

THE CHANGE IN THE QT INTERVAL IS A MARKER OF THE SEVERITY OF LIVER CIRRHOSIS

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ABSTRACT

The number of patients with chronic liver diseases of various etiologies is increasing in the population, which lead to the development of cirrhosis, which affects other organs and systems, in particular, the cardiovascular system. The aim of the study was to evaluate changes in the QT interval in patients with cirrhosis of the liver and to identify the relationship with the severity of the hepatic process.

Material and methods. The study group included 30 patients with cirrhosis of the liver of various etiologies, hospitalized in the therapeutic department city hospital. The comparison group consisted of 30 patients without cirrhosis of the liver, hospitalized at the same time in the same department. The evaluation of clinical, laboratory and instrumental data of patients with the determination of the duration of the corrected QT interval according to the Bazett formula (QTs) was carried out. Statistical processing was carried out with the determination of the average, the error of the average, the reliability of the differences according to the criterion Student, correlation analysis using Pearson's r-test (Microsoft Excel, 2013).

Results and their discussion. Prolongation of the QT interval was found in patients with cirrhosis of the liver of various etiologies. A positive correlation was found between the severity of the Child–Pugh liver cirrhosis class and the magnitude of the QT interval. Conclusions. Prolongation of the QT interval in patients with cirrhosis of the liver can lead to the development of life-threatening arrhythmias and be the cause of sudden death of patients, and therefore it is necessary to regularly monitor electrocardiographic data in this group of patients.

Key words: *cirrhosis of the liver, QT interval, cirrhotic cardiomyopathy.*

INTRODUCTION

Cirrhosis of the liver remains a serious socio-economic and clinical-epidemiological health problem in all countries of the world and occupies a significant place in the structure of diseases of the digestive system. Recently, more and more researchers have been paying attention to hemodynamic disorders on the part of various organs and systems, significantly aggravating the course of liver

cirrhosis and negatively affecting the prognosis of the disease. In 2005, at the World Congress of Gastroenterologists in Canada, diagnostic criteria were proposed for cirrhotic cardiomyopathy. However, the syndrome of cirrhotic cardiomyopathy has not yet been definitively classified and the mechanisms of development of myocardial dysfunction in cirrhosis are only partially known. Cirrhosis of the liver (CP) is one of the urgent problems of medicine of the last decade. This is due to a large increase in viral liver diseases, in particular caused by hepatitis B and C viruses. Portal circulation disorders trigger a cascade of autonomic, neurohumoral and metabolic reactions that cause changes in central hemodynamics, which exacerbates not only disorders of intrahepatic blood flow, but also leads to multiple organ extrahepatic disorders, including cirrhotic cardiomyopathy. Currently, more is being actively studied- heart disease in patients with viral cirrhosis of the liver (VCP), mechanisms of development of the main symptoms of cirrhotic cardiomyopathy, biochemical and electrophysiological changes of the heart, conditions for the occurrence of diastolic and systolic dysfunction, features of structural and functional changes in the myocardium. Meanwhile, the syndrome of cirrhotic cardiomyopathy has not yet been definitively classified, and many mechanisms for the development of myocardial dysfunction in patients with CP are unknown. The absence of these data indicates insufficient awareness of practitioners about changes in the cardiovascular system. Reports of deaths due to cardiac insufficiency during liver transplantation, transjugular intrahepatic portosystem bypass surgery and the imposition of surgical portocaval shunts in patients with cirrhosis suggest that myocardial dysfunction may progress with an increase in the volume of circulating- more blood. It is known that antiviral therapy in patients with chronic viral hepatitis and cirrhosis of the liver serves as a prevention of the development of liver failure and hepatic cell carcinoma. Currently, more convenient endpoints are used to evaluate the effectiveness of the therapy, which include suppression of virus replication, disappearance of the virus antigen, normalization of alanine aminotransferase activity, improvement of the histological picture of the liver, prevention of reactivation of infection after liver transplantation, as well as improvement of the quality of life of patients. The only drug with proven efficacy in the treatment of viral hepatitis and compensated viral cirrhosis of the liver is interferon used in combination with nucleoside analogues. The literature describes studies, as a result of which antiviral therapy leveled most of the structural and functional abnormalities of the cardiovascular system, improved the parameters of the functional state of the endothelium, and also contributed to the normalization of the number and frequency of occurrence of elevated levels of antimyocardial antibodies, with the exception of patients with mixed infection.

