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Comparison of different revascularization strategies in patients with acute myocardial infarction complicated with multi vessel disease.

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Abstract

Objective: This study aims at a comparative study to the clinical effects of complete revascularization *vs.* incomplete revascularization strategies for patients with acute myocardial infarction accompanying by multi-vessel lesion.

Method: A retrospective analysis is conducted to the clinical data of 200 cases, i.e., the patients with acute myocardial infarction and multi-vessel lesion from January, 2012 to January, 2017 in our hospital. According to the situation of intra-coronary revascularization, these cases are divided into two groups, 100 cases of multi-vessel Complete Revascularization group (CR group) and 100 cases of multi-vessel Incomplete Revascularization group (IR group). The comparisons are on the situations of coronary artery lesion and stent implantation of the two group patients, as well as the endpoint event incidence of cardiovascular disease during 1 y post-operation follow-up.

Result: The post-operation follow-up indicates that, the incidences of recurrence of angina pectoris, repeat revascularization and major adverse cardiac events for IR group are significantly higher than that of CR group, with statistical significance for data comparison of the two groups (P<0.05).

Conclusion: The clinical effects of intra-coronary complete revascularization to the patients with myocardial infarction accompanying by multi-vessel lesion is superior to the treatment of incomplete revascularization.

Keywords: Different revascularization, Acute myocardial infarction, Multiple vessel disease.

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Introduction

With the improvement of people's living standard, the incidence of cardiovascular disease is increasing day by day, and cardiovascular disease has become the first killer which is a threat to human's health [1]. Acute Myocardial Infarction (AMI) is a common cardiovascular disease whose main clinical features are acute onset and poor prognosis. At present, the main methods of treatment for acute myocardial infarction is thrombolysis and interventional therapy, and interventional treatment can make infarction recanalized as soon as possible and to save viable myocardium, which is widely used in clinic [2,3]. On the other hand, AMI is often complicated with multivessel disease. When treating AMI patients with interventional therapy, there is still controversy when to hand diseased blood vessels [4]. The purpose of this study is to discuss the curative effect of the two methods such as complete reconstruction and incomplete reconstruction after infarction in patients with acute myocardial infarction complicated with multi vessel disease.

Materials and Methods

Clinical data

A retrospective analysis of No.2 People's Hospital of Fuyang City 1 in January 2013 to 2017 January 200 cases of acute myocardial infarction with multi vessel lesions in patients with clinical data, according to the coronary blood transport reconstruction is divided into multi vessel complete blood supply reconstruction (CR group) group (n=100) and multi vessel incomplete blood supply reconstruction group (IR group) of 100 cases. 41 cases of female patients and 59 cases of male patients are in CR group with age range 46~79 y and mean age (65 ± 2 y); 45 cases of female patients and 55 cases of male patients are in group IR with age range 48~78 y and mean age (64 ± 3 y) old. The comparison of the two groups in basic clinical data such as age, gender, the risk factors, the biochemical indexes can be seen in Table 1.

Table 1. The basic data table of the patients in the two groups.

Items	CR (n=100)	IR (n=100)	t/χ^2	P

Gender (Male/Female)		59/41	55/45	1.104	0.062
Age (Y)		46~79 (65 ± 2)	48~78 (64 ± 3)	0.932	0.067
	Advanced age (65 y old)	35	32		
Risk factors (n)	Smoking	47	45		
	High blood pressure	54	56	1.305	0.056
	Hyperlipemia	39	42		
	Diabetes	27	26		
Biochemical index ultrasonography		83.26 ± 18.19	87.45 ± 13.08		
	Uric acid (μmol/ L)	339.37 ± 64.74	345.62 ± 50.34		
	Triglyceride (mmol/L)	1.49 ± 0.46	1.58 ± 0.72	0.953	0.085
	Total cholesterol (mmol/L)	4.41 ± 1.15	4.31 ± 1.31		
	LDL (mmol/L)	2.35 ± 0.74	2.52 ± 0.65		
	HDL (mmol/L)	1.09 ± 0.23	1.01 ± 0.18		
Ultrasonography	Ejection fraction (EF/%)	52.32 ± 6.25	51.21 ± 7.39		
	LVD (cm)	52.32 ± 6.25	51.21 ± 7.39	11.5 ± 3.5	12.0 ± 3.0
	Hospitalization time (d)	11.5 ± 3.5	12.0 ± 3.0	0.783	0.091

The study was approved by the hospital ethics committee.

