International Journal of Current Advanced Research
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 8; Issue 06 (A); June 2019; Page No.19050-19052
DOI: http://dx.doi.org/10.24327/ijcar.2019.19052.3659

Research Article

CLINICAL, BIOCHEMICAL AND RADIOLOGICAL CORRELATION IN CHOLEDOCHOLITHIASIS

Dr Sumitoj Singh, Dr Ashok Kumar and Dr Vikas Singh*

Department of General Surgery, Government Medical College, Amritsar, Punjab

A R T I C L E I N F O

Article History:
Received 06th March, 2019
Received in revised form 14th April, 2019
Accepted 23rd May, 2019
Published online 28th June, 2019

Key words:
USG, CBD, MRCP, ALP

A B S T R A C T

Background: Choledocholithiaisis is one of the most commonly encountered clinical entities and also one of the most commonly missed; which is most unfortunate as it is potentially curable condition. Primary choledocholithiasis is less common and occurs in the setting of bile stasis, resulting in higher propensity for intraductal stone formation. Older adults with large bile ducts and peri-ampullary diverticula are at elevated risk for formation of primary CBD stones. **Methods:** Our present study was carried out in 100 patients, admitted in surgery department with signs and symptoms suggestive of gallstone disease. Selection of patient was done on basis of inclusion criteria. Laboratory tests, and USG was done in all patients while MRCP was done in selected patients who fulfilled a certain criteria. All the patients underwent definitive surgery and surgical findings were considered the final results for evaluation. **Results:** Pain abdomen is the most common presenting symptom of Gallstone disease with associated fever (27%) and jaundice (40.9%) showeing statistical significance in patients of choledocholithiasis.ALP and transminases showed similar sensitivity of 72.73% for diagnosis of choledocholithiasis, while ALP showed highest specificity (97.44%) among laboratory parameters in choledocholithiasis patients.USG sensitivity in diagnosing choledlithiasis was 100% while, in diagnosing choledocholithiasis, it was 80.7%.MRCP showed highest sensitivity (95.65%) and highest specificity (100%) for diagnosis of choledocholithiasis. **Conclusion:** MRCP should be considered as the most accurate diagnostic tool for preoperative diagnosis of choledocholithiasis.

INTRODUCTION

Symptomatic cholelithiasis is a common medical problem, which makes cholecystectomy as one of the most frequently performed surgical procedures in the world. Choledocholithiasis complicates the workup and management of cholelithiaisis and necessitates additional diagnostic and therapeutic procedures and adds to the morbidity and mortality of the gallstone diseases.Incidence of the CBD stones in patients of gallstone diseases varies between 5% and 15% with an incidence of unsuspected stones upto 5% when routine cholangiography is performed[1,2,3]. Although CBD stones may be silent, the development of complications, such as cholangitis and acute pancreatitis, is associated with major morbidity and mortality. Therefore, the detection and treatment of CBD stones is mandatory. Most CBD stones are secondary in nature, having migrated from the gall bladder. The clinical presentation of choledocholithiasis may vary widely, as CBD stones may remain asymptomatic (in half of cases)[4] or associated with various symptoms and conditions, ranging from colicky pain to potentially life threatening complications such as ascending cholangitis or acute pancreatitis. Diagnosis of choledocholithiasis is not always straightforward and clinical evaluation and biochemical tests are often not sufficiently accurate to a firm diagnosis. The laboratory data may be normal in the patients with choledocholithiasis, warranting further evaluation of the CBD by imaging studies to calrify the diagnosis.

Corresponding author:* **Dr Vikas Singh
Department of General Surgery, Government Medical College, Amritsar, Punjab

MATERIAL AND METHODS

After approval from the Institutional Ethics Committee, Government Medical College Amritsar, a prospective study was conducted in a total of hundred (100) patients of gallstone disease, who presented to Surgical Outpatient and Indoors at Guru Nanak Dev Medical College & Hospital, Amritsar.

Inclusion Criteria: Men and Women, over the age of 18, with diagnosis or suspicion of gallstone disease.

