Evaluation on curative effect and safety of interventional treatment for patients with acute myocardial infarction

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Abstract: To evaluate the effectiveness and recent safety of emergency and selective percutaneous coronary intervention (PCI) in elderly patients (≥80 years old) with acute myocardial infarction (AMI). 120 elderly patients with coronary heart disease (CHD) were divided into AMI group (with 55 cases) and non-myocardial infarction group (control group with 65 cases). Among the AMI group, there were 18 cases underwent emergency PCI within 12 hours after the onset, (AMI emergency PCI group), the rest 37 cases were AMI selective PCI group. In the control group, 2 cases had stable angina pectoris, 59 cases unstable angina pectoris and 4 patients old myocardial infarction. The lesions were classified according to the practice guidelines of American College Of Cardiology/American Heart Association (ACC/AHA). The hospitalized major adverse cardiac events (MACE) and complications in the patients were recorded and statistically analyzed. The AMI group had a higher total Gensini score, lower left ventricular ejection fraction (LVEF), less mean stents and contrast agent dosage and shorter operation time, compared with the control group. The difference was statistically significant. Though the average postoperative length of stay in AMI emergency PCI group was longer than that of AMI selective PCI group, but the difference had no statistical significance. To all the included patients, there were 50 cases with lesions in one branch, 43 cases in two branches and 27 cases in three branches. And the immediate PCI success ratio in AMI group was lower than that in control group (80% VS. 96.9%, P= 0.003), without significant difference in the distribution number of diseased vessels and complete reconstruction ratio (P>0.05). The incidence of the total complications in AMI emergency PCI group was higher, compared with the non-emergency group (with 102 cases) and AMI selective PCI group (P<0.001, P=0.039); and the occurrence rate of complication in AMI group was higher than that of the control group (P<0.001). The emergency PCI for elder patients with AMI is safe and worthy of promotion.

Keywords: Elderly, acute myocardial infarction, interventional therapy, curative effect, security.

INTRODUCTION

Age is one of the crucial risk factors for coronary heart disease (CHD). Results of Frarningham risk score study show that the absolute risk of CHD increases with age (Grundy *et al*., 1999). Acute myocardial infarction (AMI) can be classified into two clinical types according to whether there are ST-segment elevation in electrocardiogram (EEG) at the initial stage after onset, namely acute ST-segment elevation myocardial infarction (ASTEMI) and acute non-ST-segment elevation myocardial infarction (ANSTEMI), in which about 90% ASTEMI will eventually evolve into acute Q-wave myocardial infarction, while 80% ANSTEMI will evolve into acute non-Q-wave myocardial infarction. According to statistical data in US, the patients aging ≥ 75 years old account for 1/3 of the total patients with AMI; For elderly patients with AMI, age and AMI mortality was positively correlated, that is every age increases 1 year old, the mortality rate increases by about 1.6%; The mortality of AMI patients ≥ 75 years old is four-times higher than that of the patients ≤ 65 years old (Boucher *et al*., 2001; Maxwell, 1999). AMI has become one of the most common disease causing death in elderly patients.

After the onset of AMI, the earlier the vessel open, the more myocardium will be saved, especially for ASTEMI patients. Although the medical resource distribute unevenly, thrombolytic therapy is still playing an important role in ASTEMI treatment because of its convenience and feasibility. The clinical effect of thrombolytic therapy within 3 hours after onset is better than or equivalent to emergency PCI treatment. However, there are obviously limitations of thrombolytic therapy in treating elder patients with ASTEMI. First of all, since the proportion of most elderly patients combined with thrombolytic contraindications (especially in patients with history of brain stroke, gastrointestinal bleeding and hypertension) is significantly increased compared with the non elderly population. And with the increase of age, the risk of bleeding after thrombolysis also increase.

