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Original Research Article

A Study of Haematological Abnormalities in Patients of Alcohol Liver Disease and its Clinical Significance

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Abstract

Background: The liver is the body's largest organ, accounting for 1.5-2.5% of lean body mass and weighing 1-1.5 kg. Liver diseases are fast emerging as global health priorities. Alcohol is a commonly used medicine with hematopoiesis suppression as one of its adverse effects. Alcohol consumption is known for morbidity and mortality, being a serious health hazard of the world.

Methods: The study was conducted in the patients admitted in Department of General Medicine, Jhalawar Medical College, Jhalawar, Rajasthan, after taking informed consent eligible patients were enrolled according to the inclusion and exclusion criteria.

Result: According to hematological indices (RBC and MCV), 20% of cases have normal RBC, while 80% have low RBC (with 3.41±0.95).MCV revealed that 17% of cases had a low MCV of 95.10±13.42, whereas 40% of cases had a high MCV. The mean HB was 12±32.39(4.1±13.3), with a median of 9.2 gm% and 23% of cases had leukopenia, 13% had leukocytosis, and 64% had a normal total leucocyte count. 47.72% of cases have thrombocytopenia, and 28% of cases have a normal platelet count of 1.14± 0.73 while in 17% of patients, pancytopenia was noted. According to P.B.F. Smear, 54% of cases are macrocytic anemia, 28% are normochromic normocytic, 13% are microcytic hypochromic and 5% are dimorphic anemia.PT and BT results showed that 89% of cases had high PT, 11% had normal PT, 29% had high BT, and 5% had low BT.

Conclusion: Cirrhosis of the liver is caused by long-term, excessive alcohol intake and affects a number of physiological, biochemical, and metabolic processes, including the maturation and generation of blood cells. These negative effects can have substantial medical consequences, such as anaemia, a higher chance of developing life-threatening bacterial infections, leucopenia, leukocytosis, thrombocytopenia, pancytopenia, prolonged PT and BT.

Keywords: ALD, MCV, MCHC, PT, BT, Hemoglobin, Anemia.

Introduction

The alcoholic liver disease covers a spectrum of disorders beginning from the fatty liver, progressing at times to alcoholic hepatitis and culminating in alcoholic cirrhosis, which is the most advanced and irreversible form of liver injury related to the consumption of alcohol.

There are three histologic stages of alcoholic liver disease[1][2]:

1. **Alcoholic Fatty Liver or Steatosis:** At this stage, fat accumulates in the liver parenchyma.
2. **Alcoholic Hepatitis:** Inflammation of liver cells take place at this stage, and the outcome depends on the severity of the damage. Alcohol abstinence, nutritional support, treatment of infection, and prednisolone therapy in severe cases can help in the treatment of alcoholic hepatitis, but more severe cases lead to liver failure.
3. **Alcoholic Cirrhosis:** Liver damage at this stage is irreversible and leads to complications of cirrhosis and portal hypertension.

Alcohol-related liver disease (ALD), also known as alcoholic hepatitis and chronic hepatitis with liver fibrosis or cirrhosis, is a term that refers to all liver symptoms of excessive alcohol intake, including fatty liver, alcoholic hepatitis, and cirrhosis.[3] Chronic liver diseases frequently are associated with hematological abnormalities. Anemia of diverse etiology occurs in about 75% of patients with chronic liver disease[4]. A major cause of anemia associated with chronic liver disease is hemorrhage, especially into the gastrointestinal tract. Patients with severe hepatocellular disease develop defects of blood coagulation as a consequence of endothelial dysfunction, thrombocytopenia, deficiencies of coagulation factors and various associated disorders[5]. Impact of alcohol on hematopoietic system divided into direct and indirect effects. Direct effect seen in bone marrow and involves red cell, white cell, and platelet lines. Indirect effect due to metabolic or physiologic alterations resulting in liver disease and nutritional abnormality such as folate deficiency.[6] Hence, alcohol consumption is known for morbidity and mortality, being a serious health hazard of the world. Multiple organs can be involved such as hepatobiliary system, cardiovascular system, central nervous system, and hematopoietic system.

Material and Methods

Study Setting:

The study was conducted in the patients admitted in Department of General Medicine, Jhalawar Medical College, Jhalawar, Rajasthan.

Sampling Technique:

Simple random sampling method.

Study Duration:

From February 2022 to December 2022.

Study Design:

Cross sectional Observational study.

Inclusion Criteria:

Age >18 years

Patients admitted in wards of general medicine department with alcoholic liver disease.

Exclusion Criteria:

- Patients with known primary hepatocellular carcinoma or GI malignancies were excluded.
- Patients with primary coagulation disorders or primary abnormalities in hemostatic function were excluded.
- Patients with pre-existing anaemia were excluded.
- Patients with Acute hepatic failure were excluded.

- Patients suffering from end stage medical diseases like CKD, Coronary artery disease, Cardiac failure, COPD were excluded.
- All Patients with chronic liver disease except alcoholic liver disease were excluded.

Sample Size

One hundred patients with alcoholic liver disease admitted in general medicine ward were taken over a period of Feb 2022 to Dec 2022.

Methodology

One hundred patients admitted in the Department of General Medicine at Jhalawar medical college, Jhalawar satisfying the inclusion and exclusion criteria were taken for the study.

Examinations And Investigations

A detailed clinical history was taken. Complete physical examination was done, including vitals-Temperature, Heart rate, Blood Pressure, Respiratory Rate, Oxygen Saturation (by Pulse Oxymetry), Glasgow Coma Scale.

