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Role of combined CT and MRCP in the Pre-Operative evaluation of Obstructive Biliopathy

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ABSTRACT. In this newer era of imaging where multiple imaging modalities ranging from simple radiograph to most advanced MRI are available, it is the role of radiologist to guide the clinician in selecting the right imaging modality and to answer the questions which are important in patient management. Although ultrasound remains a screening modality for diagnosis of biliary obstruction, it is unable to answer the true extent and cause of obstructive jaundice requiring the use of another imaging modality like CECT and MRCP which scores over ultrasound in the diagnostic accuracy.

I. INTRODUCTION

Obstructive jaundice is one of the most frequent and grave form of hepatobiliary disease. It can pose problems in diagnosis and management, particularly intrahepatic cholestasis. Despite the technical advances, the operative modes of management of obstructive jaundice were associated with very high morbidity and mortality.[1] Yet, during the last decade significant advances have been made in our understanding with regard to the pathogenesis, diagnosis, staging and the efficacy of management of obstructive jaundice.[2] The expanding spectrum of therapeutic options for the jaundiced patient has made it necessary for the radiologist to do more than simply discriminating between obstructive and non-obstructive jaundice. Correct choices among therapeutic options usually rest upon a precise assessment of etiology, location, level and extent of disease.[3]

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So, it is mandatory to determine pre-operatively the existence, the nature and site of obstruction because an ill chosen therapeutic approach can be dangerous.[4] US has been always considered the first choice technique in the study of biliary obstructive disease, due to itsaccessibility, speed, ease of performance and low cost.[5] Traditional Computed Tomography (CT) scan is usually considered more accurate than US for helping determine the specific cause and level of obstruction. Both ultrasound and CT scan are regarded as safe and non-invasive procedures in evaluating the status of the biliary tract.[6] Ultrasound is used as an initial modality to confirm or exclude duct obstruction, which it does with at least 90% accuracy. The range of application of CT has been partially restricted by MRCP. MRCP techniques have greatly evolved, providing high resolution images of the biliary tree with short exam duration, while remaining non invasive without contrast medium injection.

1.1 Research Gap:

To study the role of combined computed tomography(CT) and magnetic resonance cholangio
Pancreatography (MRCP) in the pre operative assessment of obstructive biliopathy.

1.2 Contribution:

1. To diagnose the obstructive biliopathy by computed tomography(CT).
2. To diagnose the obstructive biliopathy by magnetic resonance cholangioPancreatography (MRCP)
3. To corroborate the pre operative diagnostic accuracy of combined CT and MRCP inobstructive biliopathy with intra operative findings, in relation to site, level andnature(neoplastic and non neoplastic) of obstruction.

II. MATERIAL AND METHODS

STUDY DESIGN: Observational study
STUDY SET UP: In the Deptt. of Surgery collaboration with Deptt. of radio diagnosis, Tripura Medical College and Dr. BRAM Teaching Hospital
STUDY DURATION: The procedure was carried out for one and half years w.e.f the month of September 2020 to January 2022
STUDY POPULATION: All the patients who were admitted with obstructive jaundice in the

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department of surgery at Tripura Medical College and Dr. BRAM Teaching Hospital
during the study period.

SAMPLE SIZE: As per IPD record yearly about 15 obstructive jaundice patients was admitted in surgery department in last three years, so in my one and half years study duration minimum sample size was 25**.**

SAMPLING METHOD: All the patients to be taken as sample after fulfilling the inclusion and exclusion criteria. No sampling technique is required.

1. Informed consent of each patient will be taken according to vide Annexure I.
2. Socio-demographic data of each patient enrolled will be recorded in a proforma vide Annexure II.

INCLUSION CRITERIA:

1. Patients with clinical features of obstructed jaundice.
2. Those with biochemical features of obstructed jaundice such aselevated serum bilirubin.
3. Those in whom USG investigation showed dilatation of biliarysystem with jaundice
4. Those with a clinically documented cause of jaundice.
5. Those with surgical and/or obstructive lesion were included inthe study.