In addition, after receiving thrombolytic therapy, the opening rate of the infarction related artery and the bolld flow rate of thrombolysis in Myocardial Infarction-β (TIMI-3) are lower. Therefore, the infarction related artery have the risk of occlusion after receiving thrombolytic therapy, which can be up to 5-20% within the first 24h (Gurewich, 1993). However, Percutaneous coronary intevention (PCI) can effectively improve the prognosis and ischemic symptoms and decrease the recent

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mortality in elderly patients with CHD (Widimsky *et al*., 2003; Bach *et al*., 2004). In recent two decades, with the development of medical treatment such as the clinical application of balloon dilatation, bare stents and drug eluting stents, the improvement of operative instruments and surgeon experience, as well as the increased surgical experience of doctors, the number of elderly AMI patients undergoing PCI and the success rate are taking on an increasing trend (Polewczyk *et al*., 2010; Antonsen *et al*., 2011; Shelton *et al*., 2010). The lesions in elderly patients (more than 80 years old) are often involved in major vascular lesions, resulting in more severe diseases such as left main coronary artery diseases and complete occlusion and other complex lesions. Moreover, because of the combination of a variety of basic diseases, complications are prone to occur. Therefore, elderly patients with PCI should be treated with caution. This study is aimed to explore the effectiveness and recent safety of emergency PCI and selective PCI in elderly patients.

MATERIALS AND METHODS

General information

55 elderly patients (≥80 years) with AMI underwent PCI from March 2013 to December 2014 PC in XXX hospital were selected. Among them, there were 36 ASTEMI cases and 19 ANSTEMI cases, or 30 patients with anterior wall myocardial infarction, 3 cases with lateral myocardial infarction, 22 cases with inferior myocardial infarction. 18 patients underwent emergency PCI within 12 h after onset (emergency group). And another 65 elderly cases with non-myocardial infarction were taken as the control group, in which there were 2 patients with stable angina, 59 with unstable angina and 4 with old myocardial infraction. The non-emergency group was consist of the AMI selective PCI group and control group (with 102 cases). The included 120 patients aged from 80-94 years old (an average of 83.43±3.03 years old), with 41 cases not less than 85 years old. For all selected patients, there were 81 cases with hypertension, 20 cases with diabetes, 79 cases with dyslipidemia (hypercholesterolemia in 37 patients, high triglyceride levels in 25 patients, mixed hyperlipidemia in 10 cases and elevated LDL-C in 32 cases), 52 cases with chronic renal insufficiency (estimated glomerular filtration rate (eGFR)<60ml/min 1.73 m^2) 56 cases with abnormal LVEF (< 50%). All the patients in this study had signed the informed consent on coronary interventional treatment.

Exclusion criteria

The patients who had serious infection or injury or combined with serious hepatic disease, coagulation disorders, terminal malignant tumors or cerebrovascular diseases.

Methods

Indexes

(1) General situation: symptoms on admission to hospital such as typical or atypical symptoms, heart failure, arrhythmia, cardiac shock; medical history such as smoking, drinking, hypertension or diabetes; laboratory reports such as blood lipids, blood glucose, kidney function and cardiac function; cardiac function such as EF value and postoperative hospital stay, etc.

(2) The results of coronary arteriography (CAG): Gensini scores, major diseased vessels (with diameter≥2mm and more than 75% luminal stenosis) and the number of complex lesions (Bifurcation, ostial lesions and totally occlusion lesions).

(3) The condition of the target vessels: coronary lesions, vascular calcification, balloon dilation times, mean balloon dilation pressure and mean stent number, diameter, length, operating time, contrast agent dosage, PCI immediate success rate, blood vessel reconstruction ratio, temporary pacemaker and intraaortic balloon counter pulsation (IABP), etc.

(4) Intraoperative slow-reflow phenomenon or no-reflow phenomenon, coronary artery dissection, perforation, or rupture, intraoperative and postoperative major bleeding events (in the region of puncture point, the digestive tract, etc.).

(5) Postoperative MACE: heart failure, malignant arrhythmia and in-hospital mortality.

PCI planning

The patients without contraindications were conventionally given anticoagulant or anti-platelet aggregation drugs before operation. And AMI patients were given anti-platelet aggregation drugs (300 mg bay-aspirin, 300 mg clopidogre) before emergency operation; All patients were given 2500 u unfractionated heparin (UFH) and supplemented 5000-6250 u heparin sodium according to the disease. Temporary pacemaker, IABP, antiglycoprotein Ilb/IIIa receptor antagonist were used during operation accordingly. Also anticoagulation, dual antiplatelet aggregation drugs or statins, nitrate, β-blocker, angiotensin converting enzyme inhibitors (ACEI) and Angiotensin receptor blocker (ARB), etc. were applied postoperative accordingly.

