Original Article

EVALUATION OF CASES OF OBSTRUCTIVE JAUNDICE BY ULTRASOUND AND ERCP AT TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT:

OBJECTIVES:

To know causes of obstructive jaundice. To see co-relation of USG and ERCP findings.

SETTINGS AND DURATION:

This descriptive study was conducted at radiology department of Madinah Teaching Hospital and Gastroentrotology department of Madinah Teaching Hospital, Faisalabad from 1st November 2014 in patients coming from peripheral areas of Faisalabad.

STUDY DESIGN: Descriptive study.

PROJECT SUMMARY (200-250WORDS)

OBJECTIVES:

To determine the findings in ultrasound and ERCP in patients of obstructive jaundice. Obstructive jaundice (means when serum bilirubin level in greater than 50µmol/dL (3mg/dL).

METHODOLOGY:

Descriptive study was performed in Madinah Teaching Hospital to diagnose causes of obstructive jaundice. The study was performed by USG and ERCP in 55 patients having sign and symptoms of obstructive jaundice.

RESULTS:

Study shows that most of the patients having obstructive jaundice have mainly benign CBD causes and only 3 patients have malignant CBD causes. One patient has CA head of pancreas. Among these study cases 30 out of 55 have prolonged history of Cholelithiasis for 5-7years. 52/55 patients have same findings on USG and ERCP. So results are true positive in 52/55 patients.

KEYWORDS:

Choledocholethiasis, Stricture CBD, Obstructive Jaundice, MRCP, USG, Cholangiocarcinoma

INTRODUCTION:

One of the most common Hepato biliary disease in our set up is obstructive jaundice. Jaundice is broadly divided into obstructive (surgical) and non obstructive (medical) categories. Obstructive jaundice (jaundice due to intra or extrahepatic organic obstruction to biliary outflow), can present problems with the

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diagnosis and management. The surgical jaundice can be caused by the obstruction of the bile duct as with gall stones, strictures, malignancy, such as Cholangiocarcinoma, carcinoma gall bladder and carcinoma head of pancreas and periampullary carcinoma. Other rare causes are Choledochal cyst; Caroli's syndrome and primary and metastatic liver tumors.

Diagnostic accuracy of ultrasound in our study is (80%) rest of the (20%) cases of obstructive jaundice are diagnosed by ERCP so overall diagnostic accuracy of ultrasound and ERCP is (100%) in our total 55 patients.

The incidence of obstructive jaundice in different age groups in our study is as under:

- 25 patients among them are females of ages between 45-55years (65.5%).
- 20patients among them are males of ages between (35-45years).
- 10 patients among them have ages between (60-70years) 6 are female patients and 4 are male patients.

Bilirubin form	Normal value
Total (elderly, adult, child)	0.2 to .8 mg/dL
(newborn)	.8 to 12.0 mg/dL
Critical value (adult)	>12 mg/dL
Critical value (newborn)	>15 mg/dL
Pre-hepatic,unconjugated, indirect	0.2 to 0.7 mg/dL
Post-hepatic, conjugated, direct	0.1 to 0.4 mg/dL
Fecal urobilinogen	40 to 280 mg/day
Urine	0.0 to 0.02 mg/dL

BILIRUBIN LAB VALUES

The symptoms of obstructive jaundice include jaundice with or without pain, tenderness dark urine, pruritis, pale stools, weight loss and anorexia.

MATERIALS AND METHODOLOGY:

This hospital based descriptive study was conducted since November (2014) in Department of Radiology and Imaging Madinah Teaching Hospital affiliated with University Medical and dental college Faisalabad till 4th February 2015. 55 patients were selected who presented with obstructive jaundice, in which cause of obstructive jaundice is not diagnosed, which is later on diagnosed on basis of history (age, sex and profession) and relevant features like presence of clay coloured stools, anorexia, weight loss, pruritis and correlated with the examination findings i.e. presence of jaundice, scratch marks, abdominal mass and hepatomegaly, having raised Serum bilirubin and alkaline phosphatase and radiological investigation (USG) and ERCP were included in the study.

Ultrasound was performed by (TOSHIBA NEMIO XG USG machine) with Probe frequency of 3.75 mHz.

Initially USG performed, which is followed by ERCP in each of our study case.

All 55 patients were evaluated by consultant radiologist and the findings are entered in predesigned proforma without knowing ERCP findings.

Consultant gastro entrologist performing ERCP was blinded with USG findings.

Descriptive study which shows comparison between ultrasonography and ERCP to diagnose cause of obstruction by USG and ERCP corelation in 55 patient having sign and symptoms of obstructive jaundice.

(1) Laboratory tests co-relation:

We label jaundice (icterus) when serum biliary level is greater than 50μ mg/dL (3mg/dL). Patients with benign disease have less hyperbilirubinemia than those with malignant obstruction⁽¹⁴⁾. The transaminases (AST & ALT) may abruptly rise many fold above normal and decrease rapidly once the obstruction is relieved. Alkaline phosphatase and γglutamyltransferase are markers for cholestasis. As bile obstruction progresses, the levels of these two markers rise several times above normal.

