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Study of Etiology of Acute Cholecystitis with Jaundice with Reference to Its Incidence, Cause and Evaluating Its Diagnostic Methods

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Abstract: To study the etiology of acute choelecystitis with jaundice and finding its incidence, cause and evaluating various diagnostic methods this study was conducted from 1-1-1998 to 30-06-1999 at department of surgery ST Stephens hospital Delhi. This study assessed the incidence of jaundice in patient with acute cholecystitis .A total of 144 patients with acute cholecystitis out of which 22 patients had clinical or biochemical evidence of jaundice who presented at St Stephens hospital during the above duration were included in this study, Twenty two of them had a clinical jaundice. All the patients were evaluated, with special emphasis to the twenty two, patients who presented with jaundice .Blood and urine samples were taken and sent for various bio-chemical tests like CBC, RBS, BUN S. createnin, LFT, coagulation profile, HBsAg and routine examination of urine. Ultrasound was done in all 144 patients to confirm the diagnosis of acute cholycystitis and to establish the cause of jaundice in those who had either clinical or bio-chemical evidence of jaundice. USG is very much observer dependent and sometime diagnosis can be missed so all the patients with jaundice were submitted to ERCP. CECT scan was performed on jaundiced patients who had a suspected mass lesion. The incidence of acute cholecystitis associated with jaundice is found to be 15.4% .Female patients were effected more than males incidence being 3.3:1(M:F). Cholidocholithiasis (CBD stones) was found to be the commonest etiology in patient of acute cholicystitis with jaundice, (63.6%). USG was found to be a base line investigating procedure to identify acute cholecystitis and associated pathology with sensitivity of more than 98.6%. ERCP is indicated in all the patients who had shown some bile duct pathology in ultrasonographic study, its success rate in therapeutically reliving the patient from jaundice is found to be 93.7%. Most of the patient who presented with acute cholecystitis had gall bladder stones 97.2%, in 2.8% cases cholecystitis was found without cholilithiasis.(acalculus cholecystitis).

Keywords: Acutecholecystitis, jaundice, ultrasonography, endoscopic retrograde cholangiography, computed tomography, Magnetic resonance imaging, liver function test

INTRODUCTION

Acute cholecystitis is a very common surgical emergency and the incidence appears to be increasing. The investigations and management of acute cholecystitis is well documented and standardized and does not require further discussion here. However when acute cholecystitis is associated with jaundice, the management changes and the prioritization of treatment appears to shift from management of acute inflammation to investigation and management of jaundice. The definitive treatment of acute cholecystitis is then deferred till the cause of jaundice is fully evaluated. This often means that such patients are sent home after conservative treatment and called back after four to six weeks for cholecystectomy and /or choledocholithotomy or other procedures. The waiting period carries the attendant risk of another episode of acute inflammation and /or jaundice, either of which would increase patient morbidity. The association of acute cholecystitis with jaundice is not uncommon and it is important to know the incidence as well as its etiology .By doing this the patients investigations can be shortened and streamlined, thereby permitting early relief of the jaundice as well as surgery for cholecystitis in the same admission. During same stay its necessary to evaluate the patient to define the etiology associated with acute cholecystitis with jaundice,which could be either due to CBD stones or other causes beside it such as cholangitis, ascariasis, Mirizzies syndrome, periampullary carcinoma [1]. Various diagnostic modalities are used to identify the etiology like ultrasonography, ERCP, CT scan and MRCP [2]. There are many diagnostic /investigation procedures which have been standardized and often vary from institution to institution such as Liver function test (LFT), serum amylase and viral markers. USG remains the best

screening procedure [3]. More recently better procedures, such as intravenous cholangiography (IVC), Percutaneous transhepatic cholangiography (PTC) and the radioisotopes studies have been introduced. The most relevant procedure is ERCP which is of immense diagnostic and occasionally therapeutic value when combined with sphincterotomy. The advantage are obvious. Disadvantages include infection of a blocked biliary tree, as well as difficulty in ascertaining the upper limit of the obstruction. The most dreaded complication is pancreatitis [4]. CT scan is limited to patients in whom a mass lesion is suspected as a cause of jaundice. MRCP is a non invasive procedure which will delineate the pancreatico biliary tree and the site and extent of obstruction. This study will attempt to evaluate causes and the diagnostic procedures employed so as to shorten patient's admission and discomfort.

