

# Profile of Anemia in Cirrhotic Patients at the National Hospital of Niamey

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## Abstract

**Objective:** To study the profile of anemia in cirrhotic patients diagnosed in the Hepato-Gastroenterology (HGE) department of the National Hospital of Niamey. **Patients and Method:** This was a prospective and descriptive study carried out from August 1, 2023 to February 29, 2024, including cirrhotic patients, with anemia on the blood count, outside of any recent blood transfusion and/or treatment. History of anemia. **Results:** The diagnosis of anemia was made in 91 patients out of the 100 cirrhotics recorded, 91%. Men were more common, with a sex ratio of 2.79. The average age was  $50 \pm 14.22$  years old. Anemia was moderate in 52.75% of cases ( $n = 48$ ). It was non-microcytic in 50.55% ( $n = 46$ ) and iron deficient in 55.56% of cases ( $n = 20$ ). There was a statistically significant correlation between the severity of anemia and upper gastrointestinal bleeding with a  $p$ -value = 0.000. **Conclusion:** Cirrhotic anemia is multifactorial, which makes its etiological diagnosis complex.

## Keywords

Anemia, Cirrhosis, National Hospital of Niamey, Niger

## 1. Background

### A. What is known about the subject

In Niger, the prevalence of cirrhosis represents 2.87% of all hospitalizations and

35.79% of chronic liver disease at the National Hospital of Niamey; that of cirrhotic anaemia is not known.

### **B. The question addressed in this study**

Sociodemographic, clinical, biological and evolutionary aspects of the cirrhotic patient with anaemia

### **C. What is new in this study**

1) Cirrhosis represented 5.33% of patients recorded for 7 months. 91% of these cirrhotic patients were anaemic. The male sex was the most represented, with a sex ratio of 2.79. The median age was 50 years  $\pm$  14.22.

2) Cirrhosis was decompensated in 95.60% of patients with hepatitis B as the main etiology. Ascites (95.60%), hepatic encephalopathy (50.55%) and hematemesis (23.07%) were the most common clinical signs.

3) Anaemia was in the majority of cases, moderate (52.75%) and normochrome, normocytic (49.50%). It was severe in all patients with grade III esophageal varices on esogastroduodenoscopy. It was iron in 55.56% of patients.

4) The majority of patients who had more than one day in hospital remained alive and those who had one day in hospital died.

## **2. Introduction**

Anaemia in a patient with cirrhosis is a relevant but often overlooked clinical entity. Several factors can be involved in the genesis of cirrhotic anemia: digestive haemorrhage, iron deficiency, but also vitamin B12 and folic acid deficiency, hypersplenism, haemodilution. The occurrence of anaemia is frequent, especially when the liver disease is severe. In Europe, the prevalence of anaemia in cirrhotics was 40% [1]. The latter in sub-Saharan Africa varies from 42.9% to 96.96% depending on the country [2]-[4]. In Niger, it is not known, nor is cirrhosis, but according to a study carried out at the National Hospital of Niamey, cirrhosis represents 35.79% [5] of chronic liver diseases. Nevertheless, the prevalence of hepatitis B, the main etiology of cirrhosis in Niger, is 15 to 20% [6], which poses a real public health problem. The lack of data on this entity in our department motivated this study, in the Hepato-gastroenterology department of the Niamey National Hospital, by determining the profile of anemia in cirrhotic.

Objective: To study the profile of anemia in cirrhotic patients, diagnosed in the Hepato-Gastroenterology (HGE) department of the Niamey National Hospital.

## **3. Materials and Method**

### **Setting, Type and period of study**

This was a prospective and descriptive study carried out from August 1, 2023 to February 29, 2024, at the Hepato-gastroenterology (HGE) department of the Niamey National Hospital.

### **Inclusion criteria**

All cirrhotic patients regardless of age and sex, diagnosed at the HGE department of the HNN with a complete blood count at diagnosis, showing anemia apart

from any blood transfusion and/or anemia treatment and are consenting.

#### **Diagnostic and therapeutic method**

The diagnosis of cirrhosis was based on clinical data: including liver morphology, hepatocellular insufficiency syndrome, edematoascitic syndrome and portal hypertension syndrome.

#### **Paraclinical data**

Including ultrasound, endoscopic and biological data. The diagnosis of compensated cirrhosis was made in the presence of severe fibrosis classified F4 for chronic liver disease. The Blood Counts (NFS) come from the laboratories of the various level 3 centers in Niamey. Patient follow-up and care were provided by hepato-gastroenterologists.

#### **Diagnostic and therapeutic**

Care was the responsibility of the patients regardless of the number of NFS. It is in these contexts that the results of our study arise. The information collected was: age, sex, sociodemographic data, clinical manifestations, hemoglobin level in g/dl.

#### **Statistical analysis**

The data were analyzed by Microsoft Office 2019 Word and Excel software and Sphinx in version 5.1 and SPSS 20.0. The statistical significance threshold was set at  $p < 0.05$ . Quantitative variables were expressed as an average  $\pm$  standard deviation and qualitative variables as numbers and percentages.

