



## COMPARATIVE STUDY OF DIAGNOSTIC EFFICACY OF ULTRASOUND AND ERCP IN EXTRAHEPATIC CHOLESTATIC JAUNDICE

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### ABSTRACT

Accurate diagnosis of extrahepaticcholestatic jaundice has been a matter of debate in terms of use of ultrasonography (USG) and Endoscopic Retrograde CholangioPancreatography (ERCP). This prospective study conducted at CMC Ludhiana was aimed to evaluate the efficacy of the two methods in 30 patients suspected to have extrahepaticcholestatic jaundice. The study revealed the diagnostic sensitivity of ultrasound as 69.56%, its specificity 76.92% with high positive predictive value of 84.12% and a relatively high negative predictive value of 58.62%. In comparison the diagnostic sensitivity of ERCP was found to be 92% with 100% of specificity and positive predictive value. A relatively low negative predictive value of 33.33% clearly defined the superiority of ERCP over USG in evaluation of extrahepaticcholestatic jaundice.

**Keywords:**Extrahepaticcholestatic jaundice, Ultrasonogphy, Endoscopic retrograde cholangiopancreatogphy.

## INTRODUCTION

Extrahepatic Cholestatic Jaundice which occurs as a result of an obstruction in the bile duct, has been a subject of interest to the Radiologists and the Gastroenterologists both for the purpose of diagnosis as well as for treatment. The block to the flow of the bile whereby it is prevented from reaching the second part of duodenum may be present anywhere from the junction of right and left hepatic ducts to the termination of the common bile duct. This block which may be congenital or acquired may be caused by Atresia, Strictures, Choledocholithiasis, Cholangiocarcinoma, Pancreatic Carcinoma, Choledochal Cyst or Chronic Pancreatitis.

Before the advent of sectional imaging aids like Ultrasound, Computerized Tomography or MRI in modern diagnostics, a number of regions in the body and in the biliary passage were inaccessible to the clinicians and pathologists. Most of the times the diagnosis was limited to the generalized idea of block in the post hepatic area. The exact nature of the block and the location was difficult to specify except in cases of pancreatic malignancies where the biochemical parameters also helped to indicate the possible site and cause of block in the flow of the bile or inadequate delivery of bile in the duodenum and hence the elevated levels of bilirubin in the blood.

Ultrasonography, a non invasive imaging modality made it possible for the clinicians to clarify the mist and be more specific in their diagnosis regarding the nature, extent, size and probable pathology leading to cholestasis. Leopold GR, way back in 1979(1) established the usefulness of Ultrasound in evaluation of jaundiced patients which helped to diagnose both obstructive as well as non obstructive jaundice as well as state of biliary tree whether dilated or normal (2). This modality of diagnosis though widely used, was understood to have diagnostic limitations. The efficacy of Ultrasound in diagnosis of CBD stones is reported to be 25% (3).

With the advancement of Fibroptic Endoscopy, Cannulation of ampulla of Vater became easily possible. With the combined advantage of Endoscopy of the upper GI tract and visualization of the biliary tree, the diagnostic yield of the Endoscopic Retrograde CholangioPancreatography (ERCP) is particularly high. This investigation though extremely safe in experienced hands, is technically difficult to perform. ERCP vividly elaborates both the pancreatic and the biliary ducts. The interventional potential of this technique has definitely taken this modality of diagnosis and treatment to a different level of how the clinicians handle a case of Extrahepatic Cholestasis in the modern times. It is frequently being used, for example, for Papillotomy in cases of sphincteric disorders and to remove residual sludge as well as stones in the CBD. Ampullary or parampullary biopsy of lesions has become easier as also the placement of endoprosthesis as palliation in inoperable cases of Cholangiocarcinomas, Carcinoma of Gall Bladder or CBD strictures where surgery is either not possible or is not advisable.

**Aim:**

The present study was aimed to evaluate and compare the diagnostic efficacy of Ultrasonography and ERCP in patients with suspected ExtrahepaticCholestatic Jaundice. In evaluating these two techniques together we also proposed to determine the clinical situations where USG and ERCP are to be used in preference to one another and also the clinical situations in which the two techniques were complimentary in obtaining maximum benefits.

**MATERIAL AND METHODS**

Thirty patients of suspected ExtrahepaticCholestatic Jaundice admitted to Christian Medical College and Hospital , Ludhiana were evaluated in this prospective study conducted over a period of one year. All patients with toxic encephalopathy and bleeding disorders were excluded.

After routine laboratory investigations (CBC, bleeding profile, LFT, Stool analysis and urinalysis) ultrasound abdomen was done with realtime sector scanner (MODEL PHILIPS HDX 11 E COLOUR DOPPLER) using 3.5 and 5 MHz transducers. Abdominal scans were performed on fasting patients early in the morning so as to evaluate the pancreas without overlapping bowel gas. The liver parenchyma was scanned to rule out parenchymal pathology and to detect any dilated biliary radicals. Gall bladder was examined to check for Lithiasis, dilatation, oedema, growth or any other abnormality. In cases where gall bladder was difficult to locate due to calculi, the patient was made to lie in left lateral position and the probe was put on the gall bladder fossa. CBD was identified anterior to portal vein and evaluated if possible in its entirety . The pancreas was then examined after identifying its relationship to the mesenteric vessels. The size and echogenicity was also observed. Any Dilatation of the pancreatic duct was looked for. Ultrasonic image details of head, body and tail of pancreas were noted in each patient.