AIM AND OBJECTIVES

1. To study the incidence of jaundice in patient with acute cholecystitis
2. To identify the cause of jaundice in patient presenting with acute cholecystitis
3. To evaluate the diagnostic methods used for determining the cause of jaundice

METHODS

Inclusion criteria

- All patients who had clinical and radiological evidence of acute cholecystitis were included in group and latter evaluated for associated jaundice if present.

Exclusion criteria

- Patients who did not show any evidence of acute cholecystitis on ultrasonography beside jaundice.
- Patients who took discharge on request and did not complete treatment.

Various diagnostic/investigations procedures are available that are studied as

- Biochemical
- Non invasive procedures Like USG, CT scan, MRI, Xray abdomen, IVP
- Invasive procedure-ERCP

Each needs to be delt properly so that diagnostic procedures are streamlined that will help to reach the diagnosis and could be manages properly.

Assesment Of Variour Diagnostic Modalities In Patient Of Acute Cholecystitis Presenting With Jaundice

Liver Function Test

As the liver performs its various functions, it makes chemicals that pass into the bloodstream and bile. Various liver disorders alter the blood level of these chemicals. Some of these chemicals can be measured in a blood sample. Some tests that are commonly done on a blood sample are called liver function tests (LFTs). These usually measure the following (ALT), (ASP)Alkaline phosphatase T. protien, albumin/globulin T. Bilurubins, amlylases, lipase D.L.F Watikn et al carried out LFT test during acute episode in 58 patients and found that patient who has serum bilirubin level above 2mg% 14/21 patients had CBD stones ,those who had serum bilirubin between 1-1.9 mg % ,7/14 patients had calculi and those with value below 1 mg % only 2 patients had CBD stones, so the rising level of serum bilirubin increases the chances of presence of CBD stones [5].

USG (ultrasonography)

This is preferred method for first time screening because the gallbladder is relatively superficial in location and is inferior to the liver, that serve as an acoustic window, it is an easily visualized structure that is seldom obstructed from the view by intervening bowel gas or overlying rib cage .USG is the most sensitive test for detection of gallstones and is superior to the other modalities in differentiating gallbladder wall thickness from pericholecysti fluid. Permutter and Goldberg made use of USG to differentiate obstructive from hepato-cellular jaundice and found it to be 100% sensitive, a correct diagnosis was reached in 66% of the cases useful information was provided in 26% of the cases and in 8% was either misleading or non diagnostic value [13].

USG In Diagnosing CBD Obstruction

As bile duct expands centrifugally from the point of obstruction extra-hepatic dilatation occur before intra hepatic dilatation .It is most usual therefore to see isolated or disparate dilatation of the extra hepatic duct in patients with surgical jaundice most authorities consider the diameter of the common hepatic duct as the most sensitive indicator for diagnosing biliary obstruction .In many USG laboratories biliary obstruction is suggested if the common hepatic duct diameter is 8mm or greater. a diameter of 6-7 mm is equivocal and smaller diameter are not suggestive of diagnosis. Dilated intra hepatic ducts are also suggestive of obstruction.

Sample et al studied 143 jaundiced patients ,USG demonstrated the extra hepatic biliary system in 38% of those with medical and 75% with surgical jaundice. The size of extra hepatic biliary system indicated that surgical jaundice was best differentiated from medical jaundice when 5mm diameter served as the upper limit of the common hepatic or common bile duct [14].