According to the guideline for coronary arteriography of American College of Cardiology/The American Heart Association (ACC/AHA), Siemens AXIOM Artis dTA digital substraction angiography was used in this study. The radial artery or femoral artery of all the patients were punctured by Seldinger technique and with coronary angiography by Judkins method. Then suitable stents or balloons were embedded into the lesion region, with intravascular ultrasound if necessary. After the operation, the punctured artery were sutured by Angioseal instrument. The outcomes were analyzed by Gensini score system, including the main diseased artery and branches (diameter ≥2mm with more than 75% luminal stenosis). The lesions were classified by the technical standard in ACC/AHA (Guidelines for PTCA, 1993). And the MACE and complications during hospital stay were recorded.

Table 1: The clinical characteristics in AMI and control group (enumeration data)

Clinical characteristics	AMI group (%) N=55	Control group (%) N=65	P	The whole group N=120
Male/female	34/21	36/29	0.476	70/50
Smoking	20(40)	15(23.1)	0.045	37(30.8)
Drinking	10(18.2)	1015.4	0.682	20(16.7)
Hypertension	32(58.2)	49(75.4)	0.045	81(67.5)
Diabetes	9(16.4)	11(16.9)	0.935	20(16.7)
Hyperlipemia	19(34.5)	34(52.3)	0.051	53(44.2)
Dyspnea	19(34.5)	40(61.5)	0.003	59(49.2)
Heart failure	18(32.7)	8(12.8)	0.007	26(21.7)
Arrhythmia	12(21.8)	5(7.7)	0.027	17(14.2)
Cardiogenic shock	3	0	_	3

Table 2: The clinical characteristics in AMI and control group (measurement data)

Clinical characteristics	AMI group N=55	Control group N=65	P
Gensini score	62.48±35.12	46.55±34.68	0.004
Predilation times /people	1.40±0.81	1.20±0.85	<0.001
Average predilation pressure/people	11.89±4.67	10.42±6.14	<0.001
Average number of stents/people	1.89±1.03	2.14±1.25	<0.001
Average diameter of stents (mm)	2.97±0.40	2.98±0.34	0.341
Average length of the stents (mm)	26.14±5.81	24.98±6.57	0.377
Stents release pressure (ATM)	13.72±2.20	14.38±2.22	0.157
Total cholesterol (mmol/L)	4.38±0.97	4.76±1.26	0.056
Triglyceride (mmol/L)	1.20±0.63	1.52±1.07	0.043
High density lipoprotein (mmol/L)	1.184±0.33	1.27±0.40	0.225
Low density lipoprotein (mmol/L)	2.66±0.74	2.85±0.97	0.479
Blood glucose (mmol/L)	7.46±3.43	6.99±2.74	0.508
eGFR(ml/min.1.73m2)	62.83±19.51	64.61±21.37	0.983
EF(%)	45.54±9.61	52.18±9.80	<0.001
Postoperative hospitalized time(d)	11.42±10.19	8.94±5.46	0.264
Contrast agent dosage(ml)	135.45±52.20	152.85±61.39	0.535
Operation time(min)	69.00±26.15	83.46±32.03	0.124

Table 3: The clinical characteristics in AMI emergency PCI group and control group (measurement data)