The patients were examined for the clinical symptoms arising from effects and complications of gallstone disease such as - biliary Colic, acute and chronic Cholecystitis, Empyema/ mucocele Gall Bladder, perforation, biliary obstruction, acute cholangitis etc. Such patients were investigated with biochemical liver function tests, ultrasonography (USG) scanning. The patients with suspected common bile duct (CBD) stone based on above said investigations underwent magnetic resonance cholangio pancreatography (MRCP).

MRCP was done in patients who will fulfilled at least one of the following criteria

- Jaundice not due to hepatocellular causes i.e cases suspected to be of obstructive jaundice.
- Raised liver enzymes especially alkaline phosphatase (ALP) and serum bilirubin.
- Clinical/Biochemical suspicion of present or past gallstone pancreatitis.
- Dilatation of CBD or intrahepatic biliary radicals on USG in presence of gallstones.
- Presence of CBD Stone on USG scanning.

Once the CBD Stones were diagnosed, the patients were then subjected to open choledocholithotomy and findings of all investigations were verified intra operatively.

Statistical Analysis

The data from the present study was systematically collected, compiled and statistically analysed to draw relevant conclusions. The Multivariate analysis was performed using software IBM SPSS version 23.0®. The patient characteristics (non parametric data) were analysed using Chi-Square tests and the inter group comparison of the parametric data was done using the Unpaired t-test. The 'p' value was determined to finally evaluate the levels of significance. The power of the study was achieved well above 90% and with α error 0.05. The significance level was 95% ($p<0.05$), with values between 5% and 10% considered as borderline. The sensitivity and specificity of the various procedures was done and conclusions were drawn.

RESULTS

Table 1 Results of Laboratory Tests of The Analyzed Population

Laboratory test	With choledocholithiasis (n=22)		Without choledocholithiasis (n=78)	
	No.	%age	No.	%age
Elevated bilirubin	13	59.09	5	6.41
Elevated transaminases	16	72.73	6	7.69
Elevated ALP	16	72.73	2	2.56

Table 2 Sensitivity and Specificity of Laboratory Tests for Diagnosis of Choledocholithiasis

Tests	Sensitivity	Specificity	Positive predictive value	Negative predictive value
Elevated Bilirubin	59.09	93.59	72.22	89.02
Elevated Tranaminases	72.73	92.31	72.73	92.31
Elevated ALP	72.73	97.44	88.89	92.67

Table 3 Ultrasound Findings of All Analyzed Patients

Ultrasound findings	No. of cases	%age
Normal study	1	1.0
Cholelithiasis	73	73.0
Cholelithiasis with biliary dilatation	12	12.0
Cholelithiasis with choledocholithiasis	14	14.0

Table 4 Analysis of Mrcp Findings (In Patients Who Have Fulfilled Criteria for Undergoing Mrcp for Predicting Choledocholithiasis)

MRCP findings	No. of cases	%age
Cholelithiasis	3	11.53
Cholelithiasis with choledocholithiasis	23	88.47

Table 5 Comparison of Usg Findings With Respect To Surgical Findings

Findings on USG	No. of patients	No. of patients on surgery with similar findings
Normal study	1	1
Cholelithiasis	73	73
Cholelithiasis with dilatation or choledocholithiasis	26	20

Table 6 Comparison of Mrcp With Respect To Surgical Findings

Findings	No. of cases	%age
CBD stone in MRCP	23	100.0
CBD stone seen on surgery	22	95.65

DISCUSSION

Our present study was carried out in 100 patients, admitted in surgery department with signs and symptoms suggestive of gallstone disease.

In our study, female preponderance (87%) was observed against male counterparts (13%) for gall stone disease. The age distribution of patients for gall stone disease ranged from 23-76 years with a mean age of 50.5 years. Maximum incidence reported in 5th and 6th decade of life. It was observed in our study that abdominal pain, jaundice and fever were present in 95.4%, 40.9% and 27% of choledocholithiasis patients. Fever and jaundice were of statistical significant in choledocholithiasis group in comparison to patients who only had cholelithiasis.The results of our study correlate well with study done by Tozatti J *et al*[5], which reported 95% patients with pain abdomen, 30% with fever and 30% with jaundice and concluded fever and jaundice to be of statistical significance in choledocholithiasis group.

