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Complications of thrombolysis in an intensive care unit

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Background. Thrombolysis is often the only way in treating people with life-threatening conditions, like acute myocardial infarction (AMI), pulmonary embolism (PE) and acute ischemic stroke (AIS). Complications of thrombolytic therapy are not rare and have clear influence in the quality of life, hospital stay, outcomes and mortality. Most common complications are intracranial hemorrhage, severe injection site, nose, vaginal bleeding and peripheral hematomas.

Methods and materials. A retrospective study took place in the Department of Intensive Care, Hospital of Lithuanian University of Health Sciences Kaunas Clinics. Medical data of 83 patients, who underwent treatment with thrombolytic drugs in the period of 2007–2011, were analyzed. All patients were treated with intravenous infusion of Alteplase.

Inclusion criteria were as follows:

• AMI, AIS or PE treatable with thrombolytic therapy.

Results. 72.3% (n = 60) of patients experienced massive PE, 13.3% (n = 11) AMI and 14.4% (n = 12) AIS. There were 8.43% (n = 7) of patients who had bleeding complications – 2.4% (n = 2) experienced nose bleed during or shortly after thrombolytic therapy, 3.6% (n = 3) had injection site bleeding and 1.2% (n = 1) experienced multiple skin hemorrhages. 11.7% (n = 7) of patients in the group of massive PE were thrombolised during CPR and only one of them experienced bleeding to the pleural cavity. There were no internal or external bleeding observed neither in AMI nor in AIS groups. In-hospital mortality after thrombolytic therapy was 20.5% (n = 17).

Conclusions. Thrombolytic therapy very often is the only way in treating acute, life-threatening diseases, like acute myocardial infarction, pulmonary embolism or acute ischemic stroke.

Intracranial hemorrhage, injection site, nose, vaginal bleeding and peripheral hematomas are the most common complications of thrombolysis.

Risk factors should be evaluated before starting the thrombolytic therapy.

Data of our hospital experience do not dramatically differ from worldwide data.

Key words: Alteplase, thrombolysis, complications, intensive care unit, thrombolytic therapy

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BACKGROUND

Thrombosis is an important part of the normal haemostatic response that limits hemorrhage caused by microscopic or macroscopic vascular injury. Physiologic thrombosis is counterbalanced by intrinsic antithrombotic properties and fibrinolysis. The term 'thrombus' refers to an aggregation of platelets and other blood components that cause partial or complete vascular obstruction. An embolus is a clot, or other plug, broken off from one position and brought, under the influence of blood flow, to lodge in a distal vessel. The term 'thromboembolic' disease encompasses disorders involving both thrombi and blood clot emboli (1, 2). There are five main clinical manifestations as consequences of thrombi or blood clot emboli – acute myocardial infarction (AMI), pulmonary embolism (PE), acute ischemic stroke (AIS), deep vein thrombosis and acute peripheral arterial occlusion (3, 4, 5).

Thrombolytic therapy often becomes the last bridge between life and death for patients who experience AMI, PE or AIS. These kinds of patients are usually seen in an intensive care unit, and dealing with their illness becomes a great challenge for the intensive care doctors and whole team working with them.

Most common complications of thrombolytic therapy, treating acute myocardial infarction (AMI), pulmonary embolism (PE) and acute ischemic stroke (AIS) in an intensive care unit will be discussed. We will talk about their frequency, forms, risk factors and will share our hospital experience in using thrombolysis.

COMPLICATIONS

The main complication of thrombolytic drugs is bleeding. It is usually limited to the site of injection, but intracerebral hemorrhage or bleeding from other sites can occur. There were rare cases reported about reperfusion arrhythmias and episodes of ischemia, when thrombolytic drugs were used in acute myocardial infarction. Thrombolytic drugs can also cause allergic reactions (including rash, flushing and uveitis) and anaphylaxis (6).

Acute myocardial infarction

Most fatal bleeding complication in patients treated with thrombolytic therapy after myocardial infarction is intracranial hemorrhage, its probability ranges between 0.26–2.17% considering additional risk factors (7). Other hemorrhages are related with invasive procedure injection site, percutaneous angioplasty (0.2%) or coronary artery bypass surgery (0.3%). Also there is a strong relation between moderate or severe bleeding and higher mortality rates (8).

