

# The Long-term Clinical Prognosis in Patients with Anterior Wall and Non-anterior Wall Acute Myocardial Infarction Referred to Primary Percutaneous Transluminal Coronary Angioplasty

MINGZHONG ZHAO, DAYI HU, TIANCHANG LI, SANQING JIA, MING YANG, YUYUN XU

From Department of Cardiology, People's Hospital, Beijing University, Beijing 100044, China

**ZHAO ET AL.:** *The Long-term Clinical Prognosis in Patients with Anterior Wall and Non-anterior Wall Acute Myocardial Infarction Referred to Primary Percutaneous Transluminal Coronary Angioplasty. Objective:* To investigate the long-term clinical prognosis in patients with anterior wall acute myocardial infarction (AW-AMI) and non AW-AMI (NAW-AMI) referred to primary percutaneous transluminal coronary angioplasty (P-PTCA). **Methods:** 287 patients with AMI who underwent P-PTCA were divided into AW-AMI group (142 cases) and NAW-AMI group (145 cases) according to different sites of AMI. The baseline characteristics and coronary artery lesions of patients were analysed. The primary end points were in-hospital mortality and the major cardiovascular events (MACE) during a mean  $17.3 \pm 9.8$  months follow-up including the occurrences of non-fatal myocardial infarction, non-fatal congestive heart failure, revascularization of target vessels and overall cardiac-related death. **Results:** The peak values of CK and CK-MB were significantly higher ( $3533 \pm 2888$  U/L vs  $2322 \pm 1638$  U/L,  $158 \pm 197$  U/L vs  $95 \pm 64$  U/L, all  $P < 0.01$ ), and left ventricular ejection fraction decreased ( $0.55 \pm 0.13$  vs  $0.61 \pm 0.12$ ,  $P < 0.05$ ) and in-hospital mortality increased significantly ( $4.1\%$  vs  $0$ ,  $P < 0.05$ ) in AW-AMI group than in NAW-AMI group. At a follow-up of mean  $17.3 \pm 9.8$  months, the incidences of non-fatal heart failure, in-hospital mortality, total cardiac-related mortality and combined end points in AW-AMI group increased significantly than those in NAW-AMI group (all  $P < 0.05$ ). Multivariate analysis revealed that anterior location of myocardial infarction and proximal left anterior descending (LAD) coronary artery lesion were associated with the occurrence of cardiac-related death in patients with AMI after procedure of PTCA (all  $P < 0.05$ ). **Conclusions:** The present study shows that anterior location of myocardial infarction is associated with a higher incidence of MACE. The long-term clinical outcomes are poorer in patients with AW-AMI than NAW-AMI referred to P-PTCA. (*J HK Coll Cardiol* 2002;10:3-6)

*Acute myocardial infarction, angioplasty, percutaneous coronary, prognosis, transluminal*

## 摘要

目的：探討急性前壁心肌梗死(AW-AMI)與非前壁心肌梗死(NAW-AMI)患者直接經皮冠狀動脈腔內成形術(P-PTCA)後長期預後分析。方法：行P-PTCA的287例AMI患者根據梗死的不同部位分成AW-AMI組(142例)和NAW-AMI組(145例)，分析患者的基本臨床特徵和冠脈病變特點，觀察終點為住院期死亡率與隨訪期平均 $17.3 \pm 9.8$ 個月的的主要心血管事件(MACE)，包括非致命心肌梗死，非致命心力衰竭，靶血管血運重建及總心臟性死亡的發生率。結果：與NAW-AMI組比較，AW-AMI組的CK與CK-MB峰值顯著升高( $3533 \pm 2888$  U/L比 $2322 \pm 1638$  U/L， $158 \pm 197$  U/L比 $95 \pm 64$  U/L， $P$ 均 $< 0.01$ )，左室射血分數降低( $0.55 \pm 0.13$  比  $0.61 \pm 0.12$ ， $P < 0.05$ )以及住院期死亡率增高( $4.1\%$  比  $0$ ， $P < 0.05$ )。隨訪平均 $17.3 \pm 9.8$ 個月，AW-AMI組的非致命性心力衰竭、總死亡率及複合終點事件發生率高於NAW-AMI組 ( $P$ 均

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Address for reprints: Dr. Mingzhong Zhao  
Department of Cardiology, People's Hospital, Beijing University,  
Beijing 100044, China

