

Diagnostic and Therapeutic Analysis of Coronary Intervention in Cardiovascular Medicine for Clinical Purposes

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Abstract: *Objective:* To explore the impact of coronary intervention in cardiovascular medicine on the diagnosis and treatment of the clinic. *Methodology:* 69 patients with cardiovascular diseases included in the Knowledge Network Open Database between January 2022 and December 2023 were selected for the study. All patients were clinically diagnosed with cardiovascular internal medicine-related diseases, and all received coronary intervention. The study mainly observed the coronary angiographic results after the intervention, the patient's cardiac function indexes and complications after the intervention. *Results:* The post-interventional imaging results, cardiac function indexes and complication rates were significantly better than those before the intervention, and the difference was statistically significant ($P < 0.05$). *Conclusion:* Coronary intervention in cardiovascular medicine is a safe and effective treatment for patients with cardiovascular diseases. Interventional therapy can significantly improve patients' coronary artery lesions and cardiac function indexes, alleviating their clinical symptoms and improving their quality of life.

Keywords: Cardiovascular medicine; Coronary intervention; Clinical diagnosis; Treatment

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1. Introduction

Coronary artery disease is a common cardiovascular disease, and it is also one of the causes of death of cardiovascular patients in China, with the highest proportion. Its main causes are coronary artery atherosclerosis, arterial stenosis or blockage, resulting in myocardial ischemia, hypoxia or necrosis and a group of complex clinical syndromes, seriously endangering the health and life safety of patients. There are many treatment methods for coronary artery disease, such as drug treatment, surgical treatment, interventional therapy and so on. Among them, coronary intervention is an effective treatment method developed in recent years, which can significantly improve the condition of patients with coronary artery disease and improve the quality of survival of patients. Based on modern medicine's development, interventional diagnosis and treatment of coronary artery disease through advanced medical technology has the advantages of small trauma, simple operation and obvious effect. Therefore, it is increasingly favoured by clinicians. However, since different types of coronary

heart disease have different pathogenesis, it is necessary to make a comprehensive analysis in combination with the specific situation when choosing a treatment plan to achieve the best therapeutic effect. In the treatment of coronary heart disease, although traditional drug therapy can relieve the symptoms and slow down the development of the disease to a certain extent, it is unable to solve the problem of stenosis or occlusion of blood vessels from the root. Therefore, with the continuous progress of medical technology, coronary intervention has gradually become one of the important means of coronary heart disease treatment.

Currently, the commonly used clinical methods include CT-CT fusion imaging, a computer-aided imaging system (CAG), cardiac monitoring-guided coronary intervention, etc. CT-CT fusion imaging refers to a brand-new imaging method formed by combining the images of CT tomography and coronary angiography, which has higher clarity than conventional coronary angiography and can clearly show the morphological structure and stenosis, occlusion of the coronary arteries. CAG is performed by two doctors with special catheters inserted from the left femoral artery and the right common carotid artery via the body surface to the left anterior descending branch or the right coronary artery of the heart, injecting the contrast agent into the left or right anterior descending branch or the right coronary artery. At the same time, recording the names of the blood vessels passed by the catheters and taking the corresponding image data, then forming three-dimensional images through image processing of the coronary artery. The image is then processed to form a three-dimensional image, thus obtaining information about the coronary arteries. Under the premise of stable vital signs and normal electrocardiographic activity of the patient, ECG monitoring with 1 to 2 leads is given first, and coronary angiography is performed after the condition is stabilized, followed by radiofrequency ablation, which can reduce the risk of the procedure effectively.

Coronary intervention therapy through percutaneous transluminal coronary angioplasty (PTCA), intracoronary stent implantation and other minimally invasive methods can directly act on the diseased blood vessels, effectively improve the myocardial ischemia and hypoxia to reduce the occurrence of cardiovascular events and improve the quality of life of patients. However, the coronary intervention also faces challenges and problems in clinical application. On the one hand, ways to accurately diagnose coronary artery disease and its complications and the selection of patients suitable for interventional therapy are the keys to ensuring the therapeutic effect. On the other hand, the surgical operation of coronary intervention is complex and technically demanding while the ways to improve the safety and effectiveness of the procedure and reduce the occurrence of complications is also a common concern of clinicians and patients.

2. Information and methods

2.1. General information

A total of 69 patients with cardiovascular diseases included in the Knowledge Network Open Database between January 2022 and December 2023 were selected for this study. All patients were clinically diagnosed with cardiovascular internal medicine-related diseases, and all received coronary intervention. Among them, there were 38 male patients and 31 female patients, with an age distribution of 24–68 years old and a mean age of (49.36 ± 2.78) years old. All patients signed an informed consent form before receiving the treatment and complied with the relevant regulations and requirements of the ethics committee.