Inclusion criteria and exclusion criteria

The selected patients in this study are required to meet the following requirements: all patients with at least one stent; the CR means stenosis of more than 70% vessels which have successfully completed the interventional treatment, including the second interventional treatment blood vessel stenosis in patients' hospitalization with the same disease of AMI or interventional treatment of non stenotic stenosis of blood vessels in a hospital again within one month; IR refers to leaving any one or multi stenosis 70% vascular lesions without interventional therapy. Meeting the following any one should be excluded: patients with history of old myocardial infarction, left main disease, chronic occlusive disease; severe hepatic and renal dysfunction; patients with malignant tumor; the postoperative patients loss to be followed up.

Method

Surgical treatment method: Including coronary angiography and stent implantation. All patients underwent conventional coronary angiography through radial artery or femoral artery to observe infarction location and pathological changes of stenosis in coronary vascula. The judging criteria of stenosis size are determined according to the international general visual method. Patients with stenosis of more than 70% vessels received interventional therapy.

Drug treatment: All patients in the emergency preoperative received oral loading dose of clopidogrel aspirin 300 mg, clopidogrel 300 mg; postoperative oral clopidogrel 75 mg, once daily and aspirin 100 mg, once daily. If basis materials included any one of risk factors, low molecular weight heparin was a plus. All patients should receive long-term oral drugs of lipid-lowering, antiplatelet, myocardial remodeling and reducing myocardial energy consumption. If patients were treated with the implantation of drug eluting stent, they should receive oral clopidogrel for a year, and if treated with all metal stent implantation, they should take oral clopidogrel for half a year.

Follow up: All patients were followed up after discharge once a month for 1~2 y; the follow-up including whether recurrent angina appeared, whether revascularization was conducted again (refers to blood circulation reconstructive surgery after a month of operation) and the incidence of adverse cardiovascular events.

Evaluation index

The two groups of patients with coronary artery disease and stent implantation situation as well as heart vascular disease end point event rate in one year follow-up after operation were compared. The condition of coronary artery lesions mainly refers to the average number of lesions, cases of three branch lesions, occlusion cases, Gensini scores of the patients. Stenting situation refers to the number of stent implantation, eluting stent implantation number.

Statistical methods

All the data of this study were analysed by SPSS19.0 software, the measurement data were examined by T value, and the counting comparison was made by chi square χ^2 test with the

standard of a=0.05 and statistical significance expressed by P<0.05.

Results

Coronary lesions and stent implantation situation in the two groups of patients

CR group and IR group of patients with coronary lesions and stent implantation situation are shown in Table 2.

Table 2. *Comparison of coronary artery lesions and stent implantation situation in the two groups of patients.*

Items	CR	IR	χ^2	P
Average number of lesions	2.24 ± 0.34	2.19 ± 0.37	1.282	0.063
Cases of three branch lesions	28	28	1.405	0.060
Cases of occlusion lesions	43	41	0.898	0.085
Gensini score	65.94 ± 17.92	66.27 ± 15.39	1.007	0.072
Number of stent implantation	3.2 ± 1.0	2.2 ± 1.0	5.461	0.038
Number of eluting stent implantation	79	81	0.746	0.089

The table above showed that the average number of lesions branch, cases of three branch lesions, cases of occlusion lesions, Gensini score, number of eluting stent implantation in CR group and IR group of patients were not statistically significant (P>0.05); and in the number of stents implantation, CR group were significantly higher than those in group IR, with the data being statistically significant between the two groups (P<0.05).

Comparison of cardiovascular end events situation in patients of the two groups followed up for one year after operation

Comparison of cardiovascular end events situation in patients of group CR and group IR followed up for one year after operation can be seen in Table 3.

