Original Research Paper

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Surgery

SERUM FERRITIN AS PREDICTOR OF OUTCOME IN OBSTRUCTIVE JAUNDICE.

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ABSTRACT The serum ferritin is a marker for total iron store in the body. It is also an acute phase reactant in liver disease, infection, inflammation and malignancy. Early analysis of Serum Ferritin in patients with jaundice can predict the outcome. The aim of this study was to assess the utility of serum ferritin as predictor of outcome in patients with obstructive jaundice. **Materials And Methods:** This study included 60 patients with obstructive jaundice treated in a teaching hospital. Majority (37) had malignant aetiology and 23 patients had benign aetiology of obstructive jaundice. Data on Sr Ferritin, LFT and other haematological parameters were collected on the day of admission and patients were followed up & compared with the outcome. Statistical analysis was done using R statistical language, Double side t-test and Pearson's correlation test to study its significance. **Results:** The male female ratio was 34:26 with age group of 30 - 75 years. Sr Ferritin on admission was found to be significantly different in patients who survived (mean=409) and those with poor outcome (mean=729.8, p-value = 0.0076, CI-546 +- 94.013). Values of ferritin was also significantly different among those patients who required ICU admission and those who didn't (p value <0.0005). **Conclusion:** Early analysis of Serum Ferritin levels in patients with obstructive jaundice might effectively predict the disease severity and the need for early & appropriate management to improve the outcome.

KEYWORDS : Ferritin, obstructive jaundice, morbidity, mortality

INTRODUCTION:

Obstructive Jaundice is a common problem that occurs when there is an obstruction to the passage of conjugated bile from liver cells to intestine[1]. Jaundice due to biliary obstruction may be caused by a heterogeneous group of diseases that include both benign and malignant conditions [2]. If the obstruction is persistent and chronic, it is usually due to a chronic liver pathology, which commonly has a poor prognosis. Most acute cases can be successfully managed with medical, surgical, and/ or endoscopic treatment with full recovery. Obstruction caused by chronic liver disease and malignant aetiology usually has a less favourable prognosis [3]. Serum ferritin an acute phase reactant in liver disease, infection, inflammation and malignancy. A dynamic approach of assessing Serum Ferritin on the day of admission is of a great value in predicting the outcome and to modify the treatment irrespective of the causes of jaundice. The aim of this study was to establish Serum Ferritin as a biomarker in predicting the outcome in patients with obstructive jaundice of varied aetiology.

MATERIALS AND METHODS:

This prospective study was conducted on data collected from 60 consecutive patients treated for obstructive jaundice either due to benign or malignant cause in Department of General Surgery, Gauhati Medical College and hospital for a period of six months from September 2022 to February 2023.

Aetiology of obstructive jaundice was determined with ultra sonography, contrast-enhanced computed tomography (CECT) of whole abdomen, magnetic resonance cholangiography (MRCP) and tumour markers. The aetiology included both benign and malignant causes such as choledocholithiasis, benign stricture of common bile duct, carcinoma head of pancreas, Cholangiocarcinoma and advanced case of carcinoma gallbladder.

Patients less than 30 years and more than 75 years were excluded. All patients have undergone complete blood count, Liver function test, CRP, Ferritin on the day of admission and the patients were followed up and compared with the outcome. Data collected from these patients also included demographics, co-morbid conditions & vitals.

The primary end point of this study was to determine the role of Ferritin as a biomarker in predicting the outcome of patients with obstructive jaundice. Statistical analysis was done using R statistical language, Double side t-test and Pearson's correlation.

RESULTS AND OBSERVATIONS:

There were 60 patients of obstructive jaundice who were taken for the study. Mean age was 50.4 ± 11.18 and there was a male preponderance (N=36).

Table 1: Distribution of Gender with mean age

SEX	N	%	MEAN AGE
FEMALE	24	40%	47.36
MALE	36	50%	53.38
TOTAL	60	100%	50.4 ± 11.18

Majority had malignant aetiology 37(61.7%) patients and 23 patients had benign aetiology. The most common aetiology among benign causes was Choledocholithiasis followed by common bile duct stricture. The most common malignant causes were carcinoma of gall bladder followed by cholangiocarcinoma and carcinoma head of pancreas (Table 2).

Table 2: Aetiology of obstructive jaundice

Aetiology of obstructive jaundice	No of cases (%)
Choledocholithiasis	20 (86.95) ``
Benign stricture	3(13.04)
Ca GB	21(56.7)
Cholangiocarcinoma	11(29.7)
Ca head of pancreas	5(13.5)

Serum Ferritin, Total and Conjugated bilirubin of all 60 patients were taken on the day of admission and they were correlated using statistical tests. Pearson correlation coefficient was found to be 0.46, 0.50 with p values of 0.01 and 0.004 respectively. It was found that Ferritin levels highly correlated with total bilirubin & conjugated bilirubin in particular. (Table 3).

