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Electrical and Echocardiographic Abnormalities during Viral Cirrhosis B

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Abstract

Aim: To describe electrical and echocardiographic abnormalities in patients with viral cirrhosis B. **Methodology:** Prospective cross-sectional study with an analytical aim carried out in the hospitalization and outpatient departments of the Hepato-Gastroenterology department and in the emergency department of the Cocody University Hospital during the period from January 15 to July 15, 2022. Any patient with viral B cirrhosis and having performed an echocardiography and an electrocardiogram was included. The significance threshold was stopped at $p < 0.05$ for these two statistical tests. **Results:** 40 patients were selected. The prevalence of viral B cirrhosis was 16.8% and that of cirrhotic cardiomyopathy in cirrhotic patients was 33.9%. The average age of the patients was 43.9 ± 14.1. There was a male predominance with a sex ratio of 3.4. The two main clinical signs found in patients were ascites (77.5%) and edema (75%). There was a lowering of TP (70%), albumin (72.5%) and platelets (87.5%). Bilirubin was elevated in 60% of patients. All patients had a liver with irregular contours. 80% of our population had not performed Fibroscan®, 5% had fibrosis between F3-F4 and 35% F4 fibrosis. The main complication found was portal hypertension (esophageal varices at any stage) at 85%. Cirrhosis was active (virological) in 32.5% of patients. 75% of patients were classified as Child B. The two main abnormalities on echocardiography were left ventricular hypertrophy (32.5%) and dilatation of the left atrium (7.5%). The electrical abnormalities found were mainly QT prolongation (32.5%) and sinus tachycardia (12.5%). We did not find a statistically significant association between the severity of cirrhosis and electrical abnormalities. There was a statistically significant association between the severity of cirrhosis and the dilation of the left atrium ($p = 0.04$). **Conclusion:** Cirrhotic cardiomyopathy is a rare complication of cirrhosis.

Keywords

Cirrhosis, Viral Hepatitis B, Cirrhotic Cardiomyopathy

1. Introduction

Cirrhotic cardiomyopathy (CCM) is defined as chronic cardiac dysfunction in patients with cirrhosis of the liver, which is characterized by abnormal and blunted contractile responsiveness to physiological, pathological or pharmacological stress, in the absence of known cardiac disease and regardless of the causes of cirrhosis [1] [2]. The prevalence of cirrhotic cardiomyopathy is difficult to determine, mainly because the disease remains asymptomatic for a long time in the course of cirrhosis. On the other hand, the signs of heart failure may resemble those of decompensated cirrhosis, making a differential diagnosis very difficult. To date, in sub-Saharan Africa, particularly in Côte d'Ivoire, where chronic HBV infection represents the leading cause of cirrhosis, no study of this complication has been carried out, thus making its incidence and prevalence unknown, where the interest of our study is. The aim is to describe the electrical and echocardiographic abnormalities in patients with viral B cirrhosis.

2. Methodology

Prospective cross-sectional study with an analytical aim carried out in the hospitalization and outpatient departments of the Hepato-Gastroenterology department and in the emergency department of the CHU de Cocody during the period from January 15 to July 15, 2022. Included: any patient with viral B cirrhosis and having performed an echocardiography and an electrocardiogram. Were excluded: patients who refused to participate in the study, HCV, HDV, HIV and alcohol co-infections; patients with a known cause of myocarditis dysfunction or with cardiovascular risk factors (hypertension, diabetes, obesity). The variables studied were: demographic (age sex); clinical and paraclinical (history, elements of positive diagnosis and severity of cirrhosis, Child Pugh score and electrical and echocardiographic signs). Doppler echocardiography was performed at rest by the same operator. It made it possible to assess the cardiac dimensions. The measurements were carried out according to the recommendations of the American Ultrasound Society. We assessed the ejection fraction of the left ventricle using the Teicholz and/or Simpson biplane method. The data was analyzed using SPSS 2.6 software, the comparison of variables was made by standard Chi^2 and Fisher tests. The significance threshold was stopped at $p < 0.05$ for these two statistical tests.

3. Results

40 patients were selected. The prevalence of viral B cirrhosis was 16.8% including 33.9% of cirrhotic cardiomyopathy. The average age of the patients was 43.9 years. There was a male predominance with a sex ratio of 3.4. The two main clinical signs

found in patients were ascites (77.5%) and edema (75%). There was a lowering of TP (70%), albumin (72.5%) and platelets (87.5%). Bilirubin was elevated in 60% of patients. All patients had a liver with irregular contours. 80% of our population had not performed Fibroscan®, 5% had fibrosis between F3-F4 and 35% F4 fibrosis. The main complication found was portal hypertension (esophageal varices at any stage) at 85%. Cirrhosis was active (virological) in 32.5% of patients. 75% of patients were classified as Child B. The two main abnormalities on echocardiography were left ventricular hypertrophy (32.5%) and dilatation of the left atrium (7.5%) (Figure 1). The electrical abnormalities found were mainly QT prolongation (32.5%) and sinus tachycardia (12.5%) (Table 1). We did not find a statistically significant association between the severity of cirrhosis and electrical abnormalities. There was a statistically significant association between the severity of cirrhosis and the dilation of the left atrium ($p = 0.04$).