MATERIALS AND METHODS

All these data dictate the need for a thorough examination of the cardiovascular system in patients with cirrhosis of the liver, including performing an electrocardiographic study with an assessment of cardiac arrhythmias.

Table 1. Clinical and laboratory indicators

Indicator	Cirrhosis of the liver (n =30)	Chronic hepatitis (n= 10)
Ascites	90%	0
Average AST value (units)	247.9±3.2	209.9±2.0
The average ALT value (units) is	217.9±1.2	205.9±0.9
The average diameter of the portal vein (mm) is	14.2±0.2	9.4±0.3
Complaints from the cardiovascular system (%)	8	0

Table 2. Electrocardiography data

ECG report (% of the number of patients)	Cirrhosis of the liver (n =30)	Chronic hepatitis (n= 10)
Sinus tachycardia	10	50
Sinus bradycardia	5	20
AV blockade 1 st	25	0
Atrial extrasystoles	25	15
Ventricular extrasystoles	30	15
Blockade of the left leg of the Gis beam	5	0

40 patients were included in the study. The first group consisted of patients with cirrhosis of the liver – 30 patients, the second group – 10 patients with chronic hepatitis. Patients diagnosed with cirrhosis of the liver were divided into Child – Pugh classes, class A was represented in 10% of cases, class B – 50%, class C - 40%. In the first group, men made up 25 people (62.5%), respectively, women - 15 people (37.5%). In the second group, men made up 4 people (40%), women - 6 people (60%). Among patients with cirrhosis of the liver, the average age was 51.2±2.0 in the category of patients with chronic hepatitis - 43.4 ± 1.0. In the structure of the etiology

of cirrhosis of the liver in the first place alimentary toxic (70%), in the second place – the outcome of viral hepatitis (30%). Patients who abuse alcohol, have cardiovascular, mental and systemic diseases were excluded from the study. All patients underwent a standard clinical and laboratory examination. When analyzing the ECG, the adjusted QT interval was calculated using the Bazett formula. $QTc = (Q-T \text{ measured}) / (\sqrt{R-R \text{ measured}})$.

The duration of the QTc interval in patients with cirrhosis of the liver (442.3 ± 3.2 ms) was significantly longer than in patients with hepatitis (411.4 ± 2.7) ($p < 0.001$). It was revealed in patients of the first group an increasing prolongation of the YEs interval as the severity of liver cirrhosis worsened. The duration of the Ec interval was 409 ± 1.8 ms in Class A, 431 ± 2.6 ms in patients with cirrhosis of class B according to Child –Pugh, and 442.3 ± 1.1 ms in class C according to Child –Pugh ($p < 0.001$).

When assessing the duration of the QTc interval in patients with cirrhosis of the liver, attention is drawn to the differences between the duration of this interval depending on the etiology of liver cirrhosis. In patients with liver cirrhosis of alimentary–toxic genesis, the QTc interval was 432.3 ± 1.2 ms, in patients with viral etiology of liver cirrhosis - 439 ± 1.6 ms ($p < 0.001$).

CONCLUSION

Cirrhosis of the liver affects all systems of the human body, including the cardiovascular system. In cirrhosis of the liver, rhythm disturbances are more common than in chronic hepatitis; the most frequent rhythm disturbances in cirrhosis of the liver according to ECG data is ventricular extrasystole. It was found that the duration of the Qt interval is significantly longer in patients with cirrhosis of the liver, which indicates a systemic violation of metabolic processes and involvement of all systems in this category of patients. These changes "dictate" a detailed study of the cardiovascular systems in patients with cirrhosis of the liver.

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