Tel: (86) 010 68314422-4726, Fax: (86) 010 68792845

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( $P < 0.05$ )。多變量分析顯示前壁心肌梗死和前降支近段病變與AMI患者直接冠脈介入治療後心臟性死亡發生相關( $P < 0.05$ )。結論：前壁心肌梗死與主要心血管事件發生率增高有關，AW-AMI行直接PTCA患者的長期臨床預後較NAW-AMI行直接PTCA者差。

關鍵詞：急性心肌梗死 成形術 經皮冠狀動脈 預后 經腔

## Introduction

During the treatment of acute myocardial infarction (AMI), early and effective recanalization of infarct-related artery (IRA) is a very important strategy. Primary percutaneous transluminal coronary angioplasty (P-PTCA) or intracoronary stenting can restore immediate TIMI 3 coronary flow of IRA. A few reports showed the advantages of P-PTCA over intravenous thrombolysis in the treatment of AMI. But, the different sites of myocardial infarction might affect the patients' clinical outcomes. The risk of patients with anterior wall AMI (AW-AMI) was higher than that of patients with non-anterior wall AMI (NAW-AMI) because of their greater myocardial infarction sizes.<sup>1</sup> In the present study, we investigated the effect of P-PTCA on the long-term clinical outcomes in patients with AW-AMI and NAW-AMI.

## Methods

### Patient Population

From January 1997 to December 2000, a total of 287 patients had taken emergency coronary artery angiography (CAG) at our hospital with AMI and suitable coronary anatomy for P-PTCA. The eligibility criteria of P-PTCA were documented by the following: (1) Persistent chest pain  $\geq 30$  min, with no relief by nitrates; (2) ECG showing 1 mm ST segment elevation in two contiguous limb leads or 2 mm ST segment elevation in two contiguous precordial leads; (3) Fewer than 12 hours from onset of symptoms; (4) AMI patients with recurrent ischemic symptoms or persistent ST segment elevation or CAG showing TIMI 0-II flow at 90 min after thrombolysis should undergo rescue PTCA. For patients meeting above criteria, written informed consents were obtained before they underwent PTCA in the catheterization laboratory.

According to the presentation of electrocardiogram (ECG), AMI patients were divided into AW-AMI and NAW-AMI groups. The former group

included 142 cases (male:110 cases and female:32 cases) and the latter group included 145 cases (male:103 cases and female:42 cases).

### Angiography and PTCA

AMI patients were sent directly to catheterization laboratory from Emergency Department. At first, CAG was performed with Judkins method, then primary PTCA or intracoronary stenting was decided according to the characteristics of coronary artery disease. Generally, we usually intervened with IRA during emergency procedure.

### Follow-up

Patients were followed up within 1 to 41 months (a mean  $17.3 \pm 9.8$  months) for in-hospital mortality and major cardiovascular events (MACE), which included incidences of non-fatal myocardial infarction, non-fatal heart failure, need for target vessel revascularization (TVR) and total cardiac mortality.

### Statistical Analysis

Continuous variables are expressed as mean $\pm$ s; discrete variables are expressed as percentages. Differences between two groups were evaluated with the student t test or  $\chi^2$  test. The logistic regression analysis was used to investigate the changes of risk factors of cardiac death.

## Results

### Baseline Clinical and Angiographic Characteristics (Table 1)

The results showed the percentages of patients with angina before AMI or with Killip class II-IV, and the peak values of CK or CK-MB were higher in AW-AMI group than in NAW-AMI group ( $P < 0.01$ ). Angiogram indicated that left anterior descending (LAD) was the dominant IRA of patients with AW-AMI and right coronary artery (RCA) was the dominant IRA of patients with NAW-AMI.

## The Results of Follow-up (MACE)

Stent was implanted in 91.6% and 86.9% of AW-AMI and NAW-AMI patients respectively ( $P>0.05$ ). Out of 287 patients, 122 patients with AW-AMI and 117 patients with NAW-AMI were followed up. The incidences of non-fatal heart failure, in-hospital mortality, total cardiac death and combined end points were significantly higher in the AW-AMI group than in the NAW-AMI group (Table 2).

## The Effect of IRA on Cardiac Death Rate (Table 3)

The mortality rate was higher in patients whose IRA were left main trunk (LMT) than those whose IRA were LAD, LCX or RCA. Proximal and non-proximal lesions in IRA were identified according to the different sites of coronary occlusion.<sup>2</sup> Compared with patients with non-proximal IRA lesions, the cardiac mortality was higher in patients with proximal IRA lesions in LAD ( $P<0.05$ ).

Logistic regression analysis revealed that myocardial infarction sites (anterior wall) and proximal LAD lesion were associated with the occurrence of cardiac-related death in patients with AMI after PTCA procedure (all  $P<0.05$ ).