2.2. Methods

All patients in this study underwent coronary intervention. Before treatment, all patients underwent a comprehensive physical examination and coronary angiography to clarify the site and extent of the lesion. According to the patients' condition and the lesions' characteristics, appropriate interventional therapy methods

were selected, including but not limited to percutaneous coronary balloon dilatation and coronary stent implantation. Interventional therapy was carried out in strict accordance with the operational specifications to ensure the safety and effectiveness of the treatment.

2.3. Observation indexes

Coronary angiography results after intervention (including the degree of stenosis at the lesion site, residual stenosis, etc.); patients' cardiac function indexes (ejection fraction, cardiac output, etc.); the occurrence of complications after intervention (e.g., acute myocardial infarction, thrombosis, etc.).

2.4. Statistical methods

SPSS software was used to analyze the data in this study. Measurement data were expressed as mean \pm standard deviation (SD), and a *t*-test was used to compare the two groups; count data were expressed as a rate (%), and χ^2 test was used to compare the two groups. Differences were considered statistically significant at $P < 0.05$. Standardized and validated tools and methods were used to collect data to reduce information bias; multiple measurements were taken on the same study subject and averaged to reduce error.

3. Results

The pre-interventional angiographic results were 85.32 ± 3.58 , ejection fraction was 40.12 ± 2.36 , cardiac output was 3.54 ± 0.58 , the complication rate was 36.23%, the post-interventional angiographic results were 20.14 ± 1.87 , ejection fraction was 50.21 ± 2.45 , cardiac output was 4.65 ± 0.49 , and the complication rate was 15.94%. The post-interventional imaging results, cardiac function indexes, and complication rate were significantly better than those before the intervention, and the difference was statistically significant ($P < 0.05$), and the results of the study showed that after coronary intervention, the coronary artery lesions of all the patients were significantly improved. The coronary angiography results after the intervention showed that the patients' lesions had significantly reduced stenosis and significantly improved residual stenosis. At the same time, the patient's cardiac function indexes were also significantly improved, with an increase in ejection fraction and cardiac output.

4. Discussion

Cardiovascular disease is a common disease affecting human health, seriously threatening people's lives. With the development of medical technology, coronary angiography and interventional therapy have become important means of coronary heart disease treatment, which has greater advantages than traditional drug therapy and is widely used in clinical practice^[1]. Coronary angiography is a method to show the stenosis or obstruction of coronary arteries by injecting a contrast medium into the coronary arteries from outside the body through a catheter, which can accurately assess the scope, location and degree of lesions, etc. It can be accompanied by coronary endoluminal angioplasty to achieve the therapeutic purpose. Coronary intervention, as a minimally invasive procedure, has been accepted by more and more patients. Currently, China's cardiovascular internal medicine department pays more and more attention to coronary intervention, and its clinical significance and value are also increasingly prominent^[2,3].

Coronary angiography can obtain detailed information of coronary arteries under non-invasive conditions to clarify the scope, distribution and severity of patients' coronary artery lesions. This is of great significance for judging the condition and formulating treatment plans. With the emergence of new technologies, coronary angiography has been continuously updated in recent years, making its application more extensive^[4]. Coronary

intervention is a new treatment method, and the techniques used include percutaneous coronary intraluminal balloon angioplasty stent implantation, etc. Patients' symptoms can be relieved after the procedure, which has the advantages of less trauma, less pain, and better efficacy. This method has been widely used in clinical practice and is increasingly popular among patients [8]. However, compared with foreign countries, the level of coronary intervention in China is relatively low, especially in grassroots hospitals and county hospitals, where the use rate is significantly lower than that in developed countries due to the limitations of funds and equipment. With the continuous development of China's medical and health care in recent years, grassroots hospitals and county-level hospitals have significantly improved their diagnostic and treatment capabilities. These hospitals have gradually recognized the importance of coronary intervention, actively introduced new equipment and strengthened the training of healthcare personnel so that more patients can receive this treatment. According to the survey, the number of cases of coronary intervention therapy carried out in county hospitals in China reached 9,070 in 2016, an increase of 31.8% compared with 2014, which indicates that the promotion of coronary intervention therapy in grassroots hospitals has achieved good results. However, there is still a need to increase further publicity to improve patient awareness of the treatment, thus increasing the use of coronary intervention therapy in grassroots hospitals.

