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Original Research Paper

Radio-Diagnosis

ROLE OF MRI IN BILIARY CANCERS AND ITS CORRELATION WITH HISTOPATHOLOGY

Dr. Rahul Yadav* Junior Resident; Department of Radio-diagnosis SRMS IMS Bareilly. *Corresponding Author

Dr. Neeraj Prajapati Professor; Department of Radio-diagnosis SRMS IMS Bareilly.

ABSTRACT

INTRODUCTION- Biliary cancer refers to primary malignancies, of the intra- and extra-hepatic biliary ductal system giving rise to biliary tract carcinomas (BTC) and gall bladder. They show peaks in incidence in certain hotspots with relative rarity in western countries. MRI has more advantages in diagnosing hepatobiliary carcinoma. An optimum MRI exam provides accurate information regarding hepatobiliary system, tumor extent and local invasion.

AIMS AND OBJECTIVES: 1. To study the role of MRI in the diagnosis of various Biliary tumours.
2. To correlate the MRI findings with histopathological findings.

MATERIALS AND METHOD- The study was conducted in the Department of Radiodiagnosis, SRMSIMS hospital, Bareilly, Uttar Pradesh in 40 patients presenting with symptoms of right upper quadrant pain and mass on 3 Tesla MRI Skyrafit (SIEMENS).

RESULTS- In our study, females (70%) were affected more than males and most common affected age group was 61-70 years, most commonly patients present with pain. GB carcinoma most commonly presents as asymmetrical wall thickening. 34 patients show dilated IHBR's. MRI findings suggest malignant disease in 39 patients. Upon histopathology all the 40 patients show malignant disease. CCAs were the most common (45%) followed by adenocarcinoma.

CONCLUSION- MRI findings correlated well with cytological/ histopathological findings in the diagnosis of biliary masses. It can be concluded that MRI is useful imaging modality for diagnosing biliary masses and can be further substantiated by FNAC. Thus, help in early diagnosis of benign or malignant lesion and their prognosis & treatment.

KEYWORDS : MRI- Magnetic resonance imaging, CCAs- Cholangiocarcinomas, FNAC- Fine needle aspiration biopsy.

INTRODUCTION

Biliary cancer refers to primary malignancies, the intra- and extra-hepatic biliary ductal system giving rise to biliary tract carcinomas (BTC) and gall bladder. Biliary cancers show striking peaks in incidence in certain regional hotspots in contrast with relative rarity in western countries[1].

Biliary tract cancers are the second most common primary hepatobiliary malignancy after hepatocellular carcinoma. Malignancies may occur along any part of the biliary tract from the ampulla of Vater to the smallest intrahepatic ductules and the gallbladder[2]. Classically, the cancers of the biliary tract were separated into three categories: (i) cancer of the intrahepatic biliary tract, (ii) cancer of the gallbladder and extrahepatic bile ducts, and (iii) cancer of the ampulla of Vater[3]. The term cholangiocarcinoma was initially used to refer only to the primary tumors of the intrahepatic bile ducts and is now extended to include intrahepatic, perihilar, and distal extrahepatic tumors of the bile ducts[4].

Gallbladder cancer is defined as cancer arising from the gallbladder and the cystic duct. Ampullary cancers are rare and have better prognosis than cancers of the distal bile duct. Cancers arising from the distal common bile duct immediately adjacent to the ampulla of Vater tend to behave clinically similar to the cancers of the ampulla of Vater, head of pancreas and the duodenal bulb and therefore often considered under the broad category of periampullary carcinomas[5]. The entire biliary tree, including the gallbladder is lined with a simple columnar epithelium and malignant transformation of this epithelium gives rise to predominantly adenocarcinomas[2].

Magnetic resonance imaging, has more advantages than ultrasound, in diagnosing hepatobiliary carcinoma. An optimum MRI exam provides accurate information regarding hepatobiliary system, tumor extent and local invasion. With a combination of basic T1 and T2 weighted sequences, diffusion weighted imaging, (DWI), and hepatobiliary gadolinium contrast agents, that is gadobenatedimeglumine (Gd-BOPTA) and gadoxetic acid (Gd-EOB), most lesions can be adequately diagnosed[6].

AIMS AND OBJECTIVES

1. To study the role of MRI in the diagnosis of various Biliary tumours.
2. To correlate the MRI findings with histopathological findings.

MATERIAL AND METHODS-

The study population was drawn from patient who was referred to department of Radio diagnosis in collaboration with all departments at SRMSIMS hospital, Bareilly who was present with complaints of right upper quadrant pain or mass.

Inclusion Crietria-

All the patients with the complaints of right upper quadrant pain or mass.

