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# To study haematological profile in patients of chronic liver disease

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**Abstract**
**Aim**: To assess the haematological profile in chronic liver disease patients.
**Objectives**
1) To detect the abnormalities of rbcs in a chronic liver disease patient.
2) To find the type of anaemia in patient with chronic liver disease and comparison between alcoholic and non-alcohalic chronic liver disease patient.

**Materials and methods**
1) To asses type of anaemia in chronic liver disease. The study was conducted J.A. Group of Hospital during the period of June 2013 to November 2014.
2) About 100 patients of chronic liver disease with anaemia were selected in random from patients coming to department of general medicine opd and ward patients.

**Conclusion**: Normocytic normochromic anaemia was predominant in overall chronic liver disease patients and Normocytic normochromic anaemia was also predominant in both alcoholic and nonalcoholic chronic liver disease group. While Macrocytic anaemia prevalence was higher in Alcoholic chronic liver disease patients than nonalcoholic group. MCV increases and haemoglobin decreases with the severity of Child Pugh score especially in alcoholic chronic liver disease so we can say that macrocytic anaemia increases with severirty of alcoholic chronic liver disease. Early detection and treatment of haematological changes can prevent complications and reduce the mortality in CLD patients.

**Keywords:** Anaemia, chronic liver disease, alcoholic, non-alcoholic

## Introduction

Chronic liver disease in the clinical context is a disease process of the liver that involves progressive destruction and regeneration of the liver parenchyma leading to fibrosis and cirrhosis [1]. Typical presenting symptom of liver disease include fatigue, jaundice, right upper quadrant pain, itching, nausea, poor appetite, edema, abdominal distension, intestinal bleeding. Chronic liver disease frequently associated with haematological abnormalities. Anaemia of diverse etiology occur in about 75% of patients of chronic liver disease.

Pathogenesis of haematological changes is multifactorial and included portal hypertension induce sequestration, alteration in bone marrow stimulating factors, viral and toxin induced bone marrow suppression and consumption or loss. Abnormalities in haematological indices are associated with increased risk of complications including bleeding & infection. Causes of anaemia in chronic liver disease - Iron deficiency, hypersplenism, anaemia due to chronic disease, autoimmune hemolytic anaemia, folic acid deficiency, aplastic anaemia and as an effect of anti-viral drug. Major cause of anaemia associated with chronic liver disease is haemorrhage specifically gastrointestinal bleeding and hypersplenism secondary to portal hypertension. In patients of alcoholic liver disease, different effect of alcohol may contribute to anaemia such as malabsorption, malnutrition or direct toxic effect. Thrombocytopenia is common in CLD. Thrombocytopenia is mainly due to PHTN associated splenic sequestration, alteration in thrombopoetin, bone marrow suppression, consumptive coagulopathy, increased blood loss. Thrombocytopenia is associated with increased bleeding tendency in CLD patients, so early detection of thrombocytopenia is important and helpful for decreased mortality and morbidity. Changes in WBC may be associated with CLD, it is mainly due to PHTN induced splenic sequestration, changes in granulocyte colony stimulating factor, granulocyte macrophage colony stimulating factor, bone marrow suppression, infection. This study was conducted to assess the prevalence of anemia and other haematological changes so that treatment can be initiated toward reducing the morbidity and mortality of patients [2].

## Materials and Methods

The present study was conducted in J A group of hospital, Gwalior, M.P. (G.R. Medical College, Gwalior, M.P.).Study was included 100 patients of CLD presenting in indoor department

### Study Designs

The present study is conducted over a period "between" June 2013 to November 2014 on the patients of chronic liver disease patients. In the present study two groups has been created and studied. Group I comprises of patients of Alcoholic chronic liver disease & Group II comprises of patients of Non-Alcoholic chronic liver disease in the present study.

### Inclusion criteria

1) All confirm cases of chronic liver disease by clinical, biochemical and radiological evaluation.
2) Study include both sex.
3) Age >15 years.