(2) Clinical co-relation for type of jaundice:

Cause of jaundice is clinically divided as:

• Pre-hepatic causes.

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- Hepatocellular causes
- Obstructive (Cholestatic) causes

Cholestatic causes are further divided into:

- Intrahepatic cholestasis
- Extrahepatic cholestasis

Therefore, Jaundice is discussed under following headings:

- Haemolytic jaundice (having increased bilirubin load for liver cells)
- Congenital hyperbilirubinaemias (defects in conjugation)
- Cholestatic Hepatocellular (Pregnancy liver disease) and large duct obstruction.

In past there is high operative morbidity and mortality due to less diagnostic advances, but now radiological co-relation along with ERCP and surgical findings reduces the risk of morbidity and mortality⁽¹⁵⁾.

(3) Radiological / ERCP co-relation:

Aims of radiological / ERCP co-relation are as follow:

The need for radiological imaging in obstructive jaundice are:

- To confirm the cause of biliary system obstruction (i.e., to distinguish surgical versus medical jaundice).
- To see the level of the obstruction.

The radiological non-invasive investigations available for the diagnosis of obstructive Jaundice in our hospital setup are ultrasonography and ERCP. Abdominal ultrasonography shows the size of bile ducts, the level of the obstruction, causes related to benign and malignant diseases e.g. benign causes include (hepatic parenchymal disease, choledocholethiasis, pancreatitis, benign CBD stricture, choledochal cyst), malignant causes include (hepatic metastases, CA head of pancreas, CA gall bladder, periampullary carcinoma, Cholangiocarcinoma, hepatocellular carcinoma). The results of Ultrasound are largely operator dependent it can differentiate benign and malignant causes of obstruction as ultrasound is readily available comparatively cheaper and non-invasive modality. Endoscopic retrograde cholangiopancreatography (ERCP) has now a days place vital role in diagnosis of obstructive jaundice, ERCP pick choledocholethiasis, choledochal cyst, stricture of CBD, periampullary CA and Cholangiocarcinoma.

While doing workup of obstructive jaundice we make a flow chart as under:

Our final diagnosis are made on basis of radiological / ERCP / surgical findings.

Normal biliary anatomy:

Right hepatic duct (RHD) and left hepatic duct (LHD) from common hepatic duct (CHD) receives cystic duct (CD) from the gall bladder (GB) to from common bile duct $(CBD)^{(1)}$.

Variation of intra hepatic biliary anatomy:

- Normal anatomy as explained above is seen in 60% cases.
- Right posterior ducts, drain directly into LHD (Left hepatic duct) (20%)
- Right posterior duct, right anterior duct, LHD from CHD (10%)

Variations of cystic duct insertion:

- Normal insertion
- Low union
- Parallel course
- Anterior spiral course
- Posterior spiral course

Biliary system:

DUCTAL ANATOMY Right hepatic duct (RHD)



- Right anterior superior (RAS) segment
- Right anterior inferior (RAI) segment
- Right posterior superior (PPS) segment
- Right posterior inferior (RPI) segment
- Caudate (C) segment

Left hepatic duct (LHD)

- Left medial superior (LMS) segment
- Left medial inferior (LMI) segment
- Left lateral superior (LLS) segment
- Left lateral inferior (LLI) segment RHD and LHD from the common hepatic duct (CHD), which receives the cystic duct (CD) from the GB to from the common bile duct (CBD)^(1,6).

Variations of intrahepatic Biliary anatomy:

- "Normal" anatomy as shown above, 60%
- Right posterior ducts drain directly in LHD, 20%
- Right posterior duct, right anterior duct, and LHD from CHD, 10%

Variations of cystic duct insertion:

- Normal insertion
- Low union
- Parallel course
- Anterior spiral course
- Posterior spiral course



Variations of papillary insertion (Ducts within papilla = Ampulla):

The CBD drains into the duodenum through the ampulla. Variations of pancreatic duct (PD) and CBD insertion:

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- Y type: CBD and PD combine before insertion into ampulla
- V type: CBD and PD insert jointly into ampulla
- U type: CBD and PD insert separately into ampulla

US measurements of CHD:

CHD measurements (inner wall to inner wall) are performed at the level of hepatic $\operatorname{artery}^{(1, 12)}$. Normal measurements:

- <7mm in normal fasting patients <60 years; in 95% the CHD is <4mm
- <10mm in normal fasting patients age 60 to 100 years
- <11mm in patients with:

Location of the hepatic artery relative to the CBD:

Most common (80%):

- Hepatic artery between CBD and portal vein
- Hepatic artery medial to main portal vein (MPV)
- CBD lateral to portal vein

Less common (20%):

- Hepatic artery anterior to CBD
- Hepatic artery posterior to portal vein



Previous surgery:

Previous CD obstruction:

 Fatty meal challenge: If CHD enlarges more than 2mm after fatty meal (Lipomul), it indicates obstruction.

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Inclusion criteria:

History and clinical examination. All patients having obstructive jaundice must have USG + ERCP done. Lab. Values should be co-related.