Fig-1: USG image of choledocholithiasis

Endoscopic Reterograde Pancreticocholangiography ERCP: ERCP (endoscopic retrograde cholangiopancreatography) is a procedure used to diagnose diseases of the gallbladder, biliary system, pancreas, and liver.

ERCP is used to diagnose CBD stones and pancreatic duct pathology. Biopsy of periampular lesion and washings from the ampulla can be examined for malignant cells. CBD stones can be extracted as well as CBD drainage and stenting performed. Thus ERCP is both diagnostic and therapeutic.

The procedure ERCP has remained an important diagnostic modality frequently used by gastroenterologist and surgeon. ERCP is found to be more sensitive then USG in detecting CBD stones. Blumgart L H *et al* studied ERCP in 87 patients who were jaundiced in whom diagnosis remained in doubt after standard investigation. ERCP gave a definitive diagnosis in 66(77%) of the cases. Although ERCP is very sensitive it has got its own risk and complications the procedure failure occurred in 30% of the patients in study conducted [11].

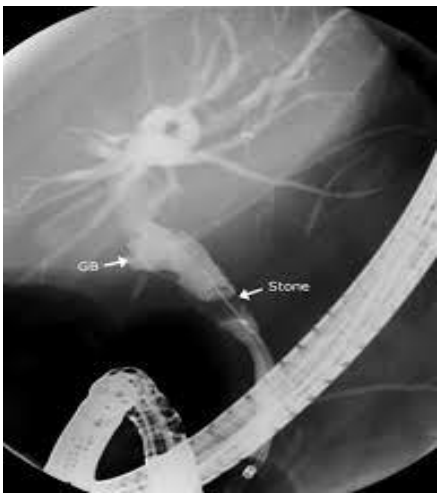

Fig-2: ERCP showing CBD stone

Computed Tomography

CT scans of the liver and biliary tract can provide more detailed information about the liver, gallbladder, and related structures than standard X-rays of the abdomen, thus providing more information related to injuries and/or diseases of the liver and biliary tract. CT scans of the liver and biliary tract may also be used to visualize placement of needles during biopsies of the liver or during aspiration (withdrawal) of fluid from the area of the liver and/or biliary tract. CT scans of the liver are useful in the diagnosis of specific types of jaundice as a result of certain conditions of the liver. CECT. may be used in mass lesions of gall bladder, bile duct and liver to know its extensions and lymph node metastasis

Pedrosa C S *et al* in there study to find out the role of CT scan in defining the level of obstruction in the cases of obstructive jaundice found that the characteristic of biliary tract disease which can be assessed by CT are biliary dilatation ,either focal or diffuse and intra-biliary calcification. .since both of these primary characteristic can be assessed very well with USG examination, CT is not used routinely as a screening examination for biliary disease. the major contribution of CT scan towards the understanding of biliary process lies in its ability to depict the extra hepatic course of biliary duct and define those extra – hepatic viscera adjacent to it. Information provided by CT scan is often critical in screening an appropriate group of patients for surgical intervention to relive obstructive jaundice. Minimal intra hepatic ductal dilatation may go undetected, if intravenous contrast is not used so it is mandatory to use intravenous contrast agent enhancement when evaluating the biliay tree [15].

Magnetic Resonance Imaging

Magnetic resonance cholangiopancreatography (MRCP) is a special type of magnetic resonance imaging (MRI) exam that produces detailed images of the hepatobiliary and pancreatic systems, including the liver, gallbladder, bile ducts, pancreas and pancreatic duct.

MRI uses a powerful magnetic field, radio frequency pulses and a computer to produce detailed pictures of organs, soft tissues, bone and virtually all other internal body structures. MRI does not use ionizing radiation (x-rays).

MRCP- visualises biliary tree more accurately (much more accurate than USG), dilatation and presence of stones, stricture of neoplasm cab be visualized, MRCP is non invasive.