### Exclusion criteria

1) Patient on drugs which cause in defect parameters such as glucocorticoid, synthetic estrogen, aspirin, tamoxifen, methotrexate, OCP.
2) Malignancy
3) Pregnancy
4) Previous history of haematological and coagulation disorder other than CLD.

### Statistical Methods

Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups Inter group analysis and chi square test has been used to analyse the data having ordinal variables.
Significant figures were analysed, + Suggestive significance (P value: <0.05)

### Statistical software

The Statistical software namely SPSS 22.0, for the analysis of the data and Microsoft word and Excel were used to generate graphs, tables. A p value of <0.05 was considered as significant.

## Results

**Table 1:** Distribution of cases according to Child pugh score in Alcoholic CLD and Non-Alcoholic CLD

| CPS | Alcoholic CLD | | Non Alcoholic CLD | | |
|---|---|---|---|---|---|
| | No. | % | No. | % | |
| A | 6 | 13.33% | 12 | 22.22% | P = 0.27 |
| B | 23 | 51.11% | 28 | 51.85% | P = 1.0 |
| C | 16 | 35.56% | 14 | 25.93% | P = 0.27 |
| Total | 45 | 100.00% | 55 | 100.00% | |

Majority of patients belonged to Child Pugh score B in both Alcoholic and Non Alcoholic CLD with 51.11% and 51.85% respectively, followed by child pugh score C and least in Child Pugh score A.

**Table 2:** Comparison of the hemoglobin level of CLD cases on the basis of child pugh score in both groups

| Hb% | | Child Pugh Score | | | Significance |
|---|---|---|---|---|---|
| | | A | B | C | |
| Alcoholic | ≤8 | 2 | 9 | 13 | C P = 0.005 |
| | >8 | 4 | 14 | 3 | B P = 0.051 |
| Nonalcoholic | ≤8 | 4 | 13 | 8 | |
| | >8 | 8 | 16 | 6 | B P = 0.92 |
| Overall | ≤8 | 6 | 22 | 21 | C P = 0.006 |
| | >8 | 12 | 30 | 9 | A P = 0.14 |

In alcoholic CLD cases, child Pugh class C patients were significantly higher in number with hemoglobin less than 8. (P= 0.005) In non-alcoholic CLD cases, no significant difference in number of patients in any child pugh classes. In overall patients, Child Pugh class C cases had significant low hemoglobin in comparison to rest of group (p = 0.006).

**Table 3:** Comparison of the MCV in CLD cases on the basis of Child Pugh Score in both groups

| Child Pugh Score | Alcoholic CLD | | Non Alcoholic CLD | |
|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. |
| A | 92.5 | 12.36 | 75.5 | 10.86 |
| B | 85.59 | 16.10 | 81.13 | 10.71 |
| C | 101.89 | 18.26 | 87.7 | 12.76 |
| Significance | P= 0.0056 | | P = 0.035 | |

In Alcoholic and Non Alcoholic CLD, MCV was more in Alcoholic CLD in all classes of Child Pugh score. Also Child Pugh C had significant higher than Both A and B Child Pugh score.

**Table 4:** Pattern of anaemia according to gender in all CLD patients

| Peripheral Smear | Total | Male | Female | |
|---|---|---|---|---|
| Normocytic Normochromic | 54 | 41 | 13 | P = 0.34 |
| Microcytic Hypochromic | 27 | 13 | 14 | P = 0.001 |
| Macrocytic | 16 | 15 | 01 | P = 0.03 |
| Dimorphic | 03 | 03 | 00 | |

Normocytic normochromic anaemia was predominant in both groups. Microcytic hypochromic anaemia was significantly more in females (p value 0.001). Macrocytic anaemia was significantly higher in males with P= 0.03.