Clinical characteristics	AMI emergency group N=18	AMI selective group N=37	Control group N=65	P	
				① vs.②	① vs. ③
Gensini score	62.03±40.10	62.70±33.03	46.55±34.68	0.530	0.072
Predilation times /people	1.28±0.752	1.46±0.84	1.20±0.85	0.311	0.858
Average predilation pressure/people	11.89±4.67	11.57±4.87	10.42±6.14	0.330	0.249
Average number of stents/people	1.44±0.51	2.11±1.15	2.14±1.25	0.040	0.029
Average diameter of stents (mm)	3.08±0.38/	2.91±0.41	2.98±0.34	0.085	0.303
Average length of the stents (mm)	25.97±5.34	26.22±6.10	24.98±6.57	0.712	0.666
Stents release pressure (ATM)	14.17±2.41	13.50±2.09	14.38±2.22	0.300	0.960
Total cholesterol (mmol/L)	4.73±1.06	4.21±0.90	4.76±1.26	0.154	0.761
Triglyceride (mmol/L)	1.12±0.57	1.24±0.66	1.52±1.07	0.560	0.052
High density lipoprotein (mmol/L)	1.28±0.27	1.14±0.36	1.27±0.40	0.036	0.565
Low density lipoprotein (mmol/L)	2.77±0.86	2.61±0.68	2.85±0.97	0.389	0.978
Blood glucose (mmol/L)	7.22±2.09	7.57±3.95	6.99±2.74	0.548	0.353
eGFR(ml/min.1.73m2)	59.55±20.16	64.42±19.27	64.61±21.37	0.451	0.522
EF(%)	47.03±8.61	44.82±10.10	52.18±9.80	0.706	0.020
Postoperative hospitalized time(d)	13.61±11.36	10.35±9.56	8.94±5.46	0.172	0.048
Contrast agent dosage(ml)	108.33±25.73	148.65±56.82	152.85±61.39	0.010	0.003
Operation time(min)	60.56±15.99	73.11±29.19	83.46±32.03	0.112	0.007

Note: Comparison between groups, with significant difference (P<0.05); no significant difference (P>0.05)

Table 4: CAG/PCI features and in-hospital outcomes in AMI group underwent emergency and selective PCI group

Indexes	AMI emergency PCI N=18	AMI selective group N=37	Chi-square	P
Thrombus	12	10	7.928	0.005
PCI immediate sucess rate	13	31	0.418	0.518
Intra-operative coronary slow flow	6	8	0.367	0.545
Dissecting	0	0	_	_
Perforation/ fracture	1	0	0.138	0.710
Hemorrhage	3	2	0.745	0.388
Complication	10	10	4.259	0.039
Heart failure	2	0	1.685	0.194
Malignant arrhythmia	0	1	<0.001	1
Hospitalized mortality	3	1	1.737	0.188
MACE	5	2	3.628	0.057
Temporary pacemaker	5	2	3.628	0.057
IABP	3	2	0.745	0.388
Tirofiban	2	5	<0.001	1

Table 5: CAG/PCI features and in-hospital outcomes in AMI emergency subgroup and AMI selective group

Indexes	AMI emergency subgroup N=18	Non-emergency group N=102	Chi-square	P
Thrombus	12	13	23.802	<0.001
PCI immediate sucess rate	13	94	4.400	0.036
Intra-operative coronary slow flow	6	10	5.436	0.020
Dissecting	0	1	<0.001	1
Perforation/ fracture	1	1	0.160	0.690
Hemorrhage	3	3	3.523	0.061
Complication	10	15	13.102	<0.001
Heart failure	2	1	2.956	0.086
Malignant arrhythmia	0	1	<0.001	1
Hospitalized mortality	3	1	7.323	0.007
MACE	5	3	11.439	0.001
Temporary pacemaker	5	2	14.162	<0.001
IABP	3	2	5.013	0.025
Tirofiban	2	9	<0.001	1

Table 6: CAG/PCI features and in-hospital outcomes in AMI and control group

Indexes	AMI group N=55	Control group N=65	Chi-square	P
Bifurcation lesions	14	23	1.377	0.241
Type A	18	49		
Type B+C	58	53	11.006	0.001
Single branch lesion	21	29		
Double branches lesion	34	36	0.507	0.476
Coronary ostial lesions	19	10	5.968	0.015
CTO	4	13	3.969	0.046
Thrombus	22	3	22.616	<0.001
PCI immediate sucess rate	44	63	8.833	0.003
Intra-operative coronary slow flow	14	2	12.910	<0.001
Dissecting	0	1	<0.001	1
Perforation/ fracture	1	1	<0.001	0.905
Hemorrhage	5	1	2.164	0.141
Complication	20	5	14.849	<0.001
Heart failure	2	1	0.022	0.883
Malignant arrhythmia	1	0	0.007	0.933
Hospitalized mortality	4	0	2.894	0.089
MACE	7	1	4.331	0.037
Temporary pacemaker	7	0	6.621	0.010
IABP	5	0	4.099	0.043
Tirofiban	7	4	1.546	0.214

