



General Medicine

A STUDY ON HAEMOTOLOGICAL ABNORMALITIES IN CHRONIC LIVER DISEASE

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ABSTRACT **Background:-** Chronic liver disease is an end stage disease and hematological abnormalities are common finding in it, adding morbidity to primary pathology and increase the mortality. The study was conducted to assess the hematological abnormalities and haemostatic derangements in CLD patients. Broadly, the hematological abnormalities are viewed under abnormalities in RBCs, WBCs, platelets and coagulation profile. **Methods:-** total 100 patients who fulfilled our criteria were enrolled in our hospital, King George hospital, Visakhapatnam. Patients were investigated after their oral and written consents wherever required. **Results :-** various hematological abnormalities encountered were normocytic normochromic anemia followed by microcytic anemia. Macrocytic anemia mostly in alcoholics. Leukocytosis was observed more than leucopenia and thrombocytopenia. Prothrombin time and APTT were increased. **Conclusion:-** every chronic liver disease patient must be evaluated for hematological abnormalities and should be treated accordingly as early as possible to decrease mortality.

KEYWORDS : Chronic liver disease, hematological abnormalities, anemia

INTRODUCTION

- The liver plays a vital role in homeostasis. Loss of Liver function can manifest as subtle metabolic abnormalities and disorders in haematological parameters which can ultimately culminate in grave complications.
- The liver is the storage site for iron, B12 and folic acid which are necessary for the normal hematopoiesis.
- The liver also secretes the clotting factors and the inhibitors and keep the hemostasis in equilibrium.

AIM OF THE STUDY

- To assess the haematological abnormalities in a chronic liver disease patient.
- To detect the abnormalities in RBCs and to find the type of anaemia in a patient with chronic liver disease.
- To detect WBC abnormalities.
- To detect the platelet abnormalities.
- To assess the secretion and function of clotting factors in patients with cirrhosis.

BACKGROUND:

- Cirrhosis is defined as an architectural distortion of the liver with intensive fibrosis and regenerative nodule formation.
- The liver secretes transferrin which is necessary for the transport of iron from the site of absorption to bone marrow for the synthesis of heme and RBCs production.
- The liver plays a crucial role in B12 metabolism in taking part in enterohepatic circulation and also secretes transcobalamin I, necessary for the transport of B12 to the storage site.
- Thrombopoietin, a regulator of platelet synthesis, is secreted by the liver.
- The liver is the leading site of synthesis of the coagulation protein: Vitamin K dependent factors - II, VII, IX & X, Labile factor - V, Contact factor - XI & XII, Fibrinogen and fibrin stabilising factors.
- The liver also synthesises inhibitors of the coagulation cascade. These are Antithrombin III, Protein C & S, Heparin cofactor II.
- The liver also synthesises plasmin inhibitors such as α_2 -antiplasmin and tissue plasminogen activator inhibitor.
- Anaemia in uncomplicated cirrhosis is due to Hemodilution - due to increased plasma volume, hypersplenism, chronic inflammation and increased level of inflammatory cytokines suppress the bone marrow.
- Leukocytosis can occur in response to infection, haemorrhage, hemolysis and malignancy.

- Leucopenia seen in CLD is due to hypersplenism or a toxic effect on bone marrow.
- The mechanism for thrombocytopenia are: Shortened mean platelet life span, Platelet pooling in an enlarged spleen, Inability of marrow to compensate, Reduced thrombopoietin production.

MATERIALS AND METHODS

- To Assess the haematological abnormalities in chronic liver disease, the prevalence study was conducted in King George Hospital, during the period from June 2021 to May 2022. About one hundred patients were selected in random for this study.
- Oral consent of the patients got for the clinical examination and the lab investigations.
- The patient was taken detailed history and examination was done.
- Patients were submitted to several blood investigations.
- To assess RBC abnormality
 1. RBC count
 2. Haemoglobin estimation
 3. Packed cell volume (PCV)
 4. MCV, MCHC, MCH
 5. Peripheral smear for blood picture.
 6. Reticulocyte count
- To assess WBC abnormality:
 1. Total WBC count
 2. Differential count
- To Assess hemostasis
 1. Platelet count
 2. Prothrombin time
 3. partial thromboplastin time.

Inclusion Criteria:

- 1. All liver disease patients whose symptoms and signs persist more than six months
- 2. Alcoholic and post-infective, metabolic causes of liver diseases are taken for study

Exclusion Criteria:

- 1. Patients with known GIT malignancy or known primary hepatocellular carcinoma.
- 2. Patients with a primary coagulation disorder.
- 3. Acute liver cell failure
- 4. Liver cell failure due to infective cause and patients with other causes of septicemia or endotoxemia other than primary liver causes.