**Table 5:** Comparison of Pattern of anaemia in alcoholic CLD and non-alcoholic CLD

| Peripheral Smear | Alcoholic CLD | Non Alcoholic CLD | Significance |
|---|---|---|---|
| | No. | No. | |
| Normocytic Normochromic | 24 | 30 | P=0.91 |
| Microcytic Hypochromic | 06 | 21 | P=0.026 |
| Macrocytic | 13 | 03 | P=0.0015 |
| Dimorphic | 02 | 01 | P=0.85 |

Normocytic normochromic was predominant in both groups. Microcytic hypochromic anaemia was significantly higher in non-alcoholic CLD (p value 0.026). Macrocytic anaemia was significantly higher in alcoholic CLD (p value 0.0015).

**Table 6**: Comparison of pattern of anaemia in male patient of both groups.

| Peripheral Smear | Male | | Significance |
|---|---|---|---|
| | Alcoholic CLD | Nonalcoholic CLD | |
| Normocytic Normochromic | 24 | 17 | P = 0.42 |
| Microcytic Hypochromic | 06 | 07 | P = 0.17 |
| Macrocytic | 13 | 02 | P=0.03 |
| Dimorphic | 02 | 01 | P = 0.88 |

On comparing male patients of alcoholic CLD and Non-alcoholic CLD no difference was seen in Normocytic Normochromic, Microcytic Hypochromic and Dimorphic anemia excluding the significant difference of microcytic anemia in previous table which was confounded by sex difference in both group. While macrocytic anemia patients were significantly higher in alcoholic CLD patients P= 0.03.

**Table 7:** Comparison of haematological parameter in Alcoholic CLD and non-alcoholic CLD

| | Alcoholic CLD | | Non-Alcoholic CLD | | p value |
|---|---|---|---|---|---|
| | Mean | Std Dev | Mean | Std Dev | |
| MCV | 92.30 | 17.82 | 81.50 | 11.76 | 0.00044 |
| MCH | 27.75 | 4.12 | 25.63 | 5.00 | 0.024 |
| MCHC | 30.16 | 3.254 | 28.91 | 3.66 | 0.07 |
| PCV | 26.67 | 9.85 | 26.42 | 9.3 | 0.8768 |
| Hb | 7.64 | 2.41 | 8.10 | 2.62 | 0.36 |
| TLC | 7362.2 | 4768.7 | 7143.09 | 5045.49 | 0.825 |
| Platelet | 1,46,000 | 62000 | 1,46,000 | 79,000 | 0.95 |

Mean MCV in alcoholic CLD was 92.30 ± 17.82 and in non-alcoholic CLD 81.50 ± 11.76, which was significantly higher in alcoholic CLD (p 0.0004). Mean MCH in alcoholic CLD was 27.75 ± 4.12 and in non-alcoholic CLD 25.65± 5.00, which significantly higher in alcoholic CLD (p 0.024).

## Discussion

In present study out of 100 cases, 45 cases of alcoholic chronic liver disease, in alcoholic group all were Male, while in 55 cases of Non-alcoholic liver disease both male and female were included whose numbers were almost equal (28 females, 27 males). In overall CLD cases, Males are predominant with 72%. In present study mean age of all patients was 47.56±13.77 years. Mean age of males was 48.708±12.36 years and Mean age of female was 44.607±16.74 years. Mean age of alcoholic and non-alcoholic were 47.07±10.92 years and 47.96±15.81 years respectively. In a study done by E Halleys kumar and colleage (2014) [3] studied in India (Tamil nadu) total no of 100 cases was taken out of which 70 males and 30 females of chronic liver disease. Sex wise ratio of this study was almost similar to our present study. In a study done in Nepal done by Om K Pathak et al (2009) [4] 181 patients of ALD was analyzed out of which 146 males and 35 are female. Mean age was 52.08 ± 13.11 years. In our Study 49 % were having Hb < 8.0gm/dl. While in study by E Halleys kumar and colleage (2014) [3] 58% of cases were having Hb < 9.0gm/dl. As discussed above MCV was higher in Alcoholic CLD than Non-alcoholic CLD.in our study mcv in alcoholic was 92.30 ± 17.80 and in nonalcoholic was 81.5 ± 11.70. While in study by Ozgur TANRIVERDĐ et al (2008) [5] mcv in alcoholic was 94.6 ± 11.9 and in nonalcoholic was 89.2 ± 2.72.