#### **Limit of the study**

The low economic level of the patients who take full care of themselves did not allow the paraclinical assessment to be carried out: the reticulocyte level, the serum ferritin ferritin assay. As a result, we were unable to assess the other risk factors for anemia in cirrhotic patients.

## **4. Results**

#### **Sociodemographic data**

During the study period, 1876 patients were hospitalized, and we recorded 100 cases of cirrhosis, *i.e.* a prevalence of 5.33%. Among the latter, 91 had anemia in the blood count, *i.e.* 91% of cirrhotic patients. In this population of cirrhotics with anemia, men were in the majority at 73.63% ( $n = 67$ ) and women at 26.37% ( $n = 24$ ). The sex ratio was 2.7.

The majority of patients were over 55 years old in 32.97% ( $n = 30$ ) of cases, with a median age of 50 years  $\pm$  14.22 years and extremes of 15 years and 85 years.

#### **Clinical data**

Cirrhosis was decompensated in 95.60% of cases. It had several etiologies, the most frequent of which were HBs antigen in 40.3% ( $n = 38$ ) and chronic ethyl alcoholism in 13.19% ( $n = 12$ ) of cases. The prevalence of anemia during cirrhosis, among the 100 cirrhotic patients who performed a complete blood count, 91 patients or 91% had anemia. The majority of cases had a preserved general condition in 60.44% ( $n = 55$ ). Ascites was most commonly found in 95.60% ( $n = 87$ ), hepatic

encephalopathy in 50.55% (n = 46) and hematemesis in 23.07% (n = 21).

#### Paraclinical data

**Esogastroduodenal characteristic:** on esogastroduodenoscopy Grade III esophageal varices were found in all patients presenting hematemesis in 23.07%. A liver ultrasound revealed an enlarged liver in 69.4% (n = 50) of cases.

#### Haematological characteristics (Table 1)

According to the grade of anemia they presented the following characteristics: mild anemia in 16.48% (n = 15); moderate anemia in 52.75% (n = 48) and severe anemia in 30.77% (n = 28) of cases. The different types of anemia were normocytic normochrome in 49.50% (n = 45), microcytic hypochromic in 45.45% (n = 44), macrocytic normochrome in 1.1% (n = 2). Thrombocytopenia in 50.55% (n = 46) and leukopenia in 1.1% (n = 1) of cases. Anemia was iron deficiency in 55.56% (n = 20).

**Table 1.** Haematological characteristics of patients.

	Number	Percentage (%)
Severity		
Mild anémia	15	16,48
Moderate anémia	48	52,75
Severe anémia	28	30,77
Type of anémia		
Normocytic normochrome anémia	45	49,45
Microcytic hypochromic anémia	44	48,35
Macrocytic normochrome anémia	2	02,2
Plate		
<150,000	46	50,55
150,000 - 450,000	30	32,97
>450,000	15	16,48
Leukocyte		
<4000	1	1,10
4000 - 10,000	88	96,70
>10,000	2	2,2
Ferritin (µg/l) (n = 36)		
<30	20	55,56
30 - 300	10	27,77
>300	6	16,67

#### Bivariate analysis and prognosis

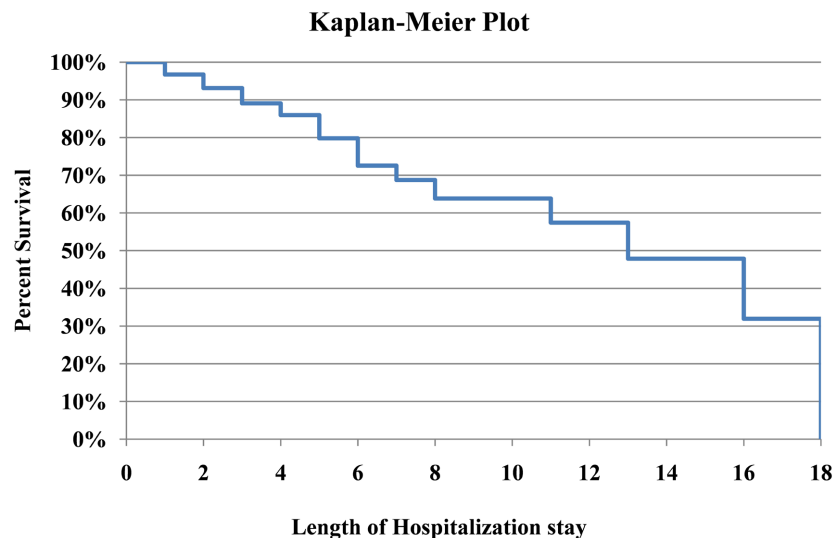
There was a statistically significant relationship between the severity of anemia and upper gastrointestinal bleeding with a p-value = 0.001. General health was

significantly linked to hemoglobin level on admission. In fact, 58.33% of patients with a deterioration in general condition had moderate anemia (**Table 2**).