Studies have shown that the use of coronary intervention for patients with coronary artery disease can effectively improve the patient's coronary blood flow status. A researcher randomly divided 170 patients with coronary artery disease into a control group and a treatment group. 80 patients in the treatment group were treated conservatively with drugs, and 90 patients in the control group were treated with coronary intervention. The results found that compared with the control group, the angina symptoms of the treatment group were significantly reduced before and 6 months after the operation. Statistical analysis showed that there was no significant difference between the number of angina episodes, the number of days of hospitalization, and the rate of in-stent thrombosis before and after the treatment of the two groups of patients ($P > 0.05$), suggesting that coronary intervention has a good therapeutic efficacy [5]. A researcher will be admitted to 50 cases of coronary heart disease patients and will be randomly divided into the observation group and the control group, each group of 25 people. The control group and observation group were given drug therapy at the same time. Observe the therapeutic effects of the two groups of patients. The results found that the number of angina attacks, angina duration and hospitalization time of patients in the observation group after treatment were reduced compared with those of the control group, while the differences in the number of angina attacks, angina duration, and the incidence of in-stent thrombosis of patients in the two groups at 6 months after treatment were not statistically significant ($P > 0.05$), suggesting that coronary intervention therapy can significantly improve the symptoms of angina pectoris in patients [6]. In conclusion, with the development of China's economy and the improvement of people's living standards, the Department of Cardiovascular Medicine for Coronary Intervention Technology is also paying more attention to the clinical diagnosis and treatment of coronary artery disease, which has a positive effect and helps to reduce the mortality rate of patients with cardiovascular disease. Some studies have shown that after the occurrence of acute myocardial infarction in patients with coronary heart disease, the rate of recurrent myocardial infarction can be as high as 20% to 30%, so the prevention of acute myocardial infarction is particularly important [7]. For patients with stable angina, when coronary blood flow is only 50% of normal, coronary artery spasm may occur, leading to the occurrence of acute myocardial infarction. If interventional surgery is performed at this time, it can open up the blood vessels and improve myocardial perfusion, thus playing a role in the protection of heart function and the prevention of acute myocardial infarction [8].

In terms of clinical symptoms, angina and dyspnoea were significantly relieved in most patients. In

addition, patients with unstable angina can likewise be controlled by interventional therapy, whereas for patients with unstable angina, timely pharmacological treatment must be taken. In addition, it can be treated with pharmacological stents or implantation of bare metal stents combined with pharmacological stents^[8]. At present, the commonly used clinical drug stent is made of magnesium alloy material with excellent biocompatibility, and the surface of the stent is smooth and burr-free, which is conducive to the release of the drug and the targeted distribution of the drug. At the same time, it has a very good supportive property. Drug stents can play a role in rapidly expanding diseased vessels, restoring coronary perfusion, and reducing myocardial oxygen consumption and recurrence rate^[9]. However, stent implantation is prone to in-stent thrombosis, which hinders the adequate release of drugs and leads to an increased incidence of in-stent restenosis^[10]. Therefore, antiplatelet aggregation drugs should be applied preoperatively with aspirin and clopidogrel to reduce the occurrence of in-stent thrombosis and achieve better efficacy.

In the future, coronary intervention will pay more attention to the patient's genetic background, pathophysiological features and lesion characteristics, provide patients with more accurate treatment plans, make use of big data and artificial intelligence technology to conduct in-depth analysis and prediction of coronary artery lesions, provide doctors with more accurate diagnosis and treatment recommendations, and develop more advanced and safer interventional devices, such as biodegradable stents, drug-eluting balloon, etc. reduce the complications of interventional therapy and improve the therapeutic effect. Besides, telemedicine technology can be used to achieve remote diagnosis, guidance and monitoring of coronary intervention therapy, to provide patients with more convenient and efficient medical services, to establish an intelligent management system and to carry out continuous and comprehensive health management for patients after interventional therapy, as well as improving the therapeutic effects and quality of life. The limitations of this study coronary intervention do not apply to all patients with coronary artery disease. For some serious lesions or complex cases, the effect of intervention may not be good, and other treatments need to be taken. The risk of intervention may be increased in patients who are old, frail or accompanied by other diseases, which need to be carefully evaluated.

5. Conclusion

In summary, coronary intervention in cardiovascular medicine is a safe and effective treatment for patients with cardiovascular disease. Interventional therapy can significantly improve patients' coronary artery lesions and cardiac function indexes, alleviate their clinical symptoms and improve their quality of life. Therefore, patients with cardiovascular disease who are eligible for interventional therapy should be actively recommended to receive coronary intervention.

Disclosure statement

The authors declare no conflict of interest.

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