Elevated bilirubin showed sensitivity of 59.09% and specificity of 93.59% for choledocholithiasis. Elevated transaminases and ALP showed similar sensitivity of 72.73%. ALP was observed to be highest specific blood parameter with 97.44% specificity for preoperative diagnosis of choledocholithiasis. Our results were in concordance with study done by Tozatti J *et al*[5], which showed similar sensitivity for AST and ALT and high specificity for ALP in pre-operative diagnosis of CBD stones.In another study done by Cintra *et al*[6], which showed Alkaline phosphatase was altered in 98% of patients with choledocholithiasis.

According to ultrasonographic findings in our study, out of all analyzed patients, 73 patients were diagnosed to have cholelithiasis, 12 patients reported with cholelithiasis and biliary dilatation, 14 patients had cholelithiasis with choledocholithiasis. After comparing with surgical findings, USG was observed to have good accuracy for both cholelithiasis and choledocholithiasis. Out of 73 patients reported to have cholelithiasis, 73 were positive for gall bladder stone during surgery predicting 100% sensitivity of ultrasonography for cholelithiasis. 14 patients who showed

cholelithiasis with choledocholithiasis, 13 of them showed same findings during surgery. 12 patients who showed cholelithiasis with biliary dilatation, 8 of them were found to have CBD stone during exploration.Hence we found that biliary tract dilatation on ultrasonography is an important predictor of CBD stone and needs further evaluation. Amongst 26 patients suspected to have CBD stone according to USG findings, 21 patients shown to have CBD stone, resulting in 80.7% sensitivity of USG for choledocholithiasis.

MRCP was done as further investigational tool to confirm choledocholithiasis as per certain criteria amongst all patients who went for MRCP because of suspicion of choledocholithiasis, 23/26 patients showed CBD stone on MRCP of these 23 cases, 22 were positive for CBD stone on surgery concluding 95.65% sensitivity of MRCP for diagnosing choledocholithiasis. As there were no false positive case, MRCP also had 100% specificity in diagnosing
All the patients underwent surgery either open/laparoscopic cholecystectomy or cholecystectomy with CBD exploration or choledochoduodenostomy as per the intraoperative findings. All the pre-operative findings were verified upon surgery.According to surgical findings, 78% patients had cholelithiasis and 22% had choledocholithiasis in addition to cholelithiasis.

The results obtained in our study were comparable with study done by Varghese JC *et al*[7]. The study compared diagnostic accuracy of MRCP and USG in diagnosis of CBD stone in a group of patients with bile duct stone confirmed at direct cholangiography. The study concluded that USG had diagnostic accuracy of 89% and MRCP had sensitivity of 91%, specificity of 98% and diagnostic accuracy of 97% for diagnosis of choledocholithiasis.

CONCLUSION

ALP and transminases showed similar sensitivity of 72.73% for diagnosis of choledocholithiasis, while ALP showed highest specificity (97.44%) among laboratory parameters in choledocholithiasis patients.USG sensitivity in diagnosing choledlithiasis was 100% while, in diagnosing choledocholithiasis, it was 80.7%.MRCP showed highest sensitivity (95.65%) and highest specificity (100%) for diagnosis of choledocholithiasis. It should be considered as the most accurate diagnostic tool for preoperative diagnosis of choledocholithiasis.

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How to cite this article:

Dr Sumitoj Singh, Dr Ashok Kumar and Dr Vikas Singh (2019) 'Clinical, Biochemical and Radiological Correlation in Choledocholithiasis', *International Journal of Current Advanced Research,* 08(06), pp.19050-19052.
DOI: http://dx.doi.org/10.24327/ijcar.2019.19052.3659

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