**Table 2.** Bivariate analysis.

Severity of anemia	Upper gastrointestinal bleeding		RR	ICRR	P
	Yes	No			
Mild Anemia	0 (0)	15 (20.55)	NA	NA	0,0001
moderate anemia	0 (0)	48 (65.75)			
sévère anemia	21 (100)	10 (13.70)			
Sévérité of anémiea	General condition		RR	ICRR	P
	Altered	Preserved			
Mild anémiea	10 (27.78)	5 (9.09)	NA	NA	0,0053
Moderate anémiea	21 (58.33)	27 (49.09)			
Severe anémiea	5 (13.89)	23 (41.82)			

The majority of patients who had more than one day of hospitalization remained alive and those who had one day of hospitalization died. The follow-up extremes were between 1 and 18 days (**Figure 1**).



**Figure 1.** Prognosis.

## 5. Discussions

In our study, 3.4% was the prevalence of cirrhotic patients, 91/100 of whom had performed a complete blood count showing anemia. Our results were similar to those of Ngo *et al.* in Cameroon in 2017, which reported a frequency of 96.96% [3]. On the other hand, our results were higher than those of Togola in Mali in 2011, and Paternostro *et al.* in Burkina Faso in 2020 which had found frequencies of 40.74%, and 74.5% respectively [4]-[7]. Anemia is therefore almost constant in

the majority of patients with cirrhosis. However, it should be noted that anaemia is more severe in patients who have bled and in those who have decompensated cirrhosis. Therefore, correct follow-up of the cirrhotic patient (preventing haemorrhage, bringing the patient with decompensated cirrhosis back to the stage of compensated cirrhosis, a rich and varied diet, etc.) would be a factor in preventing anemia in these patients.

The male gender was predominant with a sex ratio of 2.79. Togola in Mali in 2011 and Driouiche *et al.* in Morocco in 2023 made the same observation [4] [8]. This male prevalence could be explained by the lifestyle of men, which exposes them much more to the risk factors of cirrhosis (viral hepatitis through risky sexual behavior, alcohol, tobacco, etc.) than women

The majority of patients were over 55 years old in 32.97% of cases, with a median age of  $50 \pm 14.22$  years and extremes of 15 years and 85 years. Saley in Niger in 2004 and Elfarouki *et al.* in Morocco in 2020, made the same observation that the young age in these different African studies could be explained by infection with the hepatitis B virus from childhood in an African environment, the most common cause of cirrhosis in this context [6] [9].

Cirrhosis was decompensated in 95.60% of cases. It had several etiologies, the most frequent of which were HBs antigen in 40.3% and chronic ethyl alcoholism in 13.19% of cases. Alain in Cameroon in 2020, Charles N *et al.* in Kinshasa in 2018 found frequencies more linked to alcoholism in 23% and 49.6% of cases respectively [10] [11].

The majority of patients had a preserved general condition in 60.44%, ascites in 95.60%, hepatic encephalopathy in 50.55% and hematemesis in 23.07%. Our results varied from one author to another. Togola in Mali in 2011 found headaches to be the main sign in 75% of cases, and Charles. N *et al.* in Kinshasa in 2018 reported abdominal pain as the main reason for 45% of cases [4] [11]. This shows that the symptomatology of cirrhosis is variable.

On esogastroduodenoscopy, Grade III esophageal varices were found in all patients with hematemesis in 23.07%. A liver ultrasound revealed an enlarged liver in 69.4% (n = 50) of cases. Ouattara in Burkina Faso in 2022 reported 4.64% of cases of esophageal varices [12].

Depending on the grade of anemia, they presented the following characteristics: mild anemia in 16.48%, moderate in 52.75% and severe in 30.77% of cases. The different types of anemia were normocytic normochrome in 49.50%, microcytic hypochromic in 45.45% and macrocytic normochrome in 1.1%. Anemia was iron deficiency in 55.56. Doumbia *et al.* in Mali in 2021 reported severe anemia in 35.9% [13]. Nacoulma *et al.* in Burkina-Faso in 2007 and Coulibaly in Mali in 2021 who found a predominance of normochromic normocytic anemia with respective frequencies of 43.3% and 55.7% [14] [15]. Paternostro *et al.* in Burkina Faso in 2022 reported a frequency of 49.2% [7].

There was a statistically significant relationship between the severity of anemia and upper gastrointestinal bleeding with a P-value = 0.000. General health was

significantly linked to hemoglobin level on admission. In fact, 58.33% of patients with a deterioration in general condition had moderate anemia.

## 6. Conclusion

Cirrhosis is a common condition in our context and hepatic encephalopathy was the most reported complication. It appeared that anemia was almost constant in our patients with cirrhosis. It is sometimes microcytic, normocytic or macrocytic. This most often occurs at the decompensation stage of cirrhosis.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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