An estimation of the efficiency of thrombolytic therapy in patients with myocardial infarction

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ABSTRACT

Introduction: Myocardial infarction (MI) is the most prognostic terrible disease. It is caused by the blockage of a coronary artery by a thrombus or clot. This is usually the result of a rupture of an atherosclerotic plaque within the artery. The heart muscle supplied by that artery is damaged due to the lack of oxygen (ischaemia).

Objective: To study the efficiency of Thrombolytic therapy (TLT) in the emergency department of the 4th City Clinic Hospital of Minsk an estimation was made of the efficiency of TLT for two thrombolytic medications: exogene tissue activator plasminogene alteplasa (Actelyse) and Streptokinase.

Method: A total of 23 adult were divided into two groups: Alteplasa group and Streptokinase group. The effectiveness was observed after thrombolytic therapy.

Result: The diagnosis of AMI was based on WHO criteria, which included clinical symptoms (typically but not exclusively chest pain), typical changes in the 12-lead electrocardiogram (ST segment elevation, which provides the most immediate indication of the diagnosis of AMI for patients requiring thrombolytic therapy for AMI) and myocardial enzyme elevation (Creatine Kinase(CC-MB), Troponin). Male and female correlation was 14:8. An average was 64 years. 16 patients (70%) experienced arterial hypertension, 3 patients (13%) - diabetes. One patient had died.

Conclusion: The most important factor determining the choice of treatment tactics and effectiveness of TLT is the time interval from the beginning of anginal attack prior to treatment. The sooner started TLT, the higher the efficiency is.

Keywords: Myocardial infarction, thrombolytic therapy, Alteplasa, Streptokinase.

Introduction

Heart disease is a leading cause of death in many countries. Although deaths from heart disease have decreased considerably in the past 20 years. Around 1.5 million people experience AMI in the USA each year and about 600,000 people die from this condition. Acording to NICE (2002), 240,000 people experience AMI in England and Wales each year. Up to 50% of people who have an AMI die within 30 days of the event, and over half of these deaths occur before medical assistance arrives or the patient reaches hospital. And just around 50,000 AMI patients recieve thrombolytic treatment on time. Thrombolytic therapy should ideally be given as soon possible (normally up to 12 hours) after the onset of AMI symptoms.

Material and Method

The materials for investigation included 23 histories of patients' diseases, admitted to the 4th City Clinic Hospital in the first 6 hours from MI beginning in the period from December 2009 to January 2010. Patients were subdivided in two groups: in the first group 6 patients were treated with Alteplase, and in the second group 17 patients were treated with Streptokinase.

The diagnosis of AMI was based on WHO criteria, which included clinical symptoms (typically but not exclusively chest pain), typical changes in the 12-lead electrocardiogram (ST segment elevation, which provides the most immediate indication of the diagnosis of AMI for patients requiring thrombolytic therapy for AMI) and myocardial enzyme elevation (Creatine Kinase(CC-MB), Troponin). Male and female correlation was 14:8. An average was 64 years. 16 patients (70%) experienced AH, 3 patients (13%) - diabetes. One patient had died.

The efficiency of thrombolytic therapy was estimated using the following criteria: complete relief and lack of recurrence of pain, early more than 50% ST-segment return to baseline, complications in post-infarction period at the hospital stage.
As a theoretical basis for the effectiveness of TLT of acute myocardial infarction, the hypothesis of an "open coronary artery" of E. Braunwald (1989) was taken, based on three fundamental principles:

1) According to coronary angiography the total occlusion of coronary artery is found in 85% of patients with myocardial infarction. All this appears in the first 6 hours of AMI.

2) The introduction of the thrombolytic agent into the coronary or systemic circulation, promotes recanalization of thrombosed coronary artery.

3) Early recanalization of coronary artery provides a reduction in the amount of necrosis, left ventricular dysfunction, improvement of the immediate and remote results of treatment.

Results

A total of 23 patients underwent investigation, and the two groups were well matched with regard to baseline characteristics (Table 1). A total of 100 percent of patients had atherosclerosis of aorta and coronary arteries. The time from the onset of symptoms of myocardial infarction to the administration of thrombolytic agents was 6 hours. A total of 17 people received Streptokinase and only 6 people received Alteplase. Other thrombolytic agents were not used at the hospital that time. In conducting a comparative analysis of the clinical effectiveness of two thrombolytic agents, streptokinase and alteplase, it was found that TLT alteplase is more effective than TLT with streptokinase in the incidence of such complications of AMI as: postinfarction angina (18 percent in the group of Streptokinase and 3 percent in the group of Alteplase), life-threatening arrhythmia (41 percent in the group of Streptokinase and non in the group of Alteplase), acute left ventricular failure (18 percent in the group of Streptokinase) and in terms of a 30-day mortality (in the group with one patient died).

Discussion

Thrombolytic treatment given witin 12 hours of a heart attack saves between 30 and 30 lives per 1000, within the first hour it saves 65 lives per 1000, but within two hours only 37 lives per 1000 patients treated.

Every minute's delay costs 11 days of life.

Every half hour's delay is equivalent to a year of life lost. (The Task Force on the Management of Acute Myocardial Infarction of the European Society of Cardiology, 2003).

Recent trials have confirmed the importance of achieving early, complete, and sustained reperfusion after acute myocardial infarction.

It is very important to give trombolytic terapy on time. It should ideally be given as soon possible (normally up to 12 hours) after the onset of AMI symptoms.

Conclusion

The result of the following conclusions:

1) In conducting a comparative analysis of the clinical effectiveness of two thrombolytic agents, streptokinase and alteplase, it was found that TLT alteplase is more effective than TLT with streptokinase in the incidence of such complications of AMI as: postinfarction angina, life-threatening arrhythmia, acute left ventricular failure and in terms of a 30-day mortality (in the group with one patient died).

2) According to the literature by comparing two thrombolytic agents - streptokinase and TPA, it should be noted that in the first 3 hours of AMI incidence the level of

recanalization is higher by treatment with tPA (81%) than treatment with streptokinase (60%). But in prescribing after 3 h of MI the chance of recanalization of the damaged coronary artery is almost the same (74 and 76%), which was confirmed in practice.

3) The most important factor determining the choice of treatment tactics and effectiveness of TLT is the time interval from the beginning of anginal attack prior to treatment. The sooner started TLT, the higher the efficiency is.

Conflict of Interest: None declared. (Or mention here if any)

References

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Table : Clinical Characteristics of the patients:

Characteristics	The 1st group (n=6), Alteplase	The 2nd group (n=17),Streptokinase
age	36 - 74	51 - 85
Arterial hypertension, %	6 (100 %)	14 (82 %)
Angina pectoris, years	65	67,2
Metabolic syndrome, %	0	1 (5,8 %)
MI in a history, %	0	2 (12 %)
Atherosclerosis of aorta/ coronary arteries, %	100 %	100 %

Table 2: The results

Complications	1st group (n=6), Alteplase	2nd group (n=17), Streptokinase
Early post-infarction angina, %	3	18
Life-threatening arrhythmia, %	0	41
Breathing deficiency, %	16,6	6
Acute ischemic encephalopathy, %	0	24
Acute left ventricular failure, %	0	18
Acute cardiac aneurysm, %	0	5,8