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Research Article

THE MAGNETIC RESONANCE CHOLANGIO-PANCREATOGRAPHY (MRCP) APPEARANCE IN PANCREATICO-BILIARY DISEASES

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ABSTRACT

Currently the non-invasive diagnosis of bile duct obstruction mainly relies on US and CT. However the accuracy of these techniques is limited because of low sensitivity for the diagnosis of stones in Common Bile Duct (CBD) when compared with that of ERCP. A complete clinical history of patients was taken which included name, age, sex, occupation, presenting complaints. This was followed by general physical examination and detailed abdominal examination with examination of other significant systems. In the present study the cases of cholangiocarcinoma predominated and was seen in 16 patients (32 %) followed by pancreatitis in 12 (24 %) and choledocholithiasis in 6 (12 %).

Key words:- Pancreatico-biliary diseases, MRCP, Cholangiocarcinoma.

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INTRODUCTION

Evaluation of suspected biliary obstruction has traditionally involved a variety of imaging modalities including Ultrasonography (US), Computed Tomography (CT) and invasive cholangiography. These techniques have limitations because of poor visualization of intraductal stones on US and CT and the need for invasive procedures like Endoscopic Retrograde Cholangio-Pancreatography (ERCP) and Percutaneous Transhepatic Cholangiography (PTC). Magnetic Resonance Cholangio - Pancreatography (MRCP) is a non-invasive imaging modality that provides good visualization of the hepato- biliary system [1].

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Currently the non-invasive diagnosis of bile duct obstruction mainly relies on US and CT. However the accuracy of these techniques is limited because of low sensitivity for the diagnosis of stones in Common Bile Duct (CBD) when compared with that of ERCP [2].

However ERCP is a very operator dependent and invasive procedure and it is associated with 1-7% related morbidity and 0.2%-1% mortality [2]

Ultrasound is the initial screening tool that is used in evaluating patients presenting with pancreatico-biliary diseases and is mainly supplemented with CT.

Ultrasonography has limitations especially in the evaluation of the distal CBD where bowel gas, debris, fluid in the duodenum and obesity can degrade the image quality.

CT scan also has its share of limitations, especially in demonstrating two important pathologies, biliary stones and biliary strictures. CT has a sensitivity of only 90% for detecting biliary stones [3,4].

Stones which have high cholesterol content may be missed as their attenuation resembles fluid; as a result they are difficult to separate from bile. Mixed stones also may be difficult to detect on CT as they present as soft tissue density; this soft tissue density may merge with the pancreatic parenchyma thereby decreasing the sensitivity of CT. Biliary strictures are not directly visualized on CT. As CT is a cross sectional imaging modality, limited to axial plane, strictures are not demonstrated in a coronal or projectional plane. CT therefore detects strictures only by a process of exclusion, an abrupt cut off of dilated bile ducts without mass lesion. The length and extent of the stricture is difficult to determine on CT. It is very important from a management point of view to be able to visualize the length and extent of strictures. For these reasons cholangiographic modalities like Intravenous Cholangiography (IVC), PTC and ERCP are required. IVC has limitations, in 30-40% of cases there is incomplete opacification of the biliary system [5,6] PTC has the same diagnostic and therapeutic role as ERCP but is more invasive and risky. Incidence of sepsis is around 1-4% [7].

Neoplasms of the bile and pancreatic ducts present major challenge both for diagnosis and treatment. These tumors may arise primarily from the ducts or may involve the pancreatico-biliary tree secondarily by extension from metastatic tumors of the liver, gall bladder, pancreas or adjacent lymph nodes. Before definite therapy, knowledge of the level of obstruction and its cause is essential [8]

In view of limitation of US and CT and invasiveness of PTC, IVC and ERCP there is need for an imaging modality which is non invasive and provides high resolution projection images of the biliary and pancreatic duct.

MRI plays a vital role in diagnosing many conditions of the pancreatico- biliary tract. On MRI primary sclerosing cholangitis shows several characteristic features including bile duct abnormalities and increased enhancement of liver parenchyma. Wall thickening and enhancement of extrahepatic bile duct are also common MRI findings in patients with primary sclerosing cholangitis [9]. Acute pancreatitis can be distinguished from chronic pancreatitis; complications such as hemorrhage or pseudocyst formation are well examined with MRI. MRI is frequently able to distinguish focal enlargement due to chronic pancreatitis from that due to pancreatic carcinoma. MRI can depict the extent of gall bladder carcinomas and can contribute to the staging of this disease. It is a non-invasive, non-ionizing imaging modality and is unaffected by bowel gas shadow as in ultrasound.

With the development of higher magnetic field strength and newer pulse sequences, MRCP with its inherent high contrast resolution, rapidity, multiplanar capability and virtually artifact free display of anatomy and pathology in this region is proving to be examination of choice in patients with pancreatico- biliary diseases.

Since its introduction by Wallner et al in 1991 MRCP has undergone tremendous technical changes essentially in the search for an optional imaging sequence.

This imaging technique is able to create projectional type images similar in detail and appearance to direct cholangiography. It avoids the use of Intravenous (I.V) contrast and ionizing radiation and is relatively operator independent. Several recent studies have demonstrated that MRCP is able to accurately identify common bile duct stones with sensitivity of 81-100 %. Biliary strictures can also be visualized with sufficient anatomic detail to determine the level of obstruction and in some instances, differentiate benign from malignant causes. MRCP has potentially two major advantages in neoplastic pancreatico-biliary obstruction. Firstly, MRCP can directly reveal extraductal tumor whereas ERCP depicts only the duct lumen. Second, MRCP lacks the major complication rate of approximately 3% associated with ERCP such as sepsis, bleeding, bile leak and death.