Data Analysis

- This study regarding the assessment of haematological profile and

hemostasis was conducted among 100 inpatients in the medical department at Government General Hospital.

- Out of 100 patients in this study, there are 82 male patients and 18 female patients. The age of patients in this study was in the range from 20 to 60.

Age(yrs)	Male	Female	Total	%
20-30	4	1	5	5%
30-40	26	8	34	34%
40-50	38	7	45	45%
50-60	14	2	16	16%

Analysis Of RBCS:

- Eighty-four patients had anaemia, and only sixteen patients had normal haemoglobin above 12 gm%. About 30 patients had severe anaemia of less than 8 gm%.

Characteristics Of Anaemia:

- All the Sixteen patients with an average hemoglobin level had normochromic and normocytic blood picture.
- Among the 84 patients, 49 patients had normochromic and normocytic anaemia, 20 patients had microcytic anaemia, and 15 patients had macrocytosis.

Anaemia In CLD:

Hb(gm%)	Cases	%
<6	2	2%
6-8	28	28%
8.1-10	40	40%
10.1-12	14	14%
12.1-14	16	16%
>14	Nil	0%

RBC Count:

RBC Count(million/mm3)	cases	%
2.5-3.0	14	14%
3.0-3.5	28	28%
3.5-4.0	30	30%
4.0-4.5	12	12%
>4.5	16	16%

Type Of Anemia:

Type of RBC	No of patients with anemia	No of patients with normal Hb
Normocytic	49	16
microcytic	20	-
Macrocytic	15	-

Wbc Abnormalities:

- Among the 100 patients, leucocytosis was observed in 22 patients with lymphocytosis were observed in 12 patients. Leucopenia is present in 5% of patients.

TC(cells/mm3)	No of patients	%
<3000	5	5%
3000-6000	13	13%
6000-9000	32	32%
9000-12000	28	28%
>12000	22	22%

Platelet Abnormalities:

- Patients with a platelet count of fewer than 1.5 lakhs were carried out to have thrombocytopenia. Thrombocytopenia was found to be in 51 patients among 100 cases in the study.

platelet count(cells/mm3)	no of patients	%
<50,000	3	3%
50,000-1,00,000	16	16%
1,00,000-1.5 lakhs	32	32%
1.5-2.0 lakhs	26	26%
>2.0 lakhs	23	23%

Abnormalities In Coagulation:

- As we have no facility for the estimation of individual clotting factors, the patients were assessed for the coagulation profile by testing for prothrombin time and activated partial thromboplastin time.
- Among the 100 patients, 58 patients had prolonged prothrombin time, and 42 patients had standard prothrombin time.
- Among the 100 patients APTT prolonged in almost all patients who had increased PT.

DISCUSSION

- Severe anaemia in cirrhosis will necessitate the investigations to

rule out the following conditions: Bleeding oesophageal varices, Bleeding peptic ulcer, Malignancy, Hemolysis, Bleeding anorectal varices, Increased bleeding tendencies.

- Macrocytosis in cirrhosis is mostly due to the toxic of alcohol on RBC production in the bone marrow and deficiency of B12 and folic acid.
- Microcytosis in cirrhosis due to: decreased total iron concentration with alterations in iron metabolism due to reduced serum transferrin. Hemolysis due to hypersplenism, an autoimmune process, lipid abnormalities or intracorporeal defects.
- Leucocytosis, which was mostly due to infections due to the community required disease, nosocomial, infection, spontaneous bacterial peritonitis and secondary peritonitis due to repeated peritoneal paracentesis.
- Leucopenia may be due to direct intolances of alcohol on bone marrow. Chronic inflammatory cytokines had a suppressor effect on bone marrow, hypersplenism.
- In our study, patients had elevated prothrombin value which is evident in clotting factor deficiency. They have also treated with vitamin K injection for one week, and the prothrombin time was repeated. Some show a decrease in the prothrombin value.

CONCLUSION

- According to this study conducted with a limited cases of 100 patients, we inferred many conclusive results regarding the hematological and hemostatic abnormalities in a decompensated chronic liver disease patients.
- Almost 80% of the patients had anaemia in any one of the forms.
- Most common anaemia in cirrhosis is normochromic normocytic anaemia as inferred from the study.
- Macrocytosis is almost universal with alcoholics.
- Leucopenia is found to be rare as per the study, and Leucocytosis is more common in patients with spontaneous bacterial peritonitis and secondary peritonitis.
- Thrombocytopenia is present in more than 50% of patients.
- Prothrombin time and activated partial thromboplastin time are prolonged more than half of the patients.
- Hence with this study, all the cirrhosis patients must be evaluated for haematological and hemostatic abnormalities and should be monitored for any complication.
- Early treatment to correct these comorbidities can decrease mortality.

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