

ORIGINAL ARTICLE

Prehospital activation of cardiac catheterization teams in ST-segment elevation myocardial infarction



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KEYWORDS

Coronary angioplasty;
Myocardial infarction;
Ischemia time;
Treatment delay

Abstract

Introduction and Objectives: Current clinical guidelines for ST-segment elevation myocardial infarction (STEMI) suggest prehospital activation of the cardiac catheterization team. In previous protocols in our center activation occurred once patients arrived at the hospital. In January 2011, we initiated a new primary angioplasty activation protocol from prehospital locations. Our objective was to quantify the influence of this change on reperfusion times.

Methods: A total of 173 consecutive STEMI patients (n=73/100 before/after initiation of the new protocol), diagnosed in a prehospital setting within 12 hours of symptom onset, were analyzed. The time between the patient's arrival at the hospital and beginning of the angioplasty procedure was termed the cath lab activation delay.

Results: The new protocol resulted in a 37-min reduction in system delay (166 [132–235] min before vs. 129 [105–166] min after, $p<0.001$), mostly driven by a 64% reduction in cath lab activation delay (55 [0–79] min before vs. 20 [0–54] min after, $p=0.001$). This reduction was mainly observed outside working hours. The percentage of patients treated with a system delay ≤ 120 min increased from 14.5% before the new protocol to 41.8% afterwards ($p=0.001$).

Conclusions: Prehospital activation of the cardiac catheterization team resulted in earlier reperfusion of STEMI patients.

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PALAVRAS-CHAVE

Angioplastia coronária;
Enfarte do miocárdio;
Tempo de isquemia;
Atraso no tratamento

Ativação pré-hospitalar da equipa de angioplastia primária no enfarte agudo miocárdio com elevação do segmento ST

Resumo

Introdução e objetivos: As atuais diretrizes clínicas aquando da ocorrência de um enfarte agudo miocárdio com elevação do segmento ST (STEMI) sugerem a ativação da equipa de angioplastia primária ao nível pré-hospitalar. Protocolos anteriores contemplam a ativação da referida equipa assim que os pacientes chegam ao hospital. Em janeiro de 2011, o nosso centro iniciou um novo protocolo de ativação da equipa de angioplastia primária em localização pré-hospitalar de modo a quantificar a influência de tal alteração nos tempos de reperfusão.

Métodos: Foram analisados 173 pacientes consecutivos com STEMI, cujo diagnóstico se efetuou em local pré-hospitalar em 12 horas desde o início dos sintomas ($n = 73/100$ antes/ após início do novo protocolo). O tempo que decorreu entre a chegada do paciente ao hospital e o início do procedimento de angioplastia foi designado *Cath Lab Activation Delay*.

Resultados: O novo protocolo refletiu uma redução de 37 minutos no *System Delay* (166 [132 – 235] antes *versus* 129 [105 – 166] minutos depois, $p < 0.001$), que se deveu primordialmente à redução de 64% no *Cath Lab Activation Delay* (55 [0 – 79] minutos antes *versus* 20 [0 – 54] minutos depois, $p = 0.001$). Tal redução observou-se principalmente em horário pós-laboral. A percentagem de pacientes tratados com um *System Delay* ≤ 120 minutos aumentou de 14,5%, antes do início do novo protocolo, para 41,8% após ($p = 0.001$).

Conclusões: A ativação da equipa de angioplastia primária ao nível pré-hospitalar permitiu uma maior celeridade no início da terapia de reperfusão em pacientes com STEMI.

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List of abbreviations

CLAD	cath lab activation delay
D2B	door-to-balloon
EMS	emergency medical services
FMC	first medical contact
LVEF	left ventricular ejection fraction
PCI	percutaneous coronary intervention
SD	system delay
STEMI	ST-segment elevation myocardial infarction

Introduction

Treatment of ST-segment elevation myocardial infarction (STEMI) is based on early reperfusion therapy.^{1,2} A meta-analysis by Keeley et al. showed the superiority of primary percutaneous coronary intervention (PCI) over fibrinolysis in terms of mortality, reinfarction and bleeding risk.³ Current clinical guidelines stipulate that primary PCI is the preferred reperfusion therapy as long as it can be performed within 120 min of first medical contact (FMC) with the patient.^{1,2,4} This time interval (FMC-reperfusion) is called system delay (SD) and is directly related to prognosis.⁵

SD can be separated into various time intervals (Figure 1): diagnosis delay or time from FMC to an electrocardiogram showing diagnostic criteria of STEMI; the time taken to transfer the patient to a PCI-capable center (when FMC occurs outside a PCI-capable center); time from arrival at the PCI-capable center to beginning of PCI in the catheterization

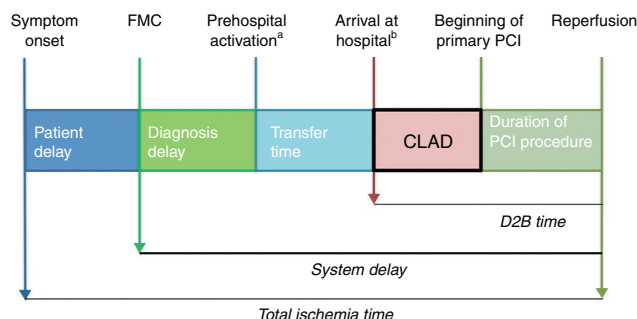


Figure 1 Components of ischemia time. CLAD: cath lab activation delay; D2B time: door-to-balloon time; FMC: first medical contact; PCI: percutaneous coronary intervention.

^a Since initiation of the new primary PCI protocol, the cardiac catheterization team is activated from the FMC site by a single phone call.

^b Before initiation of the new primary PCI protocol, the cardiac catheterization team was activated on the patient's arrival at our hospital.

laboratory; and the duration of primary PCI, until coronary reperfusion is achieved. The sum of these two last time intervals is termed door-to-balloon (D2B) time.

The previous primary PCI protocol in our center activated the cardiac catheterization team after the patient had arrived at the hospital and the on-duty cardiology team had confirmed the diagnosis of STEMI. During normal working hours (8 am–10 pm, Monday to Friday), there is a cardiac catheterization team ready at the hospital, while after hours the cardiac catheterization team is at home. Therefore, patients presenting after hours had to wait until

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