The incidence of neurological symptoms after thrombolytic therapy in elderly patients with acute myocardial infarction

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Abstract

BACKGROUND: Reperfusion therapy is the standard treatment of acute myocardial infarction (AMI). If the percutaneous coronary intervention (PCI), as a preferred reperfusion strategy, is not available, thrombolytic therapy would be chosen as an alternative treatment. However, the effect of thrombolytic therapy on old patients is still controversial especially due to its effects on increasing the incidence of intracranial hemorrhage (ICH). In this study, we evaluated the incidence of neurological symptoms and ICH after thrombolytic therapy in AMI patients over 65 years of age.

METHODS: A total number of 300 AMI patients over 65 years of age who referred to the hospital within 12 hours of their symptom onset and had no contraindications for receiving thrombolytic therapy were selected. The patients were admitted in Noor Hospital, Isfahan, Iran, between 2004 and 2006. All of them received streptokinase (SK) in the same way. Their information was extracted from their files and collected by a questionnaire.

RESULTS: Among 300 patients in our study, there were 124 women (41.33%) and 176 men (58.66%). Their mean age was 74 ± 9 years (range: 65-92 years). Moreover, 78% were discharged after one week of hospitalization and 22% (66 patients) died. Arrhythmias or myocardial reinfarction were the leading cause of death in 56.06% of all deaths. No death due to ICH and no evidence of ICH, such as hemiparesis or loss of consciousness, were observed.

CONCLUSION: We suggest that thrombolytic therapy in old patients with AMI is a good alternative treatment when there is no access to an equipped PCI facility. In our study, the increase in mortality rate due to ICH was not high enough to prevent us from prescribing SK for AMI patients over 65 years of age.

Keywords: Acute Myocardial Infarction, Percutaneous Coronary Intervention, Intracranial Hemorrhage, Streptokinase, Thrombolytic Therapy.

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Introduction

Acute myocardial infarction (AMI) is the most common diagnosis in admitted patients particularly in industrialized countries.[1,2] Since late 1980s, reperfusion therapy has been suggested as the standard treatment of AMI with ST-segment elevation.[3] The efficacy of thrombolytic drugs in elderly patients is still controversial due to increased risk of intracranial hemorrhage (ICH) in this group of patients.[4-6] Recent studies have compared the results of percutaneous coronary intervention (PCI) with thrombolytic therapy in elderly people to identify the preferred PCI method of AMI treatment in which ICH risk would be lower than thrombolytic therapy. However, due to unavailability of equipped centers with experienced and prepared teams as well as prolonged duration of patient transmission to a center equipped with PCI facilities, thrombolytic therapy is implemented as the initial treatment for AMI.[1-9] According to latest studies, even 50% of the U.S. hospitals are not equipped with PCI facilities.[1,10,11] According to the study of of Herrin and Steg 9,12, thrombolytic drugs would be more appropriate for treating patients who cannot be transferred to a PCI-equipped center within 3-12 hours after the onset of their AMI symptoms.[1,12] Furthermore, patients should receive thrombolytic therapy if they are presented within 3 hours after symptom onset with door to needle minus door to balloon time more than 60 minutes or door to balloon time more than 90

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minutes. Therefore, time is of great value in implementation of reperfusion.[1,2,13-16] Obtained data from other studies also indicated the 35-day mortality rate in people older than 75 years of age who did or did not receive thrombolytic drugs to be 24% vs. 25.3% (P = 0.0001).[3,6,17,18] In addition, Thiemann et al. suggested significant increases in the risk of ICH among elderly people who had received thrombolytic therapy as well as thin and older women.[6]

In the present study, the prevalence of neurologic symptoms after thrombolytic therapy during hospitalization time was reviewed in AMI patients over 65 years of age who referred to Noor Hospital, affiliated to Isfahan University of Medical Sciences (Isfahan, Iran), during March 2004 to August 2006.

Materials and Methods

This prospective study included all AMI patients over 65 years of age who referred to Noor Hospital, affiliated to Isfahan University of Medical Sciences, during March 2004 to August 2006. Patients were enrolled if they did not have contraindications of receiving streptokinase (SK). Using census sampling method, a total number of 300 patients were selected to participate in the study. Individuals received SK if they had typical thoracic pain, typical electrocardiogram changes, and no certain contraindications to receive thrombolytics. Absolute contraindications of receiving thrombolytics were cerebrovascular hemorrhage accidents, suspected aortic dissection, systolic blood pressure greater than 180 mm Hg and diastolic blood pressure greater than 100 mm Hg, active intracranial hemorrhage, neoplasm, arterial-venous malformation, and brain aneurysms. In case of relative contraindication for receiving thrombolytics, the physician decided about the injection of the drug based on patient status.[1,2] All subjects received an equal dose of 1.5 million units of diluted SK (ZLB Behring GmbH, Marburg, Germany) in 100 cc normal saline during 45-60 minutes with controlling blood pressure and cardiac monitoring. The information about the time of admission was collected in a questionnaire. Individuals who recovered were discharged after a week and the incidence of symptoms such as hemiparesis, hypotension, reduced consciousness level, bradycardia, arrhythmia, or reinfarction was recorded.