Note: Comparison between groups, with significant difference (P<0.05); no significant difference (P>0.05)

Definitions and standards

The complications in the patients included slow flow or no-reflow phenomenon of the target vascular, hemorrhage (in the region of puncture point and the digestive tract, etc.), coronary artery dissection, perforated or rupture, contrast nephropathy, etc. MACE was defined as cardiac death, remyocardial infarction (reascularization was required if the acute or sub acute stent thrombosis formed), heart failure, malignant arrhythmia, etc. The successful standards for PCI were 20% stenosis in the target vessels, TIMI-3 immediate blood flow, zero in-hospital mortality, remyocardial infarction requiring for emergency CABG. Complete reascularization referred to the patients (diameter≥2 mm and more than 75% stenosis in the main artery or branches). The brands of stents: Chinese-built series: Firebird (Firebird II), EXCEL, Partner (Lepu Medical); Import series: Endeavor Resolute (Medtronic).

STATISTICAL ANALYSIS

SPSS 10.0 statistical software was adopted to analyzed the data. Continuous variable was expressed by Mean ± standard deviation (X±S) and checked by M-W test. The measurement data was expressed by frequency or percentage and checked by contingency table of chi-square test R * C. P<0.05 was statistically significant.

RESULTS

General clinical outcomes

There was a higher ration of complications on admission in AMI group, with chest tightness and chest pain in about 34.5% of the patients, heart failure in 32.7% patients, atrial fibrillation, junctional rhythm and frequent ventricular premature beat (FVPB) in 21.8% patients. There were 3 patients were combined with cardiac shock on admission. The difference of the symptoms between AMI group and control group was statistically significant (P<0.05) (table 1).

Compared with control group, the Gensini score in AMI group was higher, the LVEF was lower, the average number of stents was less, with statistically significant. Compared with the control group, the average number of stents and dosage of contrast agent in AMI emergency group were less and the operation time is short, with statistically significant. The average number of stents and dosage of contrast agent in AMI emergency group were less than that in AMI selective group. In addition, the average length of stay was longer in AMI emergency group, compared with AMI selective group, without statistical significant (P=0.172) (tables 2-3).

Outcomes of coronary arteriography and intervention treatment

Complex coronary artery lesions

There were total 37 patients with bifurcation lesions among the 120 patients (31%). There were total 29 cases with ostial lesions in major coronary artery in AMI group and control group, and the difference between the two groups was statistically significant (19/55 VS.10/65, P= 0.015). The difference of thrombosis between AMI group and control group, or AMI emergency group and non-emergency group, both had statistical significance (P< 0.001). The infarct artery in ASTEMI group included 19 cases in anterior descending branches, 4 cases in left circumflex and 13 cases in right coronary artery, while they were 9, 3 and 7 cases respectively in ANSTEMI group. To all the patients, there were total 17 cases with chronic total occlusion (CTO) (18 vessels involved), including 4 cases with myocardial infarction (1 case in AMI emergency group and 3 cases in non-emergency group) and 13 cases in the control group (14 vessels involved), and one patient with the lesion both in anterior descending branch and left circumflex. The CTO was distributed in 14 anterior descending branches, 2 left circumflex branches and 2 right cornary branches. In AMI group, there were 26 cases with incomplete occlusion, 22 cases with acute total occlusion (in 36 cases with ASTEMI) and 2 cases combined with CTO. There were 67 cases (37.6%) with Type A lesion, 88 cases (49.4%) with Type B lesions and 23 cases (12.9%) with Type C lesion in the whole group. Compared with the control group, the complex lesion rate (Type B+C) was higher in AMI group (P=0.001). There were 50, 43 and 27 cases with single, two, three lesions respectively in the whole group. There was no significant difference in the distribution of blood vessels between the AMI group and the control group (P>0.05).