Exclusion Criteria-

All the patients with non-fasting status and the cases which contains artifacts during the MRI scan acquisition.

Examination Technique-

This study was done on Siemens 3 Tesla MRI Skyrafit in the department of Radiodiagnosis, SRMSIMS.

A complete history of the patient was taken.Patient is advised to have 6 hours fasting state for adequate distension of gallbladder. Following this, MRI was performed using phased array body coils with the patient in supine position. T1 and T2 weighted images were taken in coronal and axial planes. For T1, GRE images were taken. For T2, turbo spin echo sequences were used.MRCP was done using heavily weighted T2 weighted sequences. Intravenous contrast agents were used as per need. The imaging findings were recorded in performa of each patient. After this patient is asked to undergo Histopathological examination and the result was correlated with MRI findings.

RESULTS-

The present study was conducted in the Department of Radiodiagnosis, Shri Ram Murti Smarak Institute of Medical Sciences, Bareilly, Uttar Pradesh in 40 patients presenting with symptoms of right upper quadrant pain and mass.

Table 1: Age distribution

	Age distribution	Frequency
Age groups	31-40 years	03 (7.5%)
	41-50 years	10 (25%)
	51-60 years	08 (22.0%)
	61-70 years	15 (37.5%)
	71-80 years	04 (10.0%)

The study population consisted of 15 (37.5%) patients from 61 - 70 years followed by 10(25%) from 41-50 years followed by 8 (22.0%) from 51-60 years, followed by 4(10.0%) from 71-80 years.

Table 2: Sex distribution

Sex distribution	Frequency (Total 40 cases)
Male	12 (30%)
Female	28 (70%)

Out of 40 patients, 28 (70%) patients were reported as female and 12 (30%) as male.

Table 3: Clinical symptoms of Gall Bladder mass

Clinical symptoms	Frequency (Total 40 cases)
Pain	30 (75%)
Nausea & Vomiting	6 (15%)
Jaundice	13 (32.5%)
Weight loss	2 (5%)
Loss of Appetite	2 (5%)

Out of 40 cases, pain was reported by 30(75%) patients, nausea and vomiting by 6(15%), jaundice by 13 (32.5%), weight loss by 2(5%) and loss of appetite by 2 (5%) patients.

Table 4: MRI findings in patients-

MRI Findings		Total No. Of Cases=40
MRI Findings	Cholelithiasis	18(44.0%)
	Sludge	11(27.5%)
	Direct Invasion	20(51.7%)
	Indirect Invasion	10(25%)
	Mass Replacing GB Lumen	4(10.0%)
	Asymmetric Wall thickening	6(17.2%)
	Intra- Luminal Polypoid Mass	2(6.8%)
	Intrahepatic biliary dilatation	34(86.0%)

40 Patients undergo an MRI scan and shows, cholelithiasis in 18 (44%) patients, sludge 11 (27.5%), Direct invasion 20 (51.7%), Indirect Invasion 10(25%), Mass Replacing GB Lumen 8(20.6%) , Asymmetric Wall thickening 6(17.2%) , Intra-Luminal Polypoid 2(6.8%), double duct sign in 10(27.5%) and IHBRD in 34(86.0%) cases.

Table 5: – MRI findings in CBD

MRI features	Number	Percentage
Mass	20	50%
Calculi	5	12.5%
Dilated	30	75%
Normal	10	25%

Out of 40 patients 20(50%) cases shows mass in CBD, 30(75%) patients show dilated CBD while 5(12.5%) cases showed calculi while 10(25%) showed normal CBD.

Table 6- Conclusion based on MRI findings

Imaging on MRI	Number	Percentage
Malignant	39	97.5%
Inconclusive	1	2.5%

Out of 40 patients on MRI, 39 (97.5%) patients show are diagnosed having malignant disease and 1 (2.5%) patient shows inconclusive result.

Table 7- Conclusion based on Histopathology findings

Imaging on Histopathology	Number	Percentage
Malignancy	40	100%

Out of 40 patients on Histopathology all 40 (100%) are diagnosed having malignant disease.

Table 8 - Incidence of various biliary cancers (Histopathology)

Findings	Numbers	Percentage
Adenocarcinoma	12	30%
Cholangiocarcinoma	18	45%
Periampullary carcinoma	10	25%

Cases-

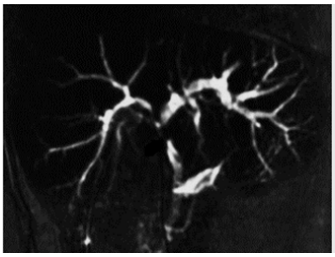

Figure-1 Magnetic resonance imaging demonstrating malignant hilar stricture.

