *CA: Cancer J Clin* 2001. 2001;51(6):349–364.
2. A.D. Levy, L.A. Murakata, C.A. Rohrmann Jr. Gallbladder carcinoma: radiologic–pathologic correlation. *Radiographics*, 21 (2001), pp. 295–314
3. Abhishek Vijayakumar, Avinash Vijayakumar, Vijayraj Patil, M. N. Mallikarjuna, and B. S. Shivaswamy, “Early Diagnosis of Gallbladder Carcinoma: An Algorithm Approach,” *ISRN Radiology*, vol. 2013, Article ID 239424, 6 pages, 2013. doi:10.5402/2013/239424.

4. S.E. Jung, J.M. Lee, K. Lee, *et al.* Gallbladder wall thickening: MR imaging and pathologic correlation with emphasis on layered pattern
5. Fong Y, Kemeny N, Lawrence TS. Cancer of the Liver and Biliary tree. In: DeVita VT Jr, Hellman S, Rosenberg SA, editors. *Cancer : Principles and Practice of Oncology*. 6th ed. Philadelphia: Lippincott, Williams and Wilkins, 2002; 1187-202.
6. H.U. Sons, F. Borchard, B.S. Joel Carcinoma of the gallbladder: autopsy findings in 287 cases and review of the literature *J Surg Oncol*, 28 (1985), pp. 199–206
7. Grulich AE, McRedie M, Coates M. Cancer incidence in Asian migrants to New South Wales Australia. *Br J Cancer* 1995;71:400-408.
8. D. Grand, K.M. Horton, E.K. Fishman CT of the gallbladder: spectrum of disease *AJR*, 183 (2004), pp. 163–170
9. Chun KA, Ha HK, Yu ES, Shinn KS. Xantho-granulomatous cholecystitis : CT features with emphasis on differentiation from gallbladder carcinoma. *Radiology* 1997; 203 : 93-7.
10. Soo Jin Kim, Jeong Min Lee, Jae Young Lee, *et al.* Analysis of enhancement pattern of flat gallbladder wall thickening on MDCT to differentiate gallbladder cancer from cholecystitis
11. Haaga JR, Herbener EH. The gallbladder and biliary tract. In: Haaga JR, Lanzieri CF, Gilkeson RC, editors. *CT and MR Imaging of the whole body*. 4th ed. St Louis: Mosby, 2003; 1357-60.
12. E.J. Yun, S.G. Cho, S. Park, *et al.* Gallbladder carcinoma and chronic cholecystitis: differentiation with two-phase spiral CT *Abdominal Imaging*, 29 (2004), pp. 102–108
13. Yoshimitsu K, Honda H, Shinoraki K, Aibe H. Helical CT of the local spread of carcinoma of the gallbladder: evaluation according to the TNM system in patients who underwent surgical resection. *Amer J Roentgen* 2002; 179: 423-8

14. Kim BS, Ha HK, Lee IJ, Kim JH. Accuracy of CT in staging of Gallbladder carcinoma. Acta Radiol 2002; 43 : 25.
15. Kumaran V, Gulati S, Paul B, Pande K. The role of dual phase helical CT in assessing resectability of carcinoma of the gallbladder. Europ Radiol 2002; 12: 1993-9.
16. Kapoor VK, McMichael AJ. Gallbladder cancer: An 'Indian' disease. The Nat Med Jour India. 2003;16:209–213.
17. National Cancer Registry Program Report. http://www.icmr.nic.in/ncrp/PBCR_Report%202009_2011. Accessed on 22 April 2015.