Comparison of mcv according to child pugh score-

| Child Pugh Score | Our Study | | Ozgur Tanriverdđ *et al* (2008) [5] | |
|---|---|---|---|---|
| | Alcoholic CLD | Non-alcoholic CLD | Alcoholic CLD | Non-alcoholic CLD |
| Class A | 92.5 ±12.36 | 75.5±10.86 | 90.9 ± 4.02 | 89.9 ± 2.74 |
| Class B | 85.59 ±16.10 | 81.13±10.71 | 94.4 ± 4.82 | 88.4 ± 4.02 |
| Class C | 101.89±18.26 | 87.17±12.76 | 98.2 ± 6.2 | 90.4 ± 6.02 |

According to childpugh score, in present study mean of alcoholic and non-alcoholic CLD were comparable with Ozgur Tanriverdđ et al (2008) [5] with mean in normal range. When mean of MCV was compared we found ,with increase in class of child pugh score MCV increases however the mean lies in normal range in Ozgur Tanriverdđ et al study while in our study mean in CPS class C is slightly higher than normal.

**Comparison of Pattern of anaemia with previous studies**

In comparison to E Halleys kumar and colleage (2014) [3], our study was very similar, as in our study Normocytic Normochromic anaemia was predominant, second predominant type in patients of CLD was microcytic hypochromic as given below. According to Sheilasherlock [7] and Oxford text book of hepatology, most common anaemia in seen in cirrhotic patients was normocytic and normochromic anaemia. Also, according to study done by Malhotra et al (1951) [3] incidence of normocytic normochromic anaemia was 90%. In study done by Bhatia and Mishra et al (1982) [3] incidence was 59%.

**Comparison according to etiology**

The normocytic normochromic anaemia was common in both group but in alcoholic CLD, MCV was higher than non-alcoholic CLD

In comparison to previous study, difference in alcoholic CLD and Non Alcoholic CLD pattern of anaemia we found: Normocytic normochromic was most prevalent anaemia in Alcoholic CLD followed by macrocytic anaemia instead of microcytic anaemia in Non-Alcoholic CLD patients as also shown in comparison with other study in following table.

| Peripheral Smear | Our Study | | | | Erhabor osaro et al (2013) [6] | | | |
|---|---|---|---|---|---|---|---|---|
| | Alcoholic | | Non Alcoholic | | Alcoholic | | Non Alcoholic | |
| | No. | % | No. | % | No. | % | No. | % |
| Normocytic Normochromic | 24 | 53.33% | 30 | 54.54% | 64 | 55.7% | 65 | 83.8% |
| Macrocytic | 13 | 28.88% | 03 | 5.4% | 23 | 20.0% | 05 | 6.3% |
| Microcytic Hypochromic | 06 | 13.33% | 21 | 38.18% | 12 | 10.4% | 07 | 8.8% |
| Dimorphic | 02 | 4.44% | 01 | 1.81% | - | - | - | - |
| Other | - | - | - | - | 16 | 13.9% | 01 | 1.2% |

In Shigeo Maruyama (2001) [8] study, macrocytosis was mainly found in cirrhotics due to alcoholics. In study by Dr Bijoy kumar Barik (2010) [9]; macrocytosis was present in chronic alcoholism supporting our observation also.

**Conclusion**

Normocytic normochromic anaemia was predominant in overall CLD patients and Normocytic normochromic anaemia was also predominant in both alcoholic and nonalcoholic CLD group. While Macrocytic anaemia prevalence was higher in Alcoholic CLD patients than nonalcoholic group. MCV increases with the severity of Child Pugh score especially in alcoholic CLD so we can say that macrocytic anaemia increases with severirty of alcoholic CLD. As severity of CLD increases it directly aggravates anaemia. Observations showed that most of the patients of Child pugh score C had severe anemia. It signifies the fact that anemia can be bad prognostic factor in CLD patients. Assessing the severity and type of anaemia is a useful tool for early initiation of the treatment in patients of CLD for reducing the mortality and morbidity.

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