Interventional therapy

On the terms of the target vessel number, in AMI group, there were 18 cases underwent emergency PCI (15 cases embedding stents in the infarct vessels, 1 case embedding stents in two vessels and 2 cases in three vessels). However, they were 21 cases, 15 cases and 1 cases respectively in AMI selective group, with statistical significant (P=0.019). The difference of the vessel distribution number between AMI emergency group and non-emergency group also had statistical significance (P = 0.007). Among the whole 120 cases in this study, there were 107 patients were recovered to TIMI-3 blood flow (success rate of 89.2%). The immediate success rate in AMI emergency group was lower than the non-emergency group in PCI operation (72.2% VS. 92%, P = 0.036). And the difference of PCI immediate success rate between AMI selective PCI and emergency PCI group had no obvious difference (P=0.518), but the PCI immediate success rate of AMI selective group was lower than that in the control group (83.8% VS. 80% VS. 96.9%, P=0.047, P = 0.003). There was no significant difference in the rate of complete revascularization between the various groups.

Postoperative hospitalized clinical outcomes

The difference of the incidence rate of MACE between AMI emergency group and non-emergency group, AMI

group and control group were statistically significant (P= 0.001; P = 0.037). The difference of the incidence rate of MACE between AMI emergency group and AMI selective group was no statistically significant (27.8% VS. 5.4%, P=0.057). The difference of hospital mortality between AMI emergency group and AMI selective group was no statistically significant (16.7%VS2.7%, P=0.188). The complication in PCI operation was usually slow coronary flow. The proportion of slow coronary flow occurred in AMI group was 25.5% during PCI operation, with 33.3% and 21.6% respectively in AMI emergency group and AMI selective group (P = 0.349). This difference between AMI group and control group, AMI emergency group and non-emergency group was significant (P<0.05). In AMI group, there was 1 patient with vascular rupture induced by balloon dilatation in the distant cornary lesion, 2 patients with bleeding in the digestive tract postoperatively and 3 patients with hematoncus in the puncture region. In terms of total complication, there was higher incidence of complication in AMI emergency group compared with non-emergency and AMI selective group (P<0.001, P=0.039), and the complication rate was higher in AMI group compared with the control group (P<0.001) (tables 4-6).

DISCUSSION

The foreign research results showed that the incidence rate of CHD in senile female patients was higher than the male patients (Alexander *et al*., 2007), which might be related to the change of blood lipid metabolism caused by significant decrease of estrogen secretion in postmenopausal women (Herrington *et al*., 2000). In this study, male senile patients all accounted for a large part of the patients with in CHD or AMI incidence rate. Due to the proportion of male smoking in our country was significantly higher than that of female in our country, there were up to 40% patients with a history of smoking in AMI group, which was significantly higher than that in the control group. Therefore, smoking might be one of the important risk factors that men were more likely than women to have CHD or AMI in this study. However, some research results also showed that the risk of serious CHD occurred in men were twice times that of in women (P<0.01) (Shaw *et al*., 2008).

Although the difference of Gensini score between men and women in this study was not statistically significant, the male Gensini score was significant higher than that of women in AMI group (P<0.05), suggesting the degree of coronary lesions in men was more serious than that in women and men were still the susceptible population among the senile patients with CHD. Age was also one important risk factor for coronary heart disease, and increased age significantly increased the incidence of coronary heart disease. Senile patients with CHD were often combined with high blood pressure, diabetes, hyperlipidemia, as well as cerebrovascular disease, chronic obstructive pulmonary disease and kidney function decline. Some research results showed that the lesions in elderly CHD patients often involved in multivessels, leading to serious calcification and left main coronary artery disease, total occlusion, often manifesting in acute coronary syndrome (ACS) clinically. The evidence-based medicine abroad showed that although the senile people (≥75 years old) only took up 6.1% of the total population, the incidence rate of AMI in senile people accounted for (≥75 years old) 36% of total AMI patients (Rich, 2001).