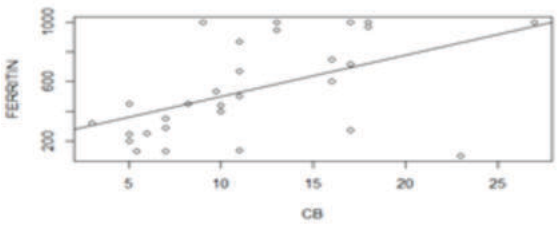


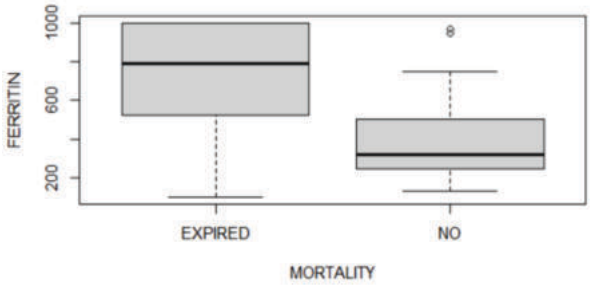
Fig 1: Correlation of Serum Ferritin with Conjugated Bilirubin

During in-patient care 33(55%) patients needed ICU care with mortality of 24(72%) patients. Serum ferritin values of those patients who required ICU care was compared with those who were treated in general wards. Values of ferritin was significantly higher among (mean=729.8) those patients treated in ICU (p value <0.0005) (Table 4 fig 2).

Table 3 Outcome In Patients With Obstructive Jaundice

SERUM FERRITIN	ICU CARE:33(%)	MORTALITY 24 (%)	P Value
<600	5 (15.15%)	2(8.33%)	<0.0005
600-799	7(21.21%)	4(16.66%)	
800-999	10(30.3%)	7(29.16%)	
>1000	11(33.3%)	11(45.83%)	

Table 5: Serum Ferritin and mortality [boxplot]



DISCUSSION:

Ferritin is a ubiquitous serum protein, known since the beginning of the 20th century. It has a molecular weight of 440 kDa. It consists of 24 subunits and contains both light (L-ferritin, 19 k Da, gene on chromosome 19) and heavy chains (H-ferritin, 21 kDa, gene on chromosome 11, It can store up to 4500 atoms of iron within its spherical cavity. It serves as an iron carrier and act as buffer against iron deficiency. The measurement of ferritin blood levels is commonly utilized in the evaluation of the total amount of iron in the body. A high concentration of ferritin found in 20% of liver diseases [4,5,6]. The ferritin levels in the blood are influenced by acute and chronic inflammation in face of bacterial invasion [7]. It is also an acute phase reactant in liver disease, infection, inflammation and malignancy [8]. A growing body of evidence has suggested that excessive values of ferritin may be predictive of increased mortality in patients with haematological, kidney, metabolic, cardiovascular and neoplastic diseases. Serum ferritin may be a potentially useful prognostic biomarker for septic patients in the ICU department [9,10,11]. In a study, ferritin levels above 1000 µg/L were found in malignancy followed by iron overload syndrome with poor prognosis (5). In this study, patients with ferritin >1000 µg/L were subjected to ICU care for septic complications with high mortality. In a study, there were extrahepatic cholestasis with various the levels of serum Ferritin were found with high levels of CA19.9. These returned to normal once obstruction was removed. There was correlation amongst level of Serum Ferritin, bilirubin and alkaline phosphatase (12). In this present study it was found that Ferritin levels highly correlated with increasing level of serum bilirubin. Ferritin is thought to be excreted into the bile canaliculi of patients with iron overload, probably by lysosomal exocytosis. The obstruction of the biliary tract is likely to elevate its serum concentrations (13). Cholangitis is a common complication of biliary tract obstruction which results in increase in serum ferritin levels [14]. It was well known that Gm negative infections enhance uptake of iron. The high ferritin levels in the patient in this study may be due to biliary tract obstruction associated with sepsis. In this present study the high level of serum ferritin was associated with high morbidity and mortality.

CONCLUSION:

Early analysis of Serum Ferritin levels in patients with obstructive jaundice might effectively predict the disease severity. The serum ferritin may be regarded as an independent prognostic marker in patients with obstructive jaundice

Conflict of interest: None

Ethical issue: None.

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