ERCP was done in all patients after regular preparation i.e. overnight fasting, slow IV sedation and precaution of asepsis. Endoscopy was performed using side viewing Endoscope (MODEL TJFV 70) and Videoscope Monitor (MODEL OLYMPUS CV 70). On reaching the pylorus a total dose of InjBuscopan 80 mg ( in installments of 20 mg) was administered to relieve the spasm. The ampulla of Vater was identified and CBD was cannulated after manipulation. Diluted contrast media (Conray 420) was injected to confirm the position of the cannula. The biliary system was then opacified taking precautions to avoid injecting air. Radiographs of CBD with contrast were taken. Pancreatic duct was then cannulated and injected. In the draining phase attention was paid to demonstrate the lower end of CBD. Spontaneous filling of GB was facilitated by putting the patient in right lateral position. In cases where obstruction was demonstrated, as much of the contrast was removed as was possible. Vital signs were monitored periodically throughout the procedure and till 1 hour after the ERCP.

The data was observed and evaluated from the Radiographic films (variable numbers for individual patients in different obliquities as assessed by image intensifier fluoroscopy) and measurements were made on the caliber of main pancreatic duct in head, body and tail. The course of the duct was also noted. The status of secondary and tertiary branches of main duct were noted. Acinar when visualized was documented. The biliary tree measurements were made at the maximum calibre of respective ducts. Presence of any calculi, stricture or any other abnormality was noted. The state of intrahepatic biliary radicles was also taken note of. The Radiographic data was correlated with lab investigation. Confirmation was obtained in most cases by follow up, surgery or histopathology. A record or time taken for the procedure as well as post procedures complications, if any, was also maintained.

Based on above correlation and analysis, conclusions were drawn regarding the efficacy, usefulness, sensitivity and specificity of ERCP.

### Observations:

Thirty patients between 20- 76 years of age (9 males, 21 females) having suspected extrahepaticcholestatis were investigated. Twelve (40%) had undergone cholecystectomy at the time of the study. Only 3.33 % had a palpable gall baldder and 76.67% had overt icterus. History of chronic alcoholism was seen in 4 (13.33%) males. Four patients (3 males and 1 female) had history of hepatitis. Family history of jaundice (n=3), gall stones (n=2) was also noted. The onset of jaundice was slow in 26 (86.67%). The nature of jaundice was progressive in 12, persistent in 9 and intermittent in 9 cases. None of the patients were positive for Australia antigen. Final Ultrasound diagnosis were as follows:

Normal	30%
Carcinoma Pancreas	3.33%
Periampullary Carcinoma	6.67%
Choledochocele	6.67%
Pancreatic Pathology	3.33%
Carcinoma GB	6.67%
Cholangiocarcinoma	6.67%
Cholelithiasis	10%
Stricture CBD	3.33%

Pancreatitis	10%
Cholesystitis	3.33%

Same set of patients also underwent ERCP. The final ERCP diagnosis in these patients were as follows:

Periampullary Carcinoma	6.67%
Extrinsic Impression	3.33%
Carcinoma GB	6.67%
Choledocholelithiasis	36.63%
Normal	20%
Stricture CBD	13.33%
Block CBD	6.67%
Pseudocyst	3.33%
Accessory PD	3.33%

The diagnostic accuracy of the imaging methods was calculated in accordance with the following formulae:

Sensitivity= true positive /true positive +false negative

Specificity= true negative/true negative +false positive

Positive predictive value= true positive/true positive +false positive

Negative predictive value= true negative/ true negative+false negative

The diagnostic sensitivity of ultrasound was computed to be 69.56%, its specificity 76.92% with high positive predictive value of 84.12% and a relatively high negative predictive value of 58.62%

In comparison the diagnostic sensitivity of ERCP was statistically computed to be 92% with 100% of specificity and positive predictive value. A relatively low negative predictive value of 33.33% clearly defines the superiority of ERCP over USG in evaluation of ExtrahepaticCholestatic Jaundice.

## DISCUSSION

Many studies in the past have tried to compare and correlate the efficacy of ERCP and Sonography in evaluation of ExtrahepaticCholestatic Jaundice ( 4,5,6,7). Although shown to have superiority over USG, the ERCP also has potential risks (8,9,10) which are minimal in an otherwise expert hands but nevertheless carry statistics of morbidity and mortality following the procedure. Studies done by Kullman (11) have shown this procedure to be reasonably safe and accurate as is proved by the present study. Recently conducted studies by Chu YL (12) emphasize the usefulness of USG in triaging and a preprocedure to a more invasive modality like ERCP which finds its utility where intervention is also anticipated .It would be interesting to correlate findings of endosonology with those of magnetic resonance imaging which gives an accurate delineation and demarcation of soft tissue. MRI though expensive would be free of risks of an invasive procedure like ERCP.

## CONCLUSION

The present study reveals that ERCP scores higher in terms of specificity and sensitivity in diagnosis of ExtrahepaticCholestatic Jaundice. However the usefulness of ultrasound as a non invasive and relatively inexpensive test with virtually no risks related to the procedure can not be negated and should be frequently employed prior to embarking upon ERCP.

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