METHODOLOGY

All patients referred for MRCP with clinically suspected pancreaticobiliary disease and comprised of total of fifty patients, which was calculated by taking in to account 80% of the average of similar cases in the previous 3 years hospitalized.

Patients having Cardiac pacemakers, prosthetic heart valves, cochlear implants or any metallic orthopedic implants were excluded

Once the patient agrees to participate in the study, information is obtained as per the proforma.

The MRCP is done; my guide will confirm findings and MRCP images will be stored in a Compact disk.

A complete clinical history of patients was taken which included name, age, sex, occupation, presenting complaints. This was followed by general physical examination and detailed abdominal examination with examination of other significant systems.

Data analysis was done using Rates, ratios and Percentages of different diagnosis and outcome made by MRCP will be computed and compiled.

RESULTS

A total of fifty patients who were clinically diagnosed as having pancreatico-biliary diseases were sent for MRCP and are included in the present study.

Table 1. Sexwise Distribution in the Pancreatico-Biliary Diseases

Sex	No. of cases	Percentage (%)
Males	33	66 %
Females	17	34 %
Total	**50**	**100 %**

In the present study there is male preponderance, male: female ratio being 1.9:1.

Table 2. Age wise Distribution in Pancreatico-Biliary Diseases

Age (Years)	No. of Patients	Percentage (%)
0 – 18	03	06
19-40	16	32
> 40	31	62
Total	**50**	**100 %**

In the present study the peak incidence of pancreatico-biliary diseases is seen in the age group of >40 years (62%) and least in age group of 0-18 Years i.e. (6%)

Table 3. Number of Patients Showing Various Diseases as Observed On MRCP

Type of disease	Cases	Percentage (%)
Cholangiocarcinoma	16	32
Pancreatitis	12	24
Periampullary carcinoma	05	10
Carcinoma pancreas	04	08
Carcinoma gall bladder	02	04
Choledocholithiasis	06	12
Post operative stricture	02	04
Choledochal cyst	02	04
Biliary atresia	01	02
Total	**50**	**100 %**

In the present study the cases of cholangiocarcinoma predominated and was seen in 16 patients (32 %) followed by pancreatitis in 12 (24 %) and choledocholithiasis in 6 (12 %).

DISCUSSION

Evaluation of suspected biliary obstruction has traditionally involved a variety of imaging modalities including ultrasonography (US), computed tomography (CT) and invasive cholangiography. These techniques have limitations because of poor visualization of intraductal stones on US and CT and the need for invasive procedures like ERCP and PTC. MRCP is a non-invasive imaging modality that provides good visualization of the hepato biliary system [10].

16 cases of cholangiocarcinoma were evaluated. In one case of cholangiocarcinoma diagnosed by MRI there was infiltration into the gallbladder and minimal local spread. Per operative findings were those of carcinoma of gallbladder. This is a known limiting factor on imaging when both, the gall bladder and bile duct are involved. MRI helped in defining the level, extent and staging of the disease in the pre surgical evaluation. Guibaud et al [11], Barish M A and Soto [12] and Pavone et al [13] who concluded their studies with sensitivities ranging from 80-86% and specificities of 96-98%and diagnostic accuracies of 91-100% for level of obstruction.In 5 cases of periampullary carcinoma, MRI was able to delineate the extent, level and local infiltration and helped in staging of the lesion. The assessment of the periampullary lesions was difficult on ultrasound in obese patients and bowel gas shadows was also a limiting factor. Sugita et al in his study of 25 cases of periampullary tumors reported a sensitivity88%, specificity 100% and diagnostic accuracy of 96% [14].

4 cases of carcinoma of pancreas were studied. 3 cases were involving the head and body region, 1 case involving the distal part of body and tail. MRI could clearly differentiate carcinoma pancreas from pancreatitis in all the cases except, in one case there was difficulty in differentiating neoplasm from chronic pancreatitis. Ultrasound is unable to detect the loco regional spread accurately. Eric Tam et al [15] who reported sensitivity of 80%and specificity of 95 % and that concluded by Enrique Lopez Haminem et. al. who in a study of 66 pts of suspected pancreatic cancers reported a diagnostic accuracy, sensitivity and specificity of 91%, 95%and 96% [16].

In our study of 2 cases of carcinoma of gall bladder, MRI can be used for investigative tool and the staging will be very accurate. MRI detected all 2 cases and detecting subtle lesions in liver and local spread and helped in pre-surgical staging.

Ultrasound can be used as a primary investigative tool and can not be used for staging purpose of carcinoma gall bladder. The diagnostic accuracy for staging was very low.

A total of 12 cases of pancreatitis were evaluated .5 cases were of acute and 7 were of chronic pancreatitis. MRI showed diffuse homogeneous enhancement of the entire gland in cases of acute pancreatitis in early stages where ultrasound features were normal. Main pancreatic duct was better seen on MRI in cases of chronic pancreatitis where surgical intervention was required. In one case differentiation between chronic pancreatitis and neoplastic change was difficult on MRI, a known limitation of MR imaging.

CONCLUSION

- MRI serves as an accurate and non invasive, non ionizing imaging method for evaluation of pancreatico-biliary anatomy and pathology.
- Ultrasound still remains the primary investigative modality of choice.
- Combination of MRI and MRCP allows safe surgical management decisions.
- Potentially useful in patients undergoing biliary enteric anastomosis for knowing the level and extent of strictures.

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