Results

Overall, 300 patients including 124 females (41.33%) and 176 males (58.66%) were studied. Mean age of the patients was 74 ± 9 years (range: 65-92 years). While 234 patients (78%) recovered and were discharged from the hospital after a week, 66 patients died (22%) due to arrhythmias (n = 37; 56.06%), reinfarction (26 females and 11 males; 70.27% and 29.72% respectively), and hypotension and bradycardia (n = 29; 43.93%). Anterior, inferior, posterior, lateral, and extensive infarction were observed in 154 (51.33%), 94 (31.33%), 20 (6.66%), 21 (7%), and 11 (3.66%) cases, respectively (Table 1).

Table 1. Frequency distribution of types of myocardial infarction (MI) in the studied elderly people

Types of MI	Number	Percent
Anterior	154	51.33
Inferior	94	31.33
Posterior	20	6.66
Lateral	21	7
Extensive	11	3.66

The highest and lowest rates of mortality were caused by extensive (63.6%) and lateral infarction (14.3%), respectively (P = 0.003) (Table 2). The mortality rate in men and women was 15.9% and 30.6%, respectively (P = 0.02) (Table 3).

Table 2. Relative frequency distribution of mortality based on types of infarction in the studied elderly people

Types of IM	Death	Recovery	Total Number
Anterior	17.5%	82.46%	154
Inferior	23.4%	76.5%	94
Posterior	35%	65%	20
Lateral	14.3%	85.7%	21
Extensive	63.6%	36.36%	11
Total	**22%**	**78%**	**300**

Table 3. Relative frequency distribution of mortality after myocardial infarction (MI) in the studied elderly people in terms of gender

Sex	Death	Recovered	Total
Male	28 (15.9%)	48 (48%)	176 (58.66%)
Female	38 (30.6%)	86 (69.3%)	124 (41.33%)

Values are expressed as number (%).

Delayed referral (after 12 hours) and lack of thoracic pain prevented 15 patients from receiving SK. However, due to the low number of participants, the results of this group were not included in statistical analyses.

Discussion

In the present study, arrhythmias occurred in 56.06% of participants after receiving SK. Previous studies showed 67% of patients who received SK and 63% of those who did not to develop arrhythmias.[19-21].

In the present study, 43.93% of deaths were due to hypotension and bradycardia. In such cases, it was impossible for us to approve myocardial rupture as the cause of death. However, Some other researchers showed cardiac free wall rupture in 8% of AMI patients which was responsible for at least 20% of related deaths.[4,7,22-25]

In the present study, the 7-day mortality rate was 22% in patients who received thrombolytic therapy. Stenestrand and Wallentin observed 14-day mortality rates of 21.2% and 24.1% in individuals who did or did not receive thrombolytic therapy, respectively.[3] Since mortality rate reach its peak during the first 24 hours and stays almost constant after that, the percentage of mortality in the present study was in accordance with other studies. However, we were not able to examine AMI patients who did not receive thrombolytic therapy because they were few. While the mortality rate of patients who did not receive thrombolytic therapy was 24.1% in the study of Stenestrand and Wallentin,[3] it was 22% in our study. Although emergency intervention facilities such as emergency PCI, cardiac output assessment, acidimetric measurement of pulmonary pressure, pulmonary wedge pressure, central venous catheter (CVC), intra-aortic balloon pump (IABP), and emergency coronary artery bypass graft surgery (CABG) and also the possibility of complete hemodynamic monitoring are not fully provided, the mortality rate in the present study was similar to hospitals in Western countries.

In the present study, there was no death due to intracranial hemorrhage. No clinical evidence for intracranial hemorrhage, such as hemiparesis and decreased consciousness level, was seen. However, Stenestrand and Wallentin reported the prevalence of nonfatal ICH as 21.4% in the first two weeks. They also found the prevalence of fatal ICH to be 1% in elderly people who used thrombolytic tenecteplase, reteplase and alteplase which was 2.5 times more than those who used SK (0.4%).[3]

Based on the present study and previous research, the prevalence of arrhythmias after thrombolytic therapy is very low and it is not associated with high mortality rate. In addition, hemodynamic instability (hypotension and bradycardia) can increase mortality after myocardial infarction. It is thus necessary for patients with myocardial infarction to be hospitalized after admission in the coronary care unit (CCU). A physician should also be constantly present while their blood pressure and pulse are regularly controlled. Patients should undergo cardiac monitoring and quick measures should be taken in case of any problems in hemodynamic status.

The limitations of the present study were lack of quick access to facilities such as magnetic resonance imaging (MRI), and computed tomography (CT) scan which consequently made it impossible for accurate determination of mortality causes. Generally, in the present study, increased mortality by ICH was not high enough to not prevent us from prescribing SK for elderly patients.

Conclusion

Since the findings of this study were almost in accordance with those of previous research in other centers 23-25, it can be concluded that unavailability of centers equipped with PCI facilities would make thrombolytic therapy an appropriate and alternative treatment to treat AMI in elderly people.

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Conflict of Interests

Authors have no conflict of interests.

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