Exclusion criteria:

Poor preparation (Extensive gas shadows). Previous biliary surgery.

Pregnancy.

ERCP is contraindicated in the presence of biliary enteric anastomoses e.g., choledochojejunostomy, Billroth II anastomosis.

While doing workup of obstructive jaundice we make a flow chart as under:



RESULTS:

Study shows that patients having obstructive jaundice have mainly benign causes of CBD obstruction and only 3 patients have CBD mass, One patient has CA head of pancreas. 30 patients out of 55 have prolonged history of Cholelithiasis for 5-7years. 52/55 patients have same findings on USG and ERCP. So our study results shows that 52/55 patients have true positive results.

- 25 patients among them are females of ages between 45-55years (65.5%).
- 20patients among them are males of ages between (35-45years).
- 10 patients among them have ages between (60-70years), 6 are female

patients and 4 are male patients.

Accuracy of ultrasound in diagnosis of obstructive jaundice (intra and extrahepatic causes) is 80% while remaining 20% were diagnosed on ERCP (Fig. 3).

ERCP outlines the level and cause of obstruction in cases of (malignant ductal and hilar Cholangiocarcinoma, periampullary carcinoma and choledocholethiasis) (Fig. 4).





DISCUSSION:

This descriptive study in our hospital setup in relation with aetiological spectrum, clinical features, lab. Investigations and with aid of imaging ERCP is completed in three months duration to see cause of obstructive jaundice^(1,5, 14).

On our pre-designed proforma, we label patients as case of obstructive jaundice as per criteria mentioned below by clinical history,

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examination, ultrasound, lab. Investigations and ERCP:

<7mm in normal fasting patients <45-55 years; in 95% the CHD is <4mm

<10-11mm in normal fasting patients age 60 to 70 years

25 patients among them are females of ages between 45-55years (65.5%).

20patients among them are males of ages between (35-45years).

10 patients among them have ages between (60-70years), 6 are female patients and 4 are male patients.

Liver disease as a cause of obstructive jaundice is seen in (10%) by lab. Investigations in which cause is hepatocelluler total serum bilirubin is increased 2times in which direct bilirubin is increased 2times and ratio of direct /total bilirubin is 0.6 ± 0.1 and urine bilirubin is 2times in increased while AST, ALT and alkaline phosphatase are also 2times increased.

Remaining (90%) cases of obstructive jaundice have causes related to CBD and the lab. findings are as follows, 3times increased in total and direct serum bilirubin and urine bilirubine while urine urobilinogen in these patients AST, ALT and alkaline phosphatase shows 2times increased levels.

ERCP:

(20%) cases of obstructive jaundice diagnosed on ERCP shows choledocholethiasis, CBD stricture and only 1patient is diagnosed as case of carcinoma of periampullary region.

Majority of patients in our study have benign causes of obstructive jaundice, i.e., 70.73% (40/55) while malignant causes of jaundice are remaining 30.27% (15/55).

LIMITATIONS:

- Pancreatic head and peripancreatic region were poorly visualized in some cases on ultrasound due to bowel gas shadows.
- In some patient were unable to hold their breath.
- In some cases patient is not in fasting state.

Regarding the various malignant causes diagnosed by USG and ERCP order of

commonest to rare pathology is as under:

Carcinoma gall bladder was the commonest followed by carcinoma head of pancreas then Cholangiocarcinoma the periampullary carcinoma and HCC.

Regarding the various benign causes diagnosed by USG and ERCP order of commonest to rare pathology is as under: Choledocholithiasis was the most common among benign causes of obstructive jaundice with CBD stricture, pancreatitis and choledochal cyst accounting for rest of the cases.

Among the symptoms, pain in the abdomen (the right hypochondrium) and clay coloured stools were noted more commonly in malignant cases. Pruritis was seen equally in both the benign and malignant cases. Anorexia and weight loss were more frequently seen amongst the patients of malignant jaundice. Hepatomegaly was found in 15/55` of the patients with malignancy while palpable gallbladder was noted in cases of malignant obstruction thus supporting the 'Courvoisier's law.

The scratch marks were seen in both benign and malignant conditions.

Laboratory investigations shows high serum bilirubin and alkaline phosphatase levels.

Radiological investigations shows the level of obstruction in about (80.8%) remaining (19.2%) were diagnosed by ERCP, respectively.

CONCLUSION:

Obstructive jaundice has different aetiological spectrum in males where malignant causes predominate compared to females who have more of benign disease. Benign causes are seen at a comparatively younger age group compared to malignant causes. Carcinoma of head of pancreas was the commonest malignant aetiology, while choledocholithiais is the commonest benign cause. Ultrasound and ERCP have high diagnostic accuracy and specificity.

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Submitted for publication:	09-03-15
Accepted for publication:	25-04-15

Whoever wants to be a leader should educate him before educating others. Before preaching to others he should first practice himself.Whoever educates himself and improves his own morals is superior to the man who tries to teach and train others.

Hazrat Ali (Karmulha Wajhay)