

Application of Color Doppler Echocardiography in The Diagnosis of Heart Disease

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Abstract

Objective: This study aimed to analyze the value of color Doppler echocardiography in the early diagnosis of hypertensive heart disease.

Methods: 84 patients with hypertensive heart disease were divided into control group and observation group according to different examination methods. ECG was used in the control group and color Doppler echocardiography was used in the observation group.

Results: the sensitivity of ST segment decrease, ischemic T wave and ST segment level prolongation in the control group was higher than that in the observation group, with a significant difference ($P < 0.05$); the coincidence rates of left ventricular hypertrophy and left atrial hypertrophy in the control group were 64.3% and 31.0%, respectively, and 90.5% and 95.2% in the observation group, with a significant difference ($P < 0.05$).

Conclusion: Color Doppler echocardiography has high application value in the early diagnosis of hypertensive heart disease.

Keywords: Color Doppler echocardiography; electrocardiogram; hypertensive heart disease; early diagnosis

1. Introduction

The early symptoms of hypertensive heart disease (HHD) are not typical, generally the symptoms of high blood pressure (Shah et al., 1991; Liu and Liu, 2011; Amsalem and Mardor, 2007). In the middle and late stage, there will be heart failure, fatigue, hemoptysis, lower extremity edema and other symptoms. If not treated in time, it will endanger the life of patients (Rice et al., 1983; Bara and Ghodsizad, 2006). Clinical practice has proved that the earlier the treatment of the disease, the better the curative effect. Therefore, effective diagnosis is the key to ensure the therapeutic effect (Xu et al., 2013). Based on this, in order to further analyze the application value of color Doppler echocardiography in the early diagnosis of hypertensive heart disease, the clinical data of 84 patients in our hospital from May 2016 to May 2017 were selected for retrospective analysis. The report is as follows.

2. Data and methods

2.1 General information

84 cases of hypertensive heart disease in our hospital were selected, all of which were confirmed by clinical diagnosis and met the relevant diagnostic

criteria of hypertensive heart disease in 2004 Chinese hypertension prevention and control guidelines.

They showed different degrees of headache, fatigue and other symptoms in clinical, excluding patients with liver and kidney dysfunction and mental diseases]. Patients were divided into control group and observation group according to different examination methods. In the control group, there were 24 males and 8 females, 52-91 years old, average (77.6 ± 2.1) years old, 4-16 years old, average (11.6 ± 3.7) years old. In the observation group, there were 25 males and 17 females, aged 54-90 years, with an average age of 78.0 Tu 2.3 years, and the course of disease was 4-15 years, with an average age of 11.4-3.3 years. There was no significant difference between the two groups ($P > 0.05$).

2.2 Method

ECG examination was used in the control group: the patient took the supine position, wiped the connection part of the lead with alcohol, carried out 12 lead ECG examination, and arranged a professional ECG doctor to carry out the analysis and observation group: Color Doppler echocardiography was used in the observation group: the frequency of the probe was 2.04.mhz,

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and the patient's body position was left lying position, The left ventricular systole, wall thickness and internal condition were detected in the long axis section of the left ventricle. Then, the left ventricular systole, wall thickness and internal condition of the chamber were sampled in the four-chamber section of the apex to the mitral valve orifice. The blood flow spectrum, peak E and peak a maximum velocity in the diastolic period were detected, and the acceleration and deceleration time of E wave and a / E were recorded in detail.

2.3 Observation indicators

(1) The sensitivity of the two methods to ST segment depression, ischemic T wave and ST segment level prolongation was compared; (2) the detection rate of left ventricular hypertrophy and left atrial hypertrophy was compared between the two groups

3. Results

3.1 Detection sensitivity comparison

The detection sensitivity of ST segment decrease, ischemic T wave and ST segment level extension in the control group were higher than that in the observation group, with significant difference ($P < 0.05$), as shown in Fig.1