Gualdi G F *et al* presented a paper on the role of MRI in the identification of biliary pathology and have discussed the possibility and the limitations of the MRI in the evaluation of biliary tree. He concluded that the morphological aspects' are the most important

markers for differential diagnosis. the role of MRCP in obstructive jaundice is growing as the investigation becomes more freely available, he found that the imaging of the biliary tree is usually excellent and often the exact pathology could be demonstrated, he also added that this will soon proceed ERCP as the method of choice% Now a days MRI/MRCP is gaining importance in detecting biliary pathology [16].

Table 1: Etiology of jaundice in patient presenting with acute cholecystitis as defined by USG/ERCP/CT scan-(total 22 patients)

	No. of patients(22)	%
cholidocholithiasis	14	63.6%
cholangitis	2	9.0%
Stricture in cbd	2	9.0%
Mass lesion abutting cbd	3	13.6%
Diverticula in duodenum	1	4.5%

Table 2: Incidence of acute cholecystitis with jaundice irrespective of sex differentiation

Acute cholecystitis	Presenting with jaundice	%
144	22	15.4%

Table 3: Comparative study of etiology of jaundice by USG and ERCP

Patient no	USG finding (22 patient)	ERCP finding(22 patient)
1	CBD obstruction	Cbd narrowing
2	Cbd narrowing	Cbdstricture
3	Cbd stones	Cbd stones
4	Cbd dilated	Cbd stone
5	Cbd dilated	Cut stone
6	Cbd stones	Cbd stones
7	Cbd stones	Cbd stone
8	Cbd stones	Assessment difficult
9	Cbd stones	Cbd stones
10	Cbd stones	Cbd stones
11	cholangitis	Cbd normal
12	Cbd stones	Cbd stones
13	Cbd stones	Cbd stones
14	Cbd stones	Cbd stones
15	Cbd stones	Cbd stones
16	Cbd stones	Cbd stones
17	Cbd stones	Cbd stone
18	Cbd stone	Cbd stone
19	Cbd stricture	Cbd stricture
20	cholangitis	Cbd narrowing
21	Cbd dilated	Cbd stones
22	Cbd stones	Cbd stones

Table 4: Various pathology of CBD in patient of jaundice as detected by USG-(done in 22 patients)

cholidocholithiasis	14	63.6%
cholangitis	2	9%
Cbd narrowing/stricture	3	13.6%
Cbd dilatation	3	13.6%

Table 5: Various pathology of CBD in patient of jaundice as detected by ERCP-(in 22 patients)

cholidocholithiasis	16	72.72%
Stricture/narrowing	4	18.18%
Assesment difficult	1	4.5%
CBD normal	1	4.5%

ERCP was found to be more sensitive than USG to localize CBD stones.