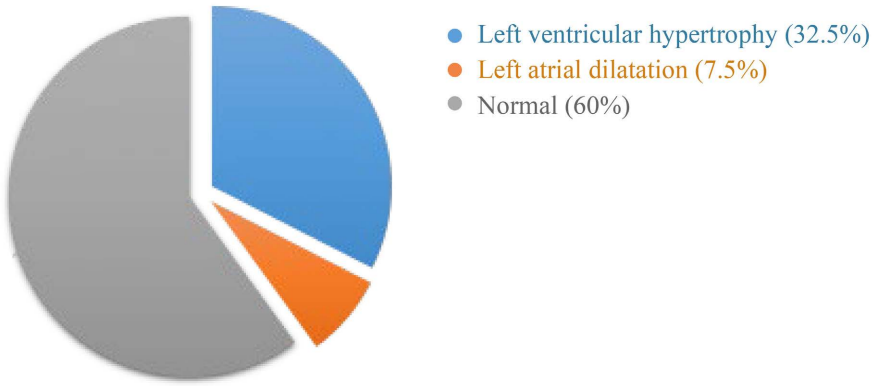

Figure 1. Distribution of abnormalities on echocardiography.

Table 1. Distribution of abnormalities on the electrocardiogram.

Results ECG	Effect (N = 40)	Percentage (%)
Sinus rhythm	19	47.5
QT prolongation	13	32.5
Sinus tachycardia	5	12.5
Atrial extrasystole	1	2.5
Right bundle branch block	1	2.5
Left bundle branch block	1	2.5
Total	40	100

4. Discussion

The prevalence of viral B cirrhosis in our study was 16.8%. This was higher than that found by Guèye N *et al.* [3] in Senegal which was 3.4%. This could be explained by the use of a single marker (AgHBs) in their study to retain viral B etiology. On the other hand, our prevalence was lower than that found by Ouattara *et al.* [4] in Côte d'Ivoire in 2013 which was 74.4% in hospitalized patients only.

The average age of our population was 43.9 years. Our results were similar to those found by Guèye N *et al.* [3] in Senegal who was 41 years old. The average age of onset of cirrhosis in developed countries is higher. Wei yuan *et al.* [5] found an average age of 53 years identical to the average age found by Gonzales *et al.* [6]. The early onset of cirrhosis in Africa could be explained by the high rate of perinatal transmission. A male predominance was observed in our study with a sex ratio of 3.4 similar to the results of Mbendi *et al.* [7] and Ouattara *et al.* [4] who found sex ratios of 2.2 and 5.5 respectively. These rates were consistent with those of Chu CM *et al.* [8] who noted a real gender difference in the transmission of viral hepatitis B and in which they demonstrated that liver disease would progress more quickly to complications in patients male. The two main clinical signs found in our series were ascites (77.5%) and lower limb edema (75%). These data were comparable to those of Mbendi *et al.* [7] who found ascites (64.7%) and lower limb edema (41.9%). Similarly, Ouattara [4] found oedemato-ascites decompensation in 66% of cases. The main complication found was the presence of esophageal varices at any stage in 85% of patients. Gueye N had found esophageal varices at all stages in all their patients. These results were superimposed on the data of certain authors such as Calès P *et al.* [9] who had found that at least 2/3 of patients with cirrhosis were at risk of developing esophageal varices. 75% of our patients had a Child-Pugh B score and 25% a Child C. Guèye N *et al.* [3] had found in their study 48.3% Child B and 33.3% Child C. This could be explained by the delay in diagnosis which is most often at the stage of complications due to the low socio-economic level of the population and the lack of specialists in rural areas. In our study, the main electrical anomaly found was a 32.5% QT prolongation. Abnormal repolarization would be at the origin of a prolongation of the QT [10]. This rate was superimposed on that of Tint *et al.* [11] in Romania who reported in a series of 57 cirrhotic patients a prolongation of QT in 33%. However, Gueye N in Senegal and Moller S *et al.* [12] in Denmark found QT prolongation at higher rates of 40% and 45% respectively. We did not find a statistically significant link between the prolongation of the QT interval and the severity of viral B cirrhosis. On the other hand, this association was highlighted in the studies of Gueye in Senegal and Tint D in Romania [3] [11]. This could be explained by the small size of our sample. The second abnormality found in our study was sinus tachycardia in 12.5% of cases. This rate was lower than that found by Tint [11] which was 38.6%. This difference would be related to the large number of our patients on beta blockers. No link was found between the severity of cirrhosis and sinus tachycardia. The two main echocardiographic abnormalities in our series were left ventricular hypertrophy (32.5%) and left atrial dilatation (7.5%). These rates were lower than those found by Tint D [11] in Romania, which reported left ventricular dilation in 70% of cases and left atrium dilation in 44% of cases. Just as Guèye N *et al.* [3] had found a dilation of the left ventricle (58.3%) and a dilation of the left atrium (30%). According to [3], these high rates of dilatation of the left heart chambers could in part be linked to the chronic anemia frequently encountered during cir-

rhosis. He found that 34.8% of their patients with ventricular dilatation had chronic anemia. We did not find a link between the severity of cirrhosis and left ventricular hypertrophy. This was consistent with data from Gueye [3] and Tint D [11]. In our study, there was a statistically significant relationship between the severity of cirrhosis and the dilation of the left atrium ($p = 0.04$) contrary to Guèye's study [3]. The limits to our work may be: the small size of our sample due to the follow-up of cirrhotic patients every 3 months thus leading to a lack of statistical power, the inclusion of a single hepato-gastroenterology center and the lack of consideration of factors such as stress through physical activity or pharmacological substances for the diagnosis of cirrhotic cardiomyopathy.

5. Conclusion

Cirrhotic cardiomyopathy is a rare complication of cirrhosis that must be sought by carrying out an electrocardiogram and a cardiac ultrasound to ensure optimal management.

Ethical Considerations

A research authorization was obtained from the Scientific Medical Department. Each patient was informed of the purpose of our study, and their consent sought, recorded in writing and validated by their signature. The data was collected in strict compliance with medical secrecy. The information contained in our survey sheet was confidential.

Conflicts of Interest

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

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