Acute ischemic stroke

Although everyday there are thousands of cases with successful treatment of acute ischemic stroke using thrombolysis, there is complication called hemorrhagic transformation. Its incidence reaches about 9% and is associated with higher mortality rates and poorer prognosis (9).

Other complications associated with thrombolytic therapy in treatment of acute ischemic stroke do not differ from complications which occur after any other thrombolytic therapy – peripheral hematomas, injection site, gastrointestinal, retroperitoneal, nose or vaginal bleeding (9, 10).

Pulmonary embolism

Fulminant massive pulmonary embolism can frequently produce cardiac arrest. During cardiopulmonary resuscitation (CPR), tissues are usually damaged and administration of thrombolytic therapy during CPR can be extremely dangerous because of severe bleeding. Despite that, there are data, which suggest that administration of thrombolytic therapy during CPR could help to reduce mortality, although it has classically been contraindicated (11). Other complications include intracranial hemorrhage, peripheral hematomas, injection site, gastrointestinal, retroperitoneal, nose or vaginal bleeding (9, 10).

Risk factors

There are some risk factors associated with the rate and severity of complications during thrombolytic therapy. The risk factors for major bleeding and intracranial bleeding are advanced age, low body weight, prior cerebral disease, hypertension, rise in systolic and diastolic blood pressure during thrombolysis (10).

There are data suggesting that the female sex and low body weight can also be independent risk factors for intracranial and noncerebral hemorrhage (12). History of stroke, cerebrovascular dis-

ease, hypertensive disease and diabetes are considered to be risk factors for bleeding complications during and shortly after thrombolytic therapy (10, 12).

METHODS AND MATERIALS

A retrospective study took place in the Department of Intensive Care, Hospital of Lithuanian University of Health Sciences Kaunas Clinics. Medical data of 83 patients, who underwent treatment with thrombolytic drugs in the period of 2007–2011, were analyzed. All patients were treated with intravenous infusion of Alteplase. Patients were divided in three groups (AMI, PE, AIS).

Inclusion criteria were as follows:

• Acute myocardial infarction, acute ischemic stroke or pulmonary embolism treatable with thrombolytic therapy.

RESULTS

72.3% (n = 60) of patients experienced massive pulmonary embolism, 13.3% (n = 11) had acute myocardial infarction and 14.4% (n = 12) experienced acute ischemic stroke. There were 67.5% (n = 56) male and 32.5% (n = 27) female. Average age was 59.93 ± 12.67 years. There were 8.43% (n = 7) of patients who had bleeding complications – 2.4% (n = 2) experienced nose bleed during or shortly after thrombolytic therapy, 3.6% (n = 3) had injection site bleeding and 1.2% (n = 1) experienced multiple skin hemorrhages. 11.7% (n = 7) of patients in the group of massive PE were thrombolised during CPR and only one of them experienced bleeding to the pleural cavity. There were no internal or external bleeding observed neither in AMI nor in AIS groups.

Intravenous infusion of Alteplase in AIS group in all cases was administered in less than 3 hours after onset of symptoms.

In-hospital mortality after thrombolytic therapy was 20.5% (n = 17).

CONCLUSIONS

Thrombolytic therapy very often is the only way in treating acute, life-threatening diseases, like acute myocardial infarction, pulmonary embolism or acute ischemic stroke.

Intracranial hemorrhage, injection site, nose, vaginal bleeding and peripheral hematomas are the most common complications of thrombolysis.

Risk factors should be evaluated before starting the thrombolytic therapy.

Data of our hospital experience do not dramatically differ from worldwide data.

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TROMBOLIZĖS KOMPLIKACIJOS INTENSYVIOSIOS TERAPIJOS SKYRIUJE

Santrauka

Įvadas. Trombolizė dažnai yra vienintelis efektyvus gydymo būdas gelbstint žmones, sergančius ūmiu miokardo infarktu (UMI), plaučių arterijų tromboembolija (PATE) ir ūmiu išeminiu insultu (ŪII). