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Imaging Evaluation of Biliary Neoplasms

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Abstract
Aims and Objectives: *To demonstrate the role of USG and triple phase CE-MDCT in accurate diagnosis, staging of biliary neoplasms and to study their epidemiology, risk factors and imaging findings.*
Materials and Methods: *It was a hospital based, observational, descriptive and cross sectional study with a sample size of 120 cases during the period of 2 yrs. in the department of radio diagnosis, VIMSAR. Patients referred to our department with symptoms and imaging findings s/o malignancy were included. Non-neoplastic pathologies were excluded from the study. The patients were subjected to USG with Doppler, MDCT and FNAC.*
Results: *Of the total 50 cases, the distribution was, Carcinoma gall bladder-35, Cholangiocarcinoma- 15.*
Conclusion: *The fact that most of the biliary neoplasms are malignant should be kept in mind. Carcinoma GB was the most common biliary tumor. Both USG and CECT are highly sensitive and specific and often complementary. Ultrasound with doppler should be the initial modality because of its real time high resolution images, cost effective nature. Regular ultrasound and CT screening programs in high risk patients like cholelithiasiscan help in early detection of malignant change.*
Keywords: *Biliary neoplasms, Ultrasound, Computed tomography.*

Introduction

Tumors of the liver and biliary tree, mainly hepatocellular carcinoma and cholangiocarc-inoma, are the second leading cause of cancer related death worldwide. Recent developments in biomarkers and imaging modalities have enhanced early detection and accurate diagnosis of these highly fatal malignancies. Notable differences exist between Asian and Western regions in guidelines on surveillance, diagnosis of hepatobiliary tumors, which reflect differences in the epidemiological and etiological factors underlying the large disease burden in Asia[1]. The most common adult malignant liver tumors are HCC, metastases to the liver, fibro lamellar HCC, epithelioidhemangioendothelioma (EHE), and angiosarcoma. Benign liver tumors include focal nodular hyperplasia, hepatic adenomas, and hemangiomas. Biliary tract malignancies include cholangiocarcinoma (CCA), both intra- and extrahepatic, gallbladder cancer and cancer of the ampulla of Vater. Benign biliary neoplasms include biliary cystadenoma, biliary hamartoma, and granular cell tumors. The epidemiology, risk

factors, imaging features and effectiveness of ultrasound and CT scan in the diagnosis of hepatobiliary benign and malignant masses will be discussed.

There are large number of cases being referred to the radiodiagnosis department with the complaints of abdominal pain, jaundice and mass per abdomen. Major problem is that detecting and characterization of focal liver masses in all standard non-invasive imaging modalities are less sensitive than generally perceived. These sensitivity problems are such that the focal hepatic lesions are frequently missed with one modality, then detected with another [2]. This justifies the use of ultrasound and CT scan as complementary investigations in our study.

Materials and Methods

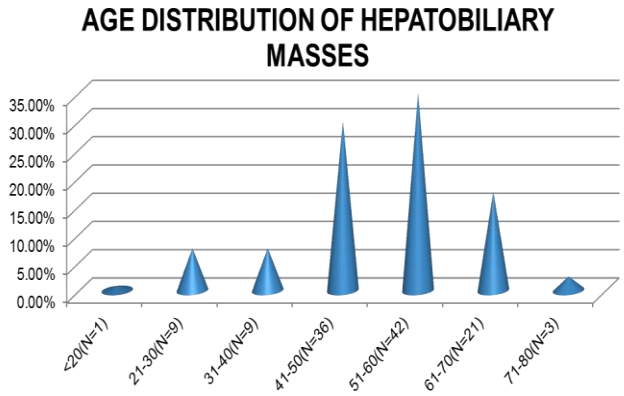
The study is a hospital based study conducted in VIMSAR, Burla, Dist- Sambalpur, Odisha, during the period of December 2015 to November 2017. It was an observational, descriptive and cross sectional study. The sample size is 120 cases with patients being referred to our department with abdominal pain, jaundice, mass per abdomen and abdominal distension and having imaging findings consistent with neoplasm and patients with a known history of a primary neoplasm to screen for metastatic deposits in liver. When in doubt the patients were subjected to FNAC and the imaging suspicion of neoplasm was cross verified.

Patients who were pregnant, allergic to contrast media, pathologies like simple hepatic cyst, diffuse fatty infiltration, infective pathologies like hepatic abscess, hydatid cyst were excluded from the study. Patients with end stage liver disease, coagulopathy, gross ascites in whom pathological intervention cannot be done. Patients with raised urea and creatinine in whom contrast administration is contraindicated

The patients were subjected to ultrasound with colour Doppler using Philips HD 7 colour Doppler, Computed tomography using Siemens Somatom Emotion scanner and ultrasound guided FNAC/Biopsy.

Results

Epidemiology



*Most of the hepatobiliary neoplasms presented between the age group of 41-60 years (65%).65% cases of HCC and carcinoma gall bladder were noted in the age group of 41-60 years.64% cases of cholangiocarcinoma were noted in the 51-60 age group.60% of hemangiomas were found in 31-40 year- younger age group

There was a slight female predominance (55.63%) overall in the distribution of hepatobiliary neoplasms. However individually there is male predominance in hepatocellular carcinoma and slightly in cholangiocarcinoma. Female predominance was noted in metastasis, carcinoma gall bladder and in benign neoplasms like hemangioma.

The most common symptom in hepatobiliary masses overall is abdominal pain (33.3%) followed by abdominal distension (27.5%) and jaundice (23.3%) and the least common symptom is fever (3.3%). Jaundice was the predominant symptom in cases of cholangiocarcinomas (98%). Most hemangiomas (95%) were asymptomatic except a giant hemangioma which presented with mass abdomen

Staging of Malignant HBN

The observation in our study was that most commonly the hepatobiliary neoplasms presented in stage IV (51.4%) f/b stage III (19.2%). Carcinoma gall bladder presented majority in stage III/IV (72.9%). Extrahepatic cholangiocarcinoma in our study presented early in stage I/II (92.85%) due to CBD obstruction.

Carcinoma Gall Bladder

Mass forming type (52%) was the most common imaging appearance of carcinoma gall bladder and polypoidal (19.5%) type was the least common. Most common location of gall bladder carcinoma was from the fundus (60.8%) and the least common was from the neck (13.0%). Most cases of carcinoma gall bladder took mild enhancement (82.6%) in CECT in arterial phase and delayed enhancement. Less percent of cases especially polypoidal type (17.3%) showed intense enhancement in the arterial phase. Calculus disease (65%) and female gender (60%) contributed to the major risk factors for carcinoma gall bladder .Ultrasound was better in delineating the presence of stone and polypoidal growths while CT scan was better in cases where the wall could not be assessed due to acoustic shadowing caused by calculus. CT scan was also better at delineating the mass forming type.

Figure showing ultrasound and CT scan images of carcinoma of gall bladder of mass forming type and exophytic invasion of duodenum.

Cholangiocarcinoma

Hilar and distal cholangiocarcinoma were the most common anatomical locations (35.7% each) of cholangiocarcinoma. The most common morphological pattern of cholangiocarcinoma is mass forming type (78.5%).

Discussion

May fill in (centripetally) with contrast material

Carcinoma Gall Bladder

In our study, Mass forming type (52%) was the most common imaging appearance and polypoidal (19.5%) type was the least common. Most common location of gall bladder carcinoma was from the fundus (60.89%) followed by body (27.3%) and the least common was from the neck (13%). Deshmukh et al [30] also found similar morphological type distribution as "Four patterns of gallbladder cancer have been described on CT scan: (a) a polypoid mass within the gallbladder lumen (15–25%), (b) focal wall thickening, (c) diffuse wall thickening (20% gallbladder cancers), and (d) a mass replacing the gallbladder (40–65%)."Lim KS et al [31] found that Gallbladder cancer may arise in the gallbladder's fundus (60%), body (30%), or neck (10%). Polypoidal type was better assessed by ultrasound whereas the wall thickening type with calculus and acoustic shadowing was better assessed by CT scan where it was difficult to assess with ultrasound. CT scan was also better at delineating the mass forming type. Similar findings were noted by Baron R L et al[32]

Most cases of carcinoma gall bladder took mild enhancement in CECT in arterial phase and delayed enhancement (82.6%). Less percent of cases especially polypoidal type showed intense enhancement in the arterial phase (17.3%)

Yun E J et al[33] noted that Gall bladder carcinoma are usually hypodense on unenhanced CT with up to 40% showing hypervascular foci of enhancement equal or greater than that of the adjacent hepatic parenchyma. Contrast enhancement may be retained in fibrous stromal components of gallbladder carcinoma during the portal venous and delayed phases. Tiffany et al noted that appearances on CECT can include a low-attenuation mass, enhancing mass with ill-

defined borders, eccentric gallbladder wall thickening or a fungating mass. Calculus 65%, female gender 60.8%, chronic cholecystitis 32.6% were the major risk factors in our study. Pandey M et al [34] also noted similar risk factors for the occurrence of carcinoma gall bladder. Liver infiltration-52.1%,metastatic lymphadenopathy-28.2%, liver metastasis-23.9%,dilated IHBR-10.8%,ascites 6.5% were the major associated features in our study.. Liver infiltration was the most common finding and ascites was the least common. Prevalence of similar findings in varying percentage was noted such as cystic nodes (62.5%),liver metastasis(55%), extension to CBD (45%) and ascites (32.5%),liver infiltration (30%) in another study by Abdul Qayyum[35] in a high incidence belt in Karachi, Pakistan. Levy AD et al[36] also noted that "Adjacent organ invasion, primarily involving the liver and biliary obstruction is often present at diagnosis. Periportal and peripancreatic lymph nodes, hematogenous and peritoneal metastases may also be seen"

Conclusion

The fact that most of the neoplasms in hepatobiliary system is malignant should be kept in mind while investigating the patients. Ultrasound should be the initial modality in investigating hepatobiliary neoplams due to its high sensitivity, cost effective and non-invasive nature. Ultrasound is superior to CT in cases of stricture forming cholangiocarcinoma, noting the presence of polypoidal type carcinoma GB and in detecting the presence of stone disease. CECT scan is superior in detecting metastasis that otherwise missed in ultrasound and in noting the presence of lymphadenopathy, extent of the tumor and for staging. It is also superior to ultrasound in assessing the vascularity pattern of HCC which could be a powerful tool for non-invasive diagnosis.

Overall both ultrasound and CT scan are highly sensitive and specific investigations in the investigation of hepatobiliary neoplasms with their own advantages and disadvantages. Ultrasound is non-invasive, real time investigation that could act as a powerful screening modality and also aids in procedures like FNAC. CT scan often adds information that is complementary to ultrasound and helps in preoperative staging. Therefore it is justified to use both of these investigations together for accurate diagnosis.

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