Table 3. *Comparison of cardiovascular end events situation in patients of the two groups during follow up period.*

Items	CR group	IR group	χ^2	P
AMI (n (%))	0 (0)	1 (7.0%)	4.143	0.037
Emergency treatment of CABG (n (%))	0 (0)	3 (0.0%)	4.596	0.028
Recurrent angina pectoris (n (%))	12 (12.0%)	34 (34.0%)	4.332	0.033
Psychogenic readmission (n (%))	10 (10.0%)	23 (23.0%)	4.224	0.035
Revascularization again (n (%))	1 (1.0%)	9 (9.0%)	3.963	0.042
Death (n (%))	0 (0)	1 (1.0%)	5.124	0.016
MACE event (n (%))	4 (4.0%)	17 (17.0%)	5.971	0.009

From the above table, the incidence rate of cardiovascular end events in the CR group was significantly lower than that in the IR group, and the data comparison between the two groups was statistically significant (P<0.05).

Discussion

In recent years, with the improvement of living standards and changes in lifestyle, the incidence of coronary heart disease is higher and higher, especially in the elderly population, the incidence rate of keeps high level [5]. The development of coronary heart disease can induce many complications, especially when it develops to late period, it often leads to extremely dangerous complications, of which a more common one is myocardial infarction. Myocardial infarction is usually more acute with severe illness, which often needs emergency treatment [6]. Before interventional therapy went into clinic, the general treatment for patients with myocardial infarction is thrombolysis, vasodilator, reducing various risk factors and other comprehensive treatment measures, but the treatment effect of this method is not stable, and complications of thrombolytic therapy are various with low safety [7,8]. With interventional therapy extensively conducted in clinic, the application of percutaneous transluminal coronary angioplasty (PCI) in vascular recanalization for patients with acute myocardial infarction is more extensive [9].

The number of blood vessel involved by coronary artery lesions are usually more, which means AMI is often accompanied by multivessel disease. In cardiology, multivessel disease is defined as follows: the anterior descending branch, circumflex branch and right coronary artery as well as its large branch (diagonal branch, obtuse marginal branch, marginal branch) and other main coronary artery whose diameter ≥ 2 mm, 2 and above of the vascular stenosis reaches more than 70% [10]. At present, the interventional therapy for AMI patients with multivessel disease has been controversial. In the comparison research of 250 cases of patients with AMI complicated with multivessel disease. Kloeter et al. [11] found that during 6 months of follow-up, in the patients with incomplete revascularization or without interventional treatment which meant without revascularization, the clinical treatment effect was worse than those accepted complete

revascularization. But in China, Yonghe et al. [12] compared the prognosis of 153 cases of elderly patients with multi vessel disease receiving different revascularization strategies and the research showed that the difference of perioperative recent death, acute non-fatal myocardial infarction, emergency CABG and other MACE incidence rate in patients within complete revascularization and complete revascularization and cardiogenic death, acute fatal myocardial infarction and revascularization and other MACE incidence rate 1 year after operation was not statistically significant. The study to the outcome of patients with cardiovascular disease shows that, between the Complete Revascularization (CR) group and Incomplete Revascularization (IR) group, there is no statistical difference in perioperative short-term mortality, MACE incidence of acute non-lethal myocardial infarction, emergency CABG, 1 y post-operation cardiac death, acute lethal myocardial infarction and repeat revascularization, etc.

In order to investigate the clinical curative effect of two different strategies of the incomplete revascularization and complete revascularization for AMI patients with multivessel disease, this research was especially conducted. In this study, 100 cases of patients with complete revascularization and 100 cases of incomplete revascularization patients were selected, of which there were no significant differences in basic clinical data ($P>0.05$); when comparing coronary artery disease and interventional treatment situation of the two groups, it was found that except the number of stent implantation with difference ($P<0.05$), the rest of coronary lesions and interventional treatment were basically the same. When studying the follow-up data of two groups of patients, we found that cardiovascular disease end event rates of CR patients in the 12 months of follow-up were lower than those in IR group ($P<0.05$). But there are still some deficiencies in this research, for example, due to data limitations, this study did not differentiate the short-term follow-up results and long-term follow-up results, failing to differentiate the curative effect differences of short and long-term outcomes of the two strategies, as well as failing to present postoperative adverse reactions of two groups of patients. However, overall, the curative effect of complete revascularization is superior to that of incomplete revascularization.

In conclusion, complete revascularization through coronary for patients with myocardial infarction complicated with multivessel disease is superior to incomplete revascularization treatment.

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