Analysis of the Value of Cardiac Ultrasound in the Diagnosis of Segmental Ventricular Wall Motion Abnormalities in Coronary Artery Disease

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Abstract: *Objective:* To compare the diagnostic value of coronary angiography and cardiac ultrasound in segmental ventricular wall motion abnormalities of coronary heart disease. *Methods:* 60 cases of coronary artery disease patients admitted to Balihan Town Central Health Hospital of Ningcheng County, Chifeng City, Inner Mongolia, from February 2021 to February 2024 were treated as the research subjects, and they were divided into the control group ($n = 30$) and the observation group ($n = 30$) according to the sequence of the admission time of the patients, and the control group performed conventional coronary artery angiography, and the observation group performed cardiac ultrasound for diagnosis, and the diagnostic accuracy and incidence of adverse reactions in the patients of the two groups were compared. The diagnostic accuracy and the incidence of adverse reactions were compared between the two groups. *Results:* The results of the study showed that the correct diagnostic rate of coronary angiography was 30/30 (100.00%), and the diagnostic accuracy of cardiac ultrasound was 29/30 (96.67%), and there was no statistically significant difference in the diagnostic accuracy of the patients in the two groups ($P < 0.05$). In the comparison of the adverse reactions, the control group had 3 cases of nausea, 1 case of dizziness, and 1 case of vomiting, a total of 5 cases, and the incidence was 16.67%, while the observation group did not have any adverse reaction, and the incidence was 16.67%. 16.67%, the observation group did not have any adverse reactions, and the two groups of patients were statistically significant in the comparison of data ($P < 0.05$). *Conclusion:* Compared with coronary angiography diagnosis, the diagnostic accuracy of cardiac ultrasound is slightly lower, but within the acceptable range, and can reduce the incidence of adverse reactions after examination, which is worthy of clinical promotion and application.

Keywords: Cardiac ultrasound; Coronary angiography; Segmental ventricular wall motion abnormalities; Coronary artery disease; Diagnostic value

1. Introduction

Coronary artery disease (CAD) is a common clinical heart disease, the cause of which is insufficient oxygen supply to the myocardium due to coronary artery stenosis [1], which has a very high mortality and disability

rate, and mainly develops in middle-aged and elderly men. With the aging of China's population becoming more and more serious, the incidence of CAD is also increasing [2]. In recent years, the quality of life of the people has significantly improved, and the incidence of the population has gradually become younger, seriously affecting the quality of life and physical health of patients [3]. The main clinical symptoms include myocardial, chest pain, vomiting, sweating, and so on, and heart failure may occur in severe cases. For CAD, early diagnosis is very important, but most patients do not have obvious symptoms in the early clinical stage, and the sensitivity of conventional ECG is not high, and it is easily affected by many external factors, which may lead to misdiagnosis and omission of diagnosis [4]. Coronary angiography is the most common diagnostic method for coronary artery disease, but it is highly invasive and requires a high level of operator training, and the overall diagnostic compliance is not high. Segmental ventricular wall motion abnormality is a common clinical symptom of coronary artery disease, and early diagnosis can help patients' good prognosis. However, with the continuous improvement of medical technology, cardiac ultrasound has been widely used, with a high diagnostic accuracy in the clinic [5], and has the advantages of being non-invasive and convenient. Based on this paper, the patients with coronary heart disease admitted to Balihan Town Central Health Hospital of Ningcheng County, Chifeng City, Inner Mongolia, from February 2021 to February 2024 were taken as the study subjects, a total of 60 cases, to explore the diagnostic differences between cardiac ultrasound and traditional coronary angiography in segmental ventricular wall motion abnormalities of coronary heart disease, and the specific research reports are as follows.

2. Information and methods

2.1. General information

A study was conducted on 60 patients with coronary heart disease admitted to Balihan Town Central Health Hospital of Ningcheng County, Chifeng City, Inner Mongolia, from February 2021 to February 2024, and they were divided into the control group and the observation group according to the sequence of the admission time, with 30 cases in each of the two groups. Firstly, among the patients in the control group, the ratio of male to female patients was 18:12; the age ranged from 41–68 years old, with an average age of 57.36 ± 7.95; the duration of coronary heart disease ranged from 2–15 months, with an average duration of 6.42 ± 1.66 months. In the observation group, there were 17 male patients and 13 female patients; the age ranged from 39–69 years old, with an average age of (57.12 ± 8.54); the duration of coronary heart disease ranged from 2–17 months, with an average duration of (6.60 ± 1.85) months. No statistical significance was found after comparing the general information of the two groups of patients ($P > 0.05$).

Inclusion criteria: (1) All patients met the diagnostic criteria for coronary heart disease in the Chinese Expert Consensus on CT Examination and Diagnosis of Coronary Heart Disease [6]; (2) No history of mental illness, and can communicate normally; (3) Patients and their families signed informed consent, and this study was unified by the hospital ethics committee.

Exclusion criteria: (1) Patients do not tolerate coronary angiography for personal reasons; (2) Combined liver and kidney insufficiency; (3) The presence of other organic diseases; (4) A history of drug allergy.