EXCLUSION CRITERIA:

1. Patients less than 12 years
2.Patients with Prehepatic/Hepatic Jaundice.
3.Patients who refused to give consent.
4.Those with contraindication for MRCP such as patients with ferromagnetic implant, aneurysm clips, pacemaker, and those with claustrophobia was excluded from the study.

WORKING DEFINATIONS:

SUBJECT SELECTION: Patients with obstructive jaundice admitted in GBPH Surgery ward during study period of two years irrespective of sex, area, religion was included in this study**.**

STUDY TOOLS: Data was collected in a pretested semi structured interview schedule,according to the Annexure II.

METHODS OF DATA COLLECTION: Informed consent was sort from the eligible subject, according to the Annexure I, consenting subject was subjected to blood sample collection, USG, doing CT scan and MRCP etc. for study.

ANALYSIS OF DATA: Descriptic statistics was expressed in frequency and percentage and chi squire test statistics was applied to assess significant association p value<0.05 was taken as significant.

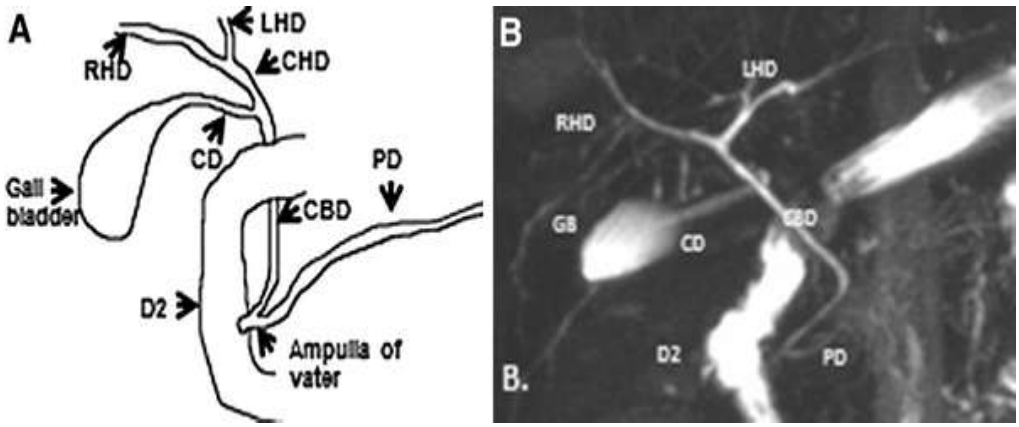

Fig. 1. Schematic diagram and b MIP 3D MRCP sequence showing normal anatomy of pancreatico-biliary tract. RHD right hepatic duct, LHD left hepatic duct, CHD common hepatic duct, CBD common bile duct, PD pancreatic duct, D2 2nd segment of duodenum, CD cystic duct

III. RESULT AND ANALYSIS

From result and analysis it has been found that 3(12.0%) patients had ≤20 years of age, 5(20.0%) patients had 21 to 30 years of age, 5(20.0%) patients had 31 to 40 years of age, 5(20.0%) patients had 41 to 50 years of age, 5(20.0%) patients had 51 to 60 years of age, and 2(8.0%) patients had 61 to 70 years of age. It was found that 11(44.0%) patients had female and 14(56.0%) patients had male.

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Age in Years	Frequency	Percent
≤20	3	12.0%
21 to 30	5	20.0%
31 to 40	5	20.0%
41 to 50	5	20.0%
51 to 60	5	20.0%
61 to 70	2	8.0%
Total	25	100.0%

Table 1 Distribution of Age in Years

3(12.0%) patients had ≤20 years of age, 5(20.0%) patients had 21 to 30 years of age, 5(20.0%) patients had 31 to 40 years of age, 5(20.0%) patients had 41 to 50 years of age, 5(20.0%) patients had 51 to 60 years of age, and 2(8.0%) patients had 61 to 70 years of age.