DISCUSSION

Acute cholecystitis is one of the most common surgical emergencies and it becomes more complicated in the presence of jaundice .though jaundice in association with acute cholecystitis is not very common presentation, incidence shown by various author are 23% according to D.L.F watkin [5], 40% according to Cheung L Y *et al* [6]. such cases have to be very carefully evaluated and the aim should be to access the cause of jaundice there is no significant delay in managing such patients. It is very important to understand the possible causes that can give rise to jaundice in patients with acute cholecystitis Sherlock. S defined ,the various causes that can lead to jaundice are 1-cholidocholithiasis,2-Mirrizies syndrome 3-associated cholangitis 4-Ascariais infestation in CBD 5-Billiary stricture 6-Dilalated CBD [7]. M.S Khuroo *et al* defined the other uncommon causes like diverticula in the second part of duodenum,carcinoma of the gall bladder or peri ampullary carcinoma the most common cause is cholidocholithiasis [8]. The incidence of CBD stones in the patient of acute cholicystitis presenting with jaundice differes from author to author,56% according to L.J Lister, 73% in the patient with acute cholicystitis with associated jaundice compare only 6.5% of the non jaundiced patients according to D.L.F. watkin [5], Cheung L Y *et al* [6] in his study found this association to be 66%.,Warner et al tried to find out the cause of jaundice in the patient with acute cholicystitis other than presence of CBD stones, he concluded that cause of jaundice without presence of extra hepatic obstruction could be ascending nature of cholangitis [9]. M. Balal *et al* in their study found multiple organism from bile culture (mostly aerobic bacteria) and found that approximately 25% of blood culture grow the same organism such as E. coli, Klebsella, bacteriod species [10]. L.M blumgart *et al* found in there study that, 69% of the patients with post operative strictures were diagnosed within 6 months, 82% within 1 year and 94% within 5 years [11]. The physical examination and laboratory studies of the patients with biliary strictures produces the same spectrum of findings as in patients with billiary .Bhansali S.K in his study found that Jaundice complicating gall stone disease may be due to choledocholithiasis or cholangitis. About 20% of patients with acute pancreatitis have jaundice. In acute cholecystitis, icterus may result due to pressure of oedematous Hartman's pouch or pressure of stone impacted in hartman's pouch on the choledochus. Pancreatitis and biliary tract disease are causally related, though. the mechanism of the relationship is not clear. The coexistence is not uncommon The exact incidence of pancreatitis in various series of cholelithiasis and cholecystitis reported from India is not clear. In the present series it was 10 per cent. About 10 to 30% of acute or chronic pancreatitis are due to biliary tract diseases. Thus in every patient with pancreatitis, biliary tree must be thoroughly assessed and vice versa [12].

CONCLUSIONS

This study was conducted to determine the prevalence of jaundice in patients presenting with acute cholecystitis and to know the etiology of the jaundice and to know the importance of various diagnostic modalities and there indications. Among 144 patients who presented with acute cholecystitis, 22 patients had jaundice-

Following conclusions are drawn-

1- Total number of cases of acute cholecystitis in the study period was 144,out of which 22 patients had jaundice, so the incidence being 15.4% ..
2- Female to male ratio of patients with acute cholecystitis is 2.4:1,while with associated jaundice is 3.3:1.,study clearly signifies that disease is more prevalent in female population.
3- Cholidocholithiasis (CBD stones) was found to be the commonest etiology in patient of acute cholicystitis with jaundice,(63.6%) of cases. Other etiology being stricture,cholangitis,diverticula and mass lesion origination from gall bladder or periampullary region abutting the CBD.Mass lesion arising from gall bladder or periampullary region was second most common cause(13.6%).
4- USG was found to be a base line investigating procedure to identify acute cholecystitis and associated pathology with sensitivity of more than 98.6%..Restrictions are due to its being observer dependent and in few cases where the changes of acute cholecystitis is concealed by other associated pathology.USG should be done in all the patients who had a clinical evidence of acute cholecystitis with or without jaundice.In our study USG was done in all 144 patients, In 2 patients only, the changes of acute cholecystitis could not be defined on USG ,this could be due to presence of gall bladder mass ,that might have concealed the changes or observers failure to detect the changes.
5- ERCP is indicated in all the patients who had shown some bile duct pathology in ultrasonographic study, as in this study 22 patients on whom ERCP was done and had shown bile duct obstruction, it was successfully relieved either by stone extraction or by doing stenting except one patient in whom it was not successful. Success rate was-93.7%. Even if USG fails to detect CBD pathology, but if there is a strong clinical and bio chemical evidence of it,, ERCP should be performed, as USG is very much observer dependent.
6- CT scan is indicated in patients with mass lesion arising from gall bladder or periampullary region ,this would provide information regarding location, extent and metastasis of disease
7- There were three cases of mass lesion that was abutting CBD causing jaundice is the second most common cause in my study its higher than other studies.

8- Most of the patient who presented with acute cholecystitis had gall bladder stones 97.2%,in 2.8% cases cholecystitis was found without cholilithiasis.
9- According to both USG and ERCP cholidocholithiasis is the commonest cause of jaundice in patient of acute cholecystitis with jaundice, stricture/narrowing being the second commonest cause.

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