Radiological evaluation was done.

Investigation

CBC & PBF

LFT

RFT & Serum Electrolytes

PT-INR AND BT

Ascitic Fluid Examination-Cell Count, Biochemical Analysis, Cytology, Culture And Sensitivity

HBsAg, Anti HCV Antibody

USG Abdomen & Pelvis

Chest X-ray, ECG

Statistical Analysis

Chi-square test and Independent t tests were employed for statistical analysis using SPSS for windows version 23. A p value of <0.05 was considered as significant.

Results

Table 1: Distribution of cases according to hematological indices

RBC (Value) 4.5-10×10^6 /µl	Number	Percentage (%)
Low	80	80
Normal	20	20
Mean±SD	3.41±0.95	
MCV (>100)		
Low	17	17
Normal	43	43
Mean±SD	95.10±13.42	

Table 2: Distribution of cases according to Hemoglobin

	Hemoglobin
Anemic cases Number (N)	95/100
Mean	9.123
Std. Deviation	2.3936
Minimum	4.1
Maximum	13.3
Median	9.200

Table 3: Distribution of cases according to Total leucocyte count.

Total leucocyte count		
Leukopenia	23	23
Leucocytosis	13	13
Normal	64	64
Mean±SD	7356.00±4186.47	

Table 4: Distribution of cases according to platelet count.

Platelet count	**Number**	**Percentage (%)**
Normal	28	28
Thrombocytopenia	72	72
Mean±SD	1.14±0.73	

Table 5: Distribution of cases according to pancytopenia.

Pancytopenia	**Number**	**Percentage (%)**
Yes	17	17

Table 6: Distribution of cases according to P.B.F. Smear

P.B.F. Smear	**Number (N=100)**	**Percentage (%)**
Macrocytosis	54	54
Normocytic normochromic	28	28
Microcytic hypochromic	13	13
Dimorphic anemia	5	5

Table 7: Distribution of cases according to PT& BT

PT (12 to 16s)	**Number (N)**	**Percentage (%)**
High	89	89
Normal	11	11
Mean±SD	21.714±4.7736	
INR	1.562±0.3434	
BT (2 to 8Mins)		
High	29	29
Low	5	5
Normal	66	66
Grand Total	100	100.00
Mean±SD	6.08	3.848
Min to max	1 to 14	

Discussion

Table 1 depicts the distribution of the cases according to hematological indices (RBC & MCV) where 80% cases head low RBC with3.41±0.95 followed by 20% head normal RBC. According to MCV, 40% of cases had a high MCV and 17% had a low MCV of 95.10±13.42.

Dr Vijay Tara *et al* in 2018 [7] studied chronic liver disease patients which showed that all hematological parameters including RBC, Hb, PCV, MCHC, Platelet, PT were decreased except MCV and MCH which were increased.

Shivam khare *et al* [8] in 2014 also analysed increased MCV & decreased Hb in alcoholic liver disease patients.

Table 2 is showing comparison of groups according to Hb Mean Hb was 9.123±2.39(4.1±13.3) median 9.2 gm%. Total Anaemic cases were 95 %.

Raviteja Cherukuri *et al* in 2018 [9] observed that mean Hb% of the study population was 8.97±2.21g/dl. E Halleys kumar, *et al* in 2021 [10]observed that 86 percentages of patients had anaemia.

Table 3 depicts, 23% cases had leukopenia, 13% had Leukocytosis& 64% had normal total leucocyte count with a mean SD of 7356.00 ±4186.47.

Table 4 depicts, 72% of cases have thrombocytopenia and 28% of cases have normal platelet count with 1.14 ±0.73.

Table 5 depicts Pancytopenia was observed in 17% in cases.

Joeimon *et al* in 2017 [11] found that 44 % of patients had a normal WBC count. 26 % had low counts below 4000. 16% of patients had a count above 12000. 50% of patients had thrombocytopenia. These verities of thrombocytopenia had good correlation with spleen size. Raviteja Cherukuri *et al.* in 2018 [9] observed that 16.9% had leukopenia and 18.5% had leucocytosis.70% had thrombocytopenia. E Halleys kumar *et al* in 2021[10] observed that 86 percent had anaemia, 36 percent had leucocytosis and 56 percent had thrombocytopenia.

Table 6 depicts distribution of cases according to P.B.F. Smear. Where 54% of cases belong to macrocytic, followed by28% of cases normochromic normocytic, 13% of cases microcytic hypochromic, and 5% dimorphic anemia.

Jha *et al* 2019[12] observed that macrocytic anemia more common in alcoholic liver disease patients. E Halleys kumar *et al* in 2021 also observed that macrocytic more common in alcoholic liver disease patients.

Table 7 depicts distribution of the cases according to PT & BTwhere89% cases had high PT and, 11% had normal PT and 29% cases had high BT and 5% with low BT.

Joeimon *et al* in 2017[11] found that the PT-INR was elevated in 72 % of patients. Raviteja Cherukuri *et al* in 2018[9] observed that Prothrombin was prolonged in 71.5%. findings of our study are comparable to that PT INR increased in most of the cases of alcoholics liver disease patient.

Conclusion

In alcoholic liver diseases patients, various hematological changes are very common which need to be identified and corrected early to reduce morbidity and mortality. It is important to typify anemia in alcoholic cirrhosis with respective etiology, characterizing hematological abnormalities may help in better clinical management and help to improve prognosis.

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