## Discussion

This report described that the enzyme leak, the Killip Class and left ventricular ejection were poorer in patients with AW-AMI than NAW-AMI. More patients with angina before AMI were presented in the AW-AMI group. The increased risk of patients with anterior wall AMI was associated with greater myocardial necrosis, as well as larger infarct expansion, which resulted in aneurysm formation, heart failure, mural thrombus formation and myocardial rupture.<sup>3-5</sup> CAG showed no difference between the 2 groups besides IRA. LAD was the dominant IRA in AW-AMI group, and RCA was the dominant IRA in NAW-AMI group. It was reported that AMI patients by occlusion of LAD had a higher risk and more importantly clinical significance than those by occlusion of LCX or RCA.<sup>6</sup>

The follow up data in this study showed that although there was no significant difference in rates of non-fatal myocardial infarction and TVR between the 2 groups, the incidences of non-fatal heart failure, in-hospital mortality and total cardiac mortality increased significantly in the AW-AMI group. The combined end point event was also higher in the AW-AMI group than

**Table 1. Baseline clinical and angiographic characteristics**

Characteristics	AW-AMI group (142)	NAW-AMI group (145)
Age	63.2±8.9	62.1±9.5
Hypertension	35.9 (51/142)	29.0 (42/145)
Hyperlipideremia	26.8 (38/142)	22.1 (32/145)
Diabetes	11.3 (16/142)	11.0 (16/145)
Smoking	38.0 (54/142)	45.5 (66/145)
Angina before AMI	59.9** (85/142)	35.2 (51/145)
Killip class II-IV	28.8** (41/142)	10.0 (15/145)
Duration from onset of symptom to reperfusion (min)	251±154	268±141
Rescue-PTCA	11.3 (16/142)	9.0 (13/145)
CK (U/L)	3533±2888**	2322±1638
CK-MB (U/L)	158±197**	95±64
LVEF	0.55±0.13*	0.61±0.12
Single vessel disease	52.8 (75/142)	41.4 (60/145)
Multivessel disease	47.2 (67/142)	58.6 (85/145)
LM	6.3 (9/142)	5.5 (8/145)
Infarct-related artery (IRA)		
LAD	95.8** (136/142)	2.8 (4/145)
LCX	0**	20.7 (30/145)
RCA	1.4** (2/142)	76.5 (111/145)
LM	2.8 (4/142)	0

LVEF, left ventricular ejection fraction; LM, left main; LAD, left anterior descending

\* $P<0.05$ , \*\* $P<0.01$ , patients with AW-AMI versus with NAW-AMI

**Table 2. The incidence of MACE in the two groups**

MACE	AW-AMI (n=122)		NAW-AMI (n=117)	
	case	%	cases	%
Non-fatal myocardial infarction	2	1.6	1	0.9
Non-fatal heart failure	18	14.8*	8	6.8
Target vessel revascularization	9	7.4	10	8.6
In-hospital mortality	5	4.1*	0	0
Total cardiac death rate	8	6.6*	2	1.7
Combine end points	37	30.3*	21	18.0

\*P<0.05, patients with AW-AMI versus with NAW-AMI

**Table 3. The effect of IRA on cardiac death rate**

IRA	Cases	Cardiac mortality	
		cases	%
LAD	112	7	6.3*
proximal	54	6	11.1▲
non-proximal	58	1	1.7
LCX	30	0**	
proximal	21		
non-proximal	9		
RCA	93	2	2.2**
proximal	57	1	1.8
non-proximal	36	1	2.8
LM	4	1	25.0
proximal	1	1	100
non-proximal	3	0	

\*P<0.05,\*\*P<0.01, compared with patients whose IRA are LM;

▲P<0.05, compared with non-proximal at the same vessel

the NAW-AMI group. Furthermore, our study also showed the cardiac mortality rate was higher in patients whose IRA was LMT or proximal in LAD compared with other subgroups, but it should be further studied due to limited cases. The present study indicated that patients with AW-AMI was a high risk population, which was identical to the results that Zijlstra reported.<sup>7</sup> The patients with AW-AMI were likely to have a greater likelihood of a cardiac event at follow-up than NAW-AMI.<sup>8</sup> The multivariate analysis revealed that myocardial infarction sites (anterior wall) and proximal LAD lesion were associated with the occurrence of cardiac-related death in patients with AMI after the PTCA procedure.

Our results showed that anterior location of myocardial infarction was associated with a higher incidence of MACE. The long-term clinical outcomes were poorer in patients with AW-AMI than NAW-AMI referred to P-PTCA.

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