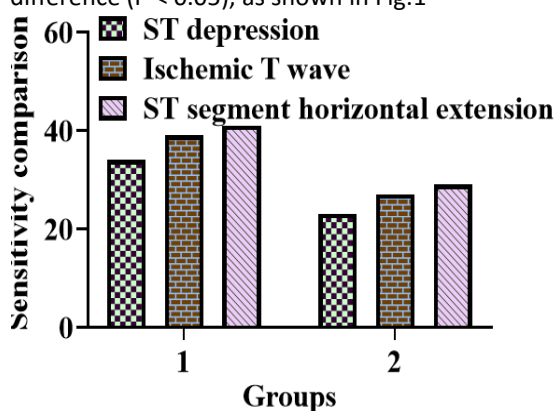


Figure 1. Comparison of the detection sensitivity between two groups

3.2 Comparison of detection rates of left ventricular hypertrophy and left atrial hypertrophy

The coincidence rate of detection of left ventricular hypertrophy and left atrial hypertrophy in the control group was 64.3% and 31.0% respectively see from Fig.2, and that in the observation group was 90.5% and 95.2% respectively. The observation group was higher than the control group, with significant difference ($P < 0.05$), as shown in Fig.3

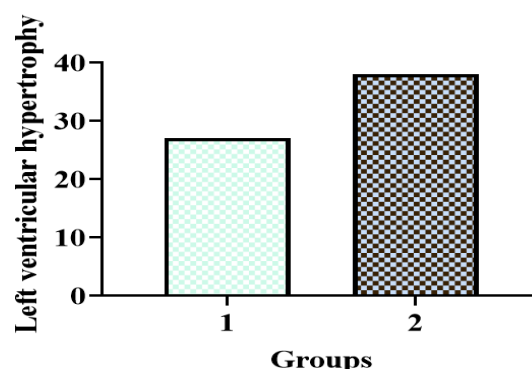


Figure 2. Comparison of detection rate of left ventricular hypertrophy between two groups

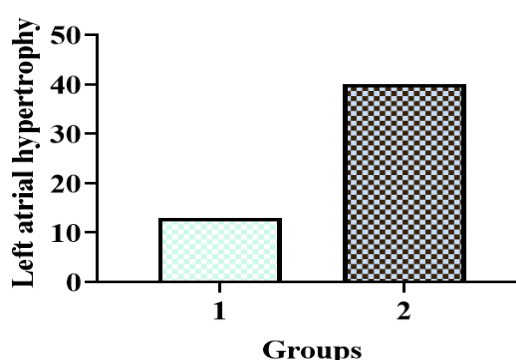


Figure 3. Comparison of detection rate of left atrial hypertrophy between two groups

3.3 Size of VSD:

The comparison of VSD size and color shunt width measured by 2DE in different sections of 25-15mm showed that there was significant difference between left ventricular long axis and big vessel short axis and five chamber heart section see from Fig.4, but there was no significant difference between big vessel short axis and five chamber heart section as shown in Fig.5. Compared with left ventriculography, VSD size and color shunt width in different sections showed significant difference in long axis section of left ventricle, but no significant difference in other sections (Fig.6)

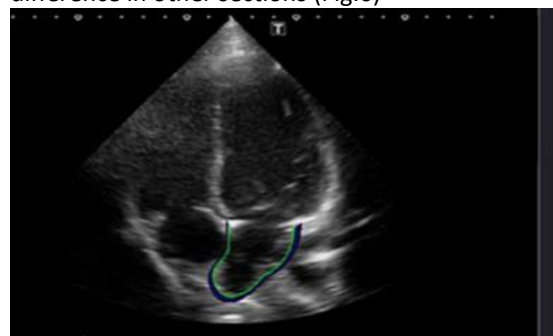


Figure 4. Five chamber view of apex

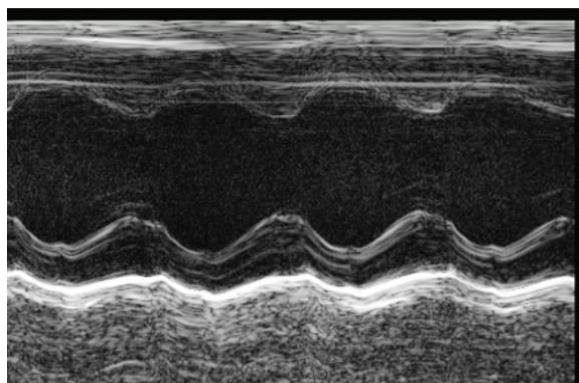


Figure 5. **Representative B-mode echocardiographic images in MR hearts before and at 6 weeks after rapamycin pumps insertion**