2.2. Methods

The patients in the control group undergo coronary angiography, with the patients in the supine position, and the catheter is delivered to the aorta of the patients using puncture, and the contrast agent is injected through the catheter, and the ductus arteriosus of the patients is observed through the angiography machine to determine whether there is any segmental ventricular wall motion abnormality.

In the observation group, cardiac ultrasound was performed, with the patient in the left prone position,

and through the colour ultrasound diagnostic instrument (GE), the probe frequency was set to 2–3.5 MHz and the patient's ventricular wall segments were divided, and the main examination positions were the apical four chambers of the patient's heart, short-axis section, long-axis section, and cardiac section. The segmental ventricular wall of the patient is judged whether there is any abnormality through the image display, and when there is a weakening of motion, ventricular wall perforation, ventricular wall rupture, etc., it can be diagnosed as segmental ventricular wall motion abnormality [7].

2.3. Observation indexes

In this study, the diagnostic accuracy rate and the incidence of adverse reactions were chosen as the observation indexes.

2.4. Statistical methods

The data of this study were analyzed using the statistical software SPSS 23.00, which includes measurement data, count data, measurement data is expressed as (n, %), using χ^2 test, and count data expressed as mean ± standard deviation (SD), using t test. It was statistically significant when $P < 0.05$.

3. Results

3.1. Comparison results of correct diagnosis rate

The results of the study showed that the diagnostic correctness rate of the two groups of patients was not statistically significant in the comparison of data ($P > 0.05$), as shown in **Table 1**.

Table 1. Comparison results of correct diagnosis rate of the two groups of patients (n, %)

Groups	n	Abnormal left ventricular end-diastolic diameter	Abnormal left ventricular end-diastolic diameter	Abnormal left ventricular outflow tract	Abnormal left atrial and right ventricular internal diameters	Abnormal left atrial and aortic internal diameters	Correct diagnosis rate
Control group	30	9 (30.00)	5 (16.67)	4 (13.33)	6 (20.00)	6 (20.00)	30 (100.00)
Observation group	30	8 (26.67)	5 (16.67)	4 (13.33)	6 (20.00)	6 (20.00)	29 (96.67)
χ^2	-	-	-	-	-	-	1.017
P	-	-	-	-	-	-	0.313

3.2. Comparison results of the incidence rate of adverse reactions

The incidence rate of adverse reactions of patients in the control group was 5 (16.66%), which was significantly higher than that of patients in the observation group, which was 0 (0.00%), with statistical significance ($P < 0.05$), see **Table 2**.

Table 2. Comparison results of the incidence rate of adverse reactions in the two groups of patients

Groups	n	Nausea (%)	Dizziness (%)	Vomiting (%)	Total incidence (%)
Control group	30	3 (10.00)	1 (3.33)	1 (3.33)	5 (16.66)
Observation group	30	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
χ^2	-	-	-	-	5.455
P	-	-	-	-	0.020

4. Discussion

Coronary heart disease is a common clinical chronic disease, at present, the main diagnostic methods of coronary heart disease include CT, electrocardiogram, coronary angiography and so on [8], which have their advantages. Taking ECG as an example, although it can diagnose coronary heart disease, it is easily affected by many external factors, resulting in false negatives or false positives. At present, the gold standard for coronary heart disease is coronary angiography [9], but the price of this test is high and it is an invasive test, so the overall compliance of patients is not high. With the rapid development of medical technology, cardiac ultrasound has been applied in the clinic, and this diagnostic modality is inexpensive, simple to operate, and has higher patient compliance. Some patients with coronary artery disease will have segmental ventricular wall motion abnormalities, and the main clinical symptoms are chest tightness, palpitations and so on. It has been pointed out that cardiac ultrasound can not only diagnose the existence of segmental ventricular wall motion abnormalities but also diagnose the degree of the disease, which has a positive effect on the development of the patient's treatment plan [10]. In addition, cardiac ultrasound does not require puncture and is non-invasive, which makes it more acceptable to patients. Some studies have pointed out that cardiac ultrasound and coronary angiography have high diagnostic value for segmental ventricular wall motion abnormalities in coronary artery disease [11].

Based on this paper, a total of 60 patients were included as research subjects, and the results of the study showed that the diagnostic accuracy of patients in the control group was 30/30 (100.00%), and the diagnostic accuracy of patients in the observation group was 29/30 (96.67%), and the comparison of the data was found to be not statistically significant ($P > 0.05$), which is in line with the results of other studies [12]. In the comparison of the incidence of adverse reactions, the observation group did not have any adverse reaction situation, and the patients in the control group had 5 cases of adverse reactions, with an incidence rate of 16.66%, and the incidence rate of adverse reactions in the observation group was significantly lower than that in the control group ($P < 0.05$). The reason for this is that coronary angiography is an invasive examination and cardiac ultrasound is a non-invasive examination, which can reduce the adverse reactions of patients to a certain extent and promote the good prognosis of patients.

5. Conclusion

Compared with traditional coronary angiography, cardiac ultrasound has a higher value in the diagnosis of segmental ventricular wall motion abnormalities in coronary artery disease, which can not only effectively improve the diagnostic accuracy, but also effectively avoid adverse reactions, and is worth promoting and applying in the clinic.

Disclosure statement

The authors declare no conflict of interest.

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