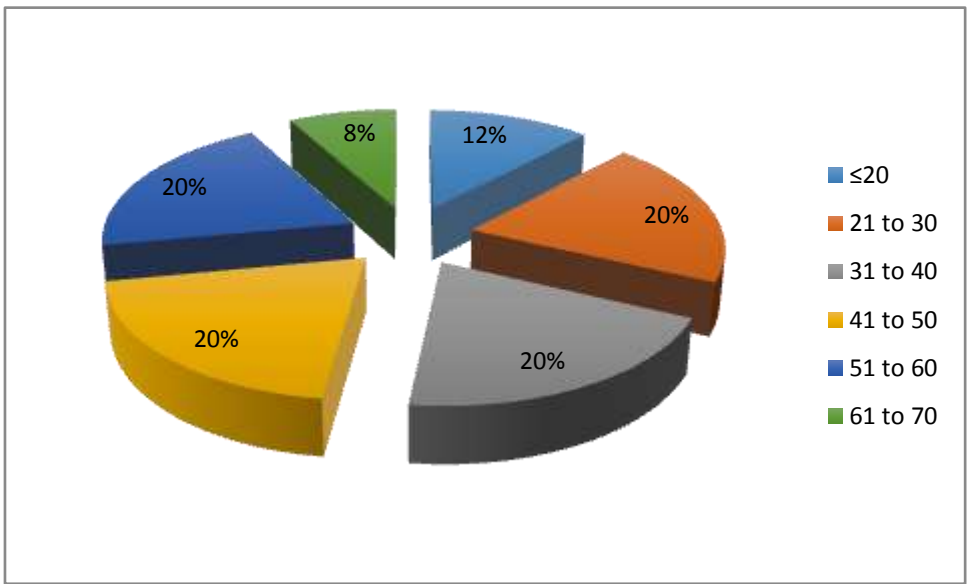

Fig 2. Distribution of age in years in graphical representation

Table 2: Association of CECT vs. OPERATIVE FINDING

	OPERATIVE FINDING		
CECT	**Detected**	**Not Detected**	**TOTAL**
Detected Row % Col %	19 95.0 82.6	1 5.0 50.0	20 100.0 80.0
Not Detected Row % Col %	4 80.0 17.4	1 20.0 50.0	5 100.0 20.0

TOTAL	23	2	25
Row %	92.0	8.0	100.0
Col %	100.0	100.0	100.0

Chi-square value: 1.2228; **p-value:**0.2688
In CECT -detected, 19(82.6%) patients had operation detected and 1(50.0%) patient had operation not detected. In CECT -not detected, 4(17.4%) patients had operation detected and 1(50.0%) patient had operation not detected. Association of CECT vs. operation finding was not statistically significant (p=0.2688).
Sensitivity: 82.6
Specificity: 50.0
Positive Predictive Value: 95.0
Negative Predictive Value: 20.0
Accuracy: 80.0% (TP+TN/Total)X100

IV. DISCUSSION:

In this newer era of imaging where multiple imaging modalities ranging from simple radiograph to most advanced MRI are available, it is the role of radiologist to guide the clinician in selecting the right imaging modality and to answer the questions which are important in patient management. Although ultrasound remains a screening modality for diagnosis of biliary obstruction, it is unable to answer the true extent and cause of obstructive jaundice requiring the use of another imaging modality like CECT and MRCP which scores over ultrasound in the diagnostic accuracy.
We found that USG Sensitivity was 60.9, Specificity: 50.0, Positive Predictive Value: 93.3, Negative Predictive Value: 10.0 and Accuracy: 60.0% .
It was found that CECT Sensitivity was 82.6, Specificity: 50.0, Positive Predictive Value: 95.0, Negative Predictive Value: 20.0 and Accuracy: 80.0%.
We found that MRCP Sensitivity was 91.3, Specificity: 50.0, Positive Predictive Value: 95.5, Negative Predictive Value: 33.3 and Accuracy: 88.0%.
MRCP is better modality with high sensitivity, specificity and diagnostic accuracy as compared to USG and CECT.

Biliary disorders are one of the common problems routinely seen in clinical practice. Ultrasound as a screening modality is useful to confirm or exclude biliary dilatation and to choose patients for MRCP examination. MRCP is an important non invasive imaging investigation in the pre operative evaluation of patients with obstructive jaundice.

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