The ACS symptom in elderly patients were often atypical since there were no obvious chest pain or light chest pain but chest distress, dizziness, epigastric pain and anhelation, which was prone to misdiagnosis or delayed medical treatment. Therefore, the proportion of elderly patients with ACS received reperfusion therapy showed a trend of decline with age (64.8% in 65-69 years; 60.1% in 75-79 years; 50.4% in 80-84 years and 20.4% in more than 85 years) (Rathore *et al*., 2003; Barchielli *et al*., 2004). According to Chinese clinical research on ACS, among 518 cases with STEMI, near 30% patients whose clinical time were < 12 h after the onset were not able to receive any reperfusion therapy. According to the multiply logistic regressed analysis, patients whose age were >75 years old or combined with diabetes were usually misdiagnosed or delayed diagnosis because of the atypical chest pain on hospital (Rajendra *et al*., 2001). The results of GRACE also showed that there were no predictive factors of reperfusion therapy accepted by ASTEMI patients whose age were more than 75 years old (Devlin *et al*., 2008).

In the group of 120 patients aged ≥ 80 in elderly patients with coronary heart disease, the incidence rate of AMI reached 45.8%. In AMI group, nearly one third patients suffered from chest distress, chest pain, or combined with heart failure. 3 cases had cardiac shock on admission, while the rest of the AMI patients had no typical chest pain or distress, even only manifesting in nonspecific symptoms of dizziness, fatigue, sweating, abdominal discomfort. Since advanced age was one of the contraindications of thrombolysis therapy, as well as the thrombolysis treatment effect was uncertain and the rate of reocclusion in infarct artery was higher, PCI treatment should be the first choice for patients with emergency AMI onset. If the first hospital admissions lack of intervention conditions, transfer PCI should be done as soon as possible in order to open the infarct vessel early and to maximum rescue the myocardium and improve prognosis.

Because of their complex types of basic diseases in elderly patients with coronary heart disease, there was a higher risk of major bleeding complications and puncture

vascular complications after surgery or on surgery (Aronow *et al*., 2009; Resnic *et al*., 2001). No-reflow/slow flow phenomenon refered to that after relieving or eliminating of coronary occlusion, the microcirculation of the ischemic tissue still could not recover to the normal condition, which had been verified to be induced by many factors including microcyclerefusion injury, microthrombosis, capillary endothelial cell injury and external mechanical forces, etc. (Ndrepepa *et al*., 2010) and the incidence rate of no-reflow/slow flow phenomenon when patients receiving emergency PCI operation could be up to 20%-30% (Resnic *et al*., 2003).

Noneffective myocardial reperfusion was an independent factor affecting the recent prognosis and long-term cardiac events (Morishima *et al*., 2000). The research by Lee showed that there were about 1/3 elderly CHD patents (≥75 years) patients (the fist time to undergo PCI) developed no-reflow phenomenon. The incidence rate of end point events were 20.6%, 25.5% and 27.7% respectively in hospital, 30d and 6-month postoperative (Lee *et al*., 2010). The application of Adenosine, calcium antagonist, sodium nitroprusside could promote the TIMI flow, which might due to these drugs could dilate coronary artery, inhibit platelet aggregation and the formation of free radicals, reduce of micro thrombus and so on. In the present study, the major complications were slow blood flow in different degrees after balloon dilation or stent implantation, and the rate of slow flow in the AMI group and emergency PCI group was higher, which might be related to the load target vessel thrombosis in AMI patients. Therefore, to the elderly AMI patients, it was better to make a particular PCI and preoperative anti-coagulation and antithrombotic therapy plan. The findings from Feldman study showed that the in-hospital mortality in patients underwent emergency or selective PCI all increased with the age (Feldman *et al*., 2006). The in-hospiatal mortality in AMI patients aged 60-80 years old receiving emergency PCI or selective PCI was 4 times higher than the middle-young aged, while the in-hospiatal mortality in AMI patients aged ≧80 years old receiving emergency PCI or selective PCI were 11 times and 9 times compared with the middle-young aged patients. About 7%-10% AMI patients were combined with cardiac shock, often occurred in the patients whose infarct expansion was more than 40%. And part patients also combined with pulmonary edema or pulmonary infection. The in-hospital mortality rate was as high as 80% (Domanski and Topol, 1994).