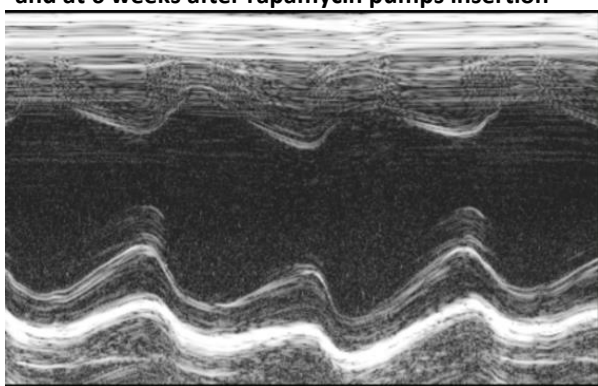


Figure 6. **Representative M-mode echocardiographic images in MR hearts before and at 6 weeks after rapamycin pumps insertion**

4. Discussion

Hypertensive heart disease is due to the long-term high blood pressure in patients, so that the structure and function of the heart disease (Aldaye et al., 2008; Kim and Saha, 2013; Lanza and Abendschein, 2000). At the early stage of the disease, the patient's heart will only appear the increase of negative pressure, without any substantial change (Moon et al., 2006). But with the time going on, the condition will gradually aggravate, the patient's myocardial fiber will gradually become thicker, which will lead to left ventricular hypertrophy, and then affect the heart function (López-Pérez et al., 2014). For hypertensive heart disease, early diagnosis and effective treatment can significantly improve the clinical efficacy (Kolli et al., 2014; Li and Li, 2004;). At present, the common clinical diagnosis is ECG and color Doppler echocardiography. ECG is mainly used to record the mechanical contraction of the heart, and the detection of cardiac hypertrophy is poor. Therefore, the clinical application of this examination method has certain limitations. In addition, because the clinical symptoms of coronary

heart disease and hypertensive heart disease are similar, it is easy to be misdiagnosed (Yang et al., 2013).

Color Doppler echocardiography, mainly in the form of ultrasonic examination, can also reflect the early pathological changes of hypertensive heart disease, with the characteristics of no pain, no radiation, etc. and the imaging of this diagnostic method is relatively clear, can also clearly show the organs around the organs, with a sense of entity, can clearly show the anatomical structure of the organs, It is helpful to improve the accuracy of clinical diagnosis. In the process of color Doppler echocardiography, the condition of valve regurgitation, cardiac cavity enlargement and cardiac hypertrophy can also be observed directly, and then the state of cardiac function can be reflected, which can provide reliable treatment information for clinical. A large number of clinical practice has confirmed that color Doppler echocardiography can detect the specific location and thickness of left ventricle, and can effectively distinguish hypertrophic cardiomyopathy and hypertensive heart disease.

5. Conclusion

In conclusion, color Doppler echocardiography has a high value in the early diagnosis of hypertensive heart disease, It is worth popularizing the application value of echocardiography in the diagnosis of senile hypertensive heart disease. It is found that the sensitivity of echocardiography to assess the change of heart in patients with hypertensive heart disease is higher than that of electrocardiogram, so it is considered that echocardiography can be used as a method to detect hypertensive heart disease in clinic. In this study, color Doppler echocardiography and electrocardiogram were compared and analyzed in hypertension

The results showed that the sensitivity of ST segment depression, ischemic T wave and ST segment level prolongation in the control group was higher than that in the observation group, but the detection rate of left ventricular hypertrophy and left atrial hypertrophy in the observation group was higher than that in the control group.

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