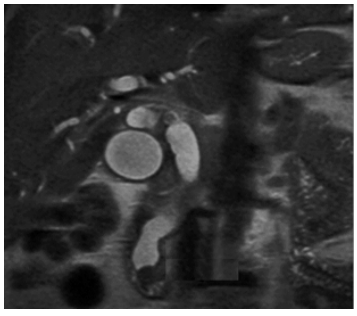

Figure-2 Coronal T2-weighted SSFSE images show a hypointense mass protruding into the duodenum

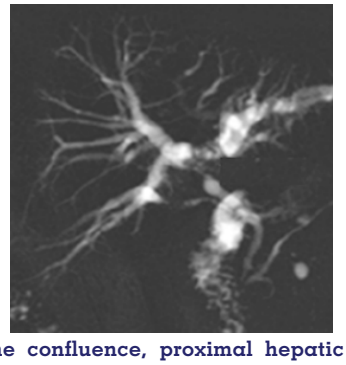

Figure-3 The confluence, proximal hepatic ducts and proximal common hepatic duct are strictured.

Figure-4 MR cholangiopancreatographic image shows abrupt cutoff with segmental narrowing of distal common bile duct and upstream bile duct dilatation

DISCUSSION

"Role of MRI in biliary masses and its correlation with histopathology" is a hospital based cross sectional study comprising 40 patients, conducted in department of Radiodiagnosis, SRMSIMS.

The mean age of incidence was 59yrs with an age range of 38-79yrs. In terms of sex distribution of gallbladder carcinoma, a female preponderance was observed in our study comprising of 28 patients (70%).

Loannis T. Konstantinidis et al, (2011)[7] in their retrospective review of data of patients with a biliary mass identified median age of 52 years (range=11–87 years) and 147 (69%) were females which was similar to our study.

Levy et al (2001)[8] studied the role of radiologic-pathologic correlation in Gallbladder carcinoma and also reported that it affects women more frequently than men and vague symptoms are more common. In ours study we found the most common complaint was pain in upper right quadrant constituting 80% cases, followed by nausea & vomiting in 12%, jaundice in 4%, weight loss and loss of appetite in 2%.

Mitchell C et al in 2014[9] concluded that the imaging findings of biliary cancers can be subtle, regardless of whether the tumor presents as a discrete mass, focal wall thickening, or circumferential diffuse wall thickening. In our study 4 patients presents with mass completely replacing the GB lumen and 2 patients shows a discrete polypoid mass, 6 with irregular wall thickening. By far, the most common appearance of gallbladder cancer in this series was focal wall thickening (in 6 of the 12 patients)

Hundal and Shaffer (2014)[10] relates to the gallbladder lacking a serosal layer adjacent to the liver, enabling hepatic invasion and metastatic progression. In our study, direct invasion of liver parenchyma was noted in 35 patients (70%) and indirect invasion (metastasis) in 15 patients (30%).

Hann LE et al in 2000[11] found that diagnostic imaging plays an essential role in management of hepato-biliary tumors. MRI provides lesion characterisation for differentiation into benign and malignant and its surgical planning.In present study MRI provided multiplanar imaging which was necessary for mass characterisation and surgical planning.

Kartrup S[12] et al found that the presence of IHBRD's with normal CBD should raise the suspicion of high bile duct carcinoma. If a tumor is suspected patient should be send for histopathological coorelation. In our study patients is send for histopathology if there is dilated IHBRD.

CONCLUSION-

MRI has widely become the imaging modality of choice for diagnosis and staging of biliary carcinoma with the similar accuracy of CECT combined with direct cholangiography. High soft-tissue contrast of MRI helps better detect and identify the infiltrating tumors; magnetic resonance cholang opancreaticography (MRCP), the most accurate noninvasive method for assessment of biliary system, allows evaluation of tumor spread in bile ducts both proximal and distal to level of obstruction; dynamic contrast-enhanced MRI and magnetic resonance angiography (MRA) provide crucial information pertaining to features of tumors, and presence of distant metastasis and/or vascular involvement. Clinical diagnosis based on examination/ blood investigations & radiological investigation MRI can help us to arrive at an accurate diagnosis most of the times. Image guided FNAC/FNB can confirm/dispute radiological diagnosis.

MRI findings correlated well with cytological/ histopathological findings in the diagnosis of biliary masses. It can be concluded that MRI is useful imaging modality for diagnosing biliary masses and can be further substantiated by FNAC /FNB. Thus help in early diagnosis of benign or malignant lesion and their prognosis & treatment. Cholangiocarcinoma was well detected on MRI. MRI findings shows very good coorelation with the histopathological findings.

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