Cardiogenic shock (CGS) was still a major cause of death in patients with AMI, though receiving reperfusion therapy, IABP, homeostasis to make the hospital mortality decline (Hochman *et al*., 2000). In this study, there were no deaths in the control group. However, in the AMI group, there were 3 cases and 1 cases respectively death in the hospital in the AMI emergency group and selective group, which mortality rates were 16.7% and 1 respectively, without significant difference (P=0.188). There were 3 AMI patients combined with CGS, in which 2 cases underwent emergency PCI to implant stents and given intra-aortic balloon pump after operation, but they still died on the operation day and the 20th day after operation respectively. The results in Dzavik V study on SHOCK test showed that the emergency PCI in elderly AMI patients (≥75 years) combined with cardiac shock did not bring higher survival rate than the medical conservative therapy (Dzavik *et al*., 2005). Whether all the coronary artery lesions were treated with interventional therapy (i.e., complete revascularization) depended on some clinical condition such as the coronary artery blood supply range, cardiac and renal function etc. (Rana *et al*., 2013). In this study, there were 70 cases (58%) with multivessel disease, 17 cases (14.2%) with chronic occlusion. The complete reascularization rate in AMI group and control group were 38.2% and 47.7% respectively, without significant difference. There was still controversy about the clinical effect of incomplete revascularization. 208 patients with unstable angina pectoris and multiple coronary artery branches lesions who received coronary artery angioplasty were followed-up about one year by Mariani *et al*, the results showed that the incomplete revascularization did not increase the near-long term mortality rate and incidence of major adverse cardiac events, compared with total revascularization (Mariani *et al*., 2001).

Six thousand cases underwent coronary artery bypass grafting (CABG) in elderly patients aged 70 years were investigated for half a year by Osswsld *et al*. It showed that the incomplete revascularization was an independent risk factor causing resent death (Osswald *et al*., 2001). We believeD that it WAs difficult to achieve complete revascularization in elderly patients. And because the activity of the elder people was small, the large blood vessels causing symptomsonly were only need to be intervened to achieve complete revascularization. But for some high-risk elderly patients with AMI, due to coronary artery involvement, emergency opening of infarct related blood vessels alone was not enough to improve myocardial blood supply and cardiac function. If the noninfarct related arteries of patients had a serious lesion with a larger blood supply, it was still necessary to intervene in the reconstruction. The findings in our study showed that there was a higher success rate in elderly CHD patients undergoing interventional therapy. Elderly patients with AMI who underwent emergency PCI had increase the risk of complications of slow blood flow, but it didn't prolong postoperative hospitalization time and increase hospital mortality compared with the AMI selective PCI group. Advanced age was not a contraindication for emergency PCI. However, for the high-risk elderly AMI patients, if suitable PCI strategy

and anticoagulant, anti thrombotic treatment plans could be made, they could still benefit from the emergency PCI.

CONCLUSION

The results of this study show that stents were successfully implanted into the 120 elderly CHD patients in PCI operation. In AMI group, after the operation of PCI, TIMI 3 blood flow was recovered at once in target vessel in emergency PCI group and selective PCI group, then coronary slow flow phenomenon occurred. The total MACE incidence rate was close to the hospital mortality rate. There was no death in control group. To compare the success rate of TIMI 3 blood flow in the target vessel after PCI surgery, the AMI emergency group was significantly lower than that in the non emergency group and the control group ($P<0.05$), and the AMI group was significantly lower than that in the control group ($P<0.05$). There was a significant difference of slow blood flow and MACE incidence rate between the AMI group and control group, emergency group and the non-emergency group ($P<0.05$). In total complications, AMI emergency group was significantly higher than that in non-emergency group and AMI selective group ($P<0.05$) and AMI group was higher than that in the control group ($P<0.05$).

All in all, for elderly patients with AMI, the success rate of emergency PCI and selective PCI surgery are all higher. Although emergency PCI has increased the risk of cardiovascular complications, compared with AMI patients who have received selective PCI, it dose not prolong the length of stay and increase hospital mortality. Therefore, emergency PCI is safe in elderly patients with AMI, which is worth to be popularized.

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