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TO EVALUATE HAEMATOLOGICAL INDICES IN CHRONIC LIVER DISEASE IN ADULTS

Pathology

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ABSTRACT

Chronic liver disease refers to disease of the liver which lasts over a period of six months. It consists of a wide range of liver pathologies which include inflammation (chronic hepatitis), liver cirrhosis, and hepatocellular carcinoma. Fibrosis is a structural change that occurs in the liver secondary to chronic injury, due to intrahepatic vascular remodeling with capillarization of sinusoids, fibrogenesis, neoangiogenesis, and development of intrahepatic shunts that lead to increased hepatic resistance. This eventually produces an increase in portal pressures and a decrease in effective hepatocyte perfusion. Liver functions include the production of clotting factors and other proteins, detoxification of harmful products of metabolism and excretion of bile. Cirrhosis is a final stage of chronic liver disease that results in disruption of liver architecture, the formation of widespread nodules, vascular reorganization, neo-angiogenesis, and deposition of an extracellular matrix. There is alteration of various hemodynamic parameters which will be discussed in our study. We can determine the occurrence of fibrosis in such patients by hematological indicators as well as imaging studies which are further correlated with fibroscan.

KEYWORDS

Chronic liver disease, hematological indices, fibrosis.

INTRODUCTION

Chronic liver diseases (CLDs) are a set of diseases characterized by decreased hepatic function as a result of chronic inflammation or insult to the liver for more than 6 months. Chronic liver disease with or without liver failure is associated with considerable morbidity and mortality and affects the quality of life as usually they are progressive and often non-reversible.1 Cirrhosis and its complications represent the end in the spectrum of chronic liver diseases, irrespective of etiology. The diagnosis of decompensated cirrhosis was based on the presence of any of the following: ascites, variceal bleeding or encephalopathy. Liver function tests are blood tests used to help diagnose and monitor liver disease or damage. the tests include alanine transaminase (alt), aspartate transaminase (ast). alkaline phosphatase (alp).

Primary liver problems like cirrhosis can lead to haematological abnormalities and primary haematological diseases can in turn affect the liver and its functioning.[2]

Using a combination hematological profile and imaging tests like fibroscan may also be helpful in preventing complications in patients with chronic liver disease.[3]

Ultrasound (US) has a major role in the diagnosis and management of chronic liver diseases by providing diagnostic and prognostic information as well as detecting complications such as HCC and portal hypertension. Transient elastography (FibroScan) is a new, non-invasive, rapid, and reproducible method allowing evaluation of liver fibrosis by measurement of liver stiffness.

Transient elastography is a promising non- invasive method for detection of cirrhosis in patients with chronic liver disease.4 APRI is aspartate aminotransferase to platelet ratio index. When there's too much fibrosis in the liver, scar tissue replaces healthy tissue. This leads to cirrhosis, which is life threatening condition. The APRI score measures the amount of fibrosis in the liver.

Major complications of cirrhosis include portal hypertension, esophagealvarices, hepatomegaly, hypersplenism, ascites, spontaneous bacterial peritonitis, hepatorenal syndrome type I and II, hepatic encephalopathy, hepatopulmonary syndrome, malnutrition, coagulapathy, fibrinolysis factor deficiency, thrombocytopenia, bone disorders, osteopenia, osteoporosis, osteomalacia, hematologic disorders, anemia, hemolysis, neutropenia, diabetes mellitus, cancer, heart or renal failure, pancreatitis, etc.

OBJECTIVE:

To evaluate the haematological indices, type of anemia, abnormalities in red blood cell and white blood cell, platelet abnormality, liver function test and to correlate haematological findings in chronic liver disease patient with fibroscan.

MATERIAL METHODS:.

This prospective study was carried out in the department of pathology in haematology section, Government Medical College, Amritsar, from April 2021 to June 2022. The written informed consent was taken from the patient who was presented with sign and symptoms of chronic liver disease. They were first undergone complete blood count, liver function test and fibroscan. Institutional Ethical Committee clearance was obtained for the study.

To evaluate the following haematological indices we were using H360 haematological analyzer.

For evaluation of liver function test we were using Erba Mannheim XL system pack machine.

Gray scale ultrasound with fibroscan was done using Samsung RS80 for patients suspected of chronic liver disease.

F0 to F1 (2 to 7 kPa)	Little or no scarring
F2 (7.5 to 10 kPa)	Moderate scarring indicates that has spread outside the liver

F3 (10 to 14 kPa)	Severe scarring which has spread and disrupts normal blood flow.
F4 (14 kPa or higher)	Means late-stage scarring or cirrhosis

OBSERVATIONS

Table 1: Age Distribution

Age group (years)	Number	Percentage
18 to 30	2	2.86
31 to 40	11	15.71
41 to 50	23	32.86
51 to 60	22	31.42
More than 60	12	17.14
Total	70	100
Mean	48.9	
SD	9.37	

Table 2: Distribution Of Patients According To Gender

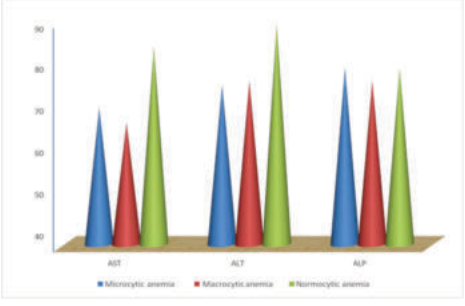
Gender	Number	Percentage
Males	41	58.57
Females	29	41.43
Total	70	100

Table 3: Etiologic Profile Of Chronic Liver Disease

Etiologic profile	Number	Percentage
Alcohol	42	60.00
Hepatitis B	12	17.14
Hepatitis C	9	12.86
Others	7	10.00
Total	70	100

Table 4: AST, ALT AND ALP LEVELS In Anemia Patients

Type of anemia	AST		ALT		ALP	
	Mean	SD	Mean	SD	Mean	SD
Microcytic anemia	55.09	10.75	64.28	15.39	70.99	11.71
Macrocytic anemia	49.00	8.02	65.67	16.80	65.73	10.42
Normocytic anemia	79.68	8.32	88.56	8.14	70.88	12.36
Overall	64.48	10.18	74.11	14.36	70.56	11.84

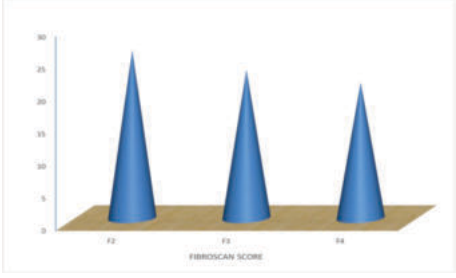


Graph 1: AST, ALT AND ALP Levels In Anemia Patients

Overall, AST levels among anemic patients were found to be 64.48 IU/L. Overall, ALT levels among anemic patients was found to be 74.11 IU/L. Overall, ALP levels among anemic patients was found to be 70.56 IU/L.

Table 5: Distribution Of Patients According To FIBROSCAN Score

FibroScan score	Number	Percentage
F2	26	37.14
F3	23	32.86
F4	21	30.00
Total	70	100



Graph 2: Distribution Of Patients According To FIBROSCAN Score

DISCUSSION

Chronic liver disease is a wide spectrum disease ranging from chronic hepatitis to cirrhosis. It is caused by many different etiology's agents. Among these, anemia is a frequent occurrence, seen in about 75% of patients with advanced liver disease. The etiology of anemia, especially in cirrhotic patients, is complex and multifactorial.[5]

The liver performs a major role in iron homeostasis. It is the main organ for the production of the iron regulatory hormone hepcidin, expressed in iron excess conditions as well as in cases of inflammation, blocking the absorption of iron from the enterocytes.

Hemolysis also represents a common cause of anemia in patients with liver disease, especially of alcoholic cause, and is usually attributed to spur-cell anemia.

In patients with alcoholic liver disease, the iron is not incorporated into the haemoglobin molecules. Instead, it is converted into the storage form i.e., ferritin, which can accumulate in RBC precursors, forming granules around the nucleus producing functionally immature cells. Megaloblasts are frequently seen in the peripheral smear of alcoholic patients affecting up to one-third of these patients. These alcoholics generally have reduced folic acid levels in their RBC's mostly due to dietary deficiency of folic acid. In addition, alcohol ingestion aggravates this by altering the absorption of folic acid from food.[6,7] Alcohol was the most common etiologic agent followed by hepatitis B and Hepatitis C.

Mean Hb ,mean MCV, Mean MCHC , Mean MCH, Mean platelet count, Mean WBC count and RBC count, Mean AST, ALT and ALP levels were calculated and we found that similar results have been reported in the past literature. In a previous study conducted by Özatli D et al[8] ,on patients with chronic liver disease, Out of 70 patients with chronic liver disease, anemia was found to be present in 40 patients (57.14 %). In another study conducted by Khare S et al,[9] authors reported presence of anemia in 75 % of the patients with chronic liver diseases.

TYPE OF ANEMIA

Out of 40 patients with anemia, microcytic anemia was found to be present in 21 patients (52.5%), while macrocytic anemia and normocytic anemia was present in 3 patient (7.5%) and 16 patient (40%). Overall, WBC Count among anemic patients was found to be $4.53x10^9$cells/cu mm.

Overall, RBC Count among anemic patients was found to be $3.47x10^{12}$ cells/cu mm. Overall, AST levels among anemic patients were found to be 64.48 IU/L. Overall, ALT levels among anemic patients was found to be 74.11 IU/L. Overall, ALP levels among anemic patients was found to be 70.56 IU/L.

Table 6: Hematological Indices With FIBROSCAN Score

Correlation with FibroScan score	r- value	p- value
Hb (g/dL)	-0.1718	0.3156
MCV (fl)	-0.3913	0.0017*
MCHC (g/dL)	-0.3546	0.0020*
MCH (Pg)	-0.3022	0.0398*
Platelet count ($x10^3$/dL)	-0.7921	0.0012*
WBC Count ($x10^9$ cells/cu mm)	-0.4687	0.0021*
RBC Count (x1012 cells/cu mm)	-0.1543	0.2468
AST (IU/L)	-0.5135	0.0038*
ALT (IU/L)	-0.5642	0.0010*
ALP (IU/L)	-0.4984	0.0015*

*significant

While evaluating the FibroScan score with haematological indices, significant correlation of FibroScan score was seen with MCV, MCHC, MCH ,

Platelet count, WBC count, AST and ALT. Our results were similar to Foucher J et al1, who also reported similar findings in their study.

Significant correlation of Platelet count with fibrosis was seen among patients with chronic liver diseases. In a similar study conducted by Zhong LK et al10, significant correlation of platelet count with fibrosis was seen among patients with chronic liver diseases.

RESULTS

The present study was conducted for evaluating occurrence of anemia among 70 patients with chronic liver diseases. Following results were obtained:

- 32.86% of the patients belonged to the age group of 41 to 50 years while 31.42% of the patients belonged to the age group of 51 to 60 years. 15.71% of the patients belonged to the age group of 31 to 40 years. Mean age of the patients was 48.9 years.

- 58.57 % of the patients were males while the remaining were females.

- Alcohol was the etiologic agent found to be present in 60% of the patients while hepatitis B was responsible for 17.14% of cases. Hepatitis C was the etiologic agent in 10% of the patients.

- Mean Hb levels were found to be 10.66 g/dL while mean MCV was found to be 83.26 fl. Mean MCHC was found to be 29.68 g/dL. Mean MCH was found to be

- 29.03 Pg. Mean platelet count was found to be 107.73 x 103 /dL. Mean WBC count and RBC count was found to be 4.82 x109 cells / cu mm and 3.76 x 1012 cells/ cu mm respectively. Mean AST, ALT and ALP levels were found to be 61.17 IU/L, 67.52 IU/L and 72.12 IU/L respectively. Out of 70 patients with chronic liver disease, anemia was found to be present in 57.14% of the patients. Out of 40 patients with anemia, microcytic anemia was found to be present in 52.5% of the cases, while macrocytic anemia and normocytic anemia was present in 7.5% and 40% of the patients.

CONCLUSION

The present study was conducted for evaluating occurrence of anemia among 70 patients with chronic liver diseases.

- Alcohol was most common etiologic agent followed by hepatitis B and Hepatitis C.
- Microcytic anemia was found to be present in 52.5% of the cases, while macrocytic anemia and normocytic anemia was present in 7.5% and 40% of the patients.
- While evaluating the FibroScan score with haematological indices, significant correlation of FibroScan was seen with MCV, MCHC, MCH, Platelet count, WBC count, AST, ALT and ALP.
- Thrombocytopenia is observed in most of the patients with deranged liver function test.
- Overall, AST, ALT and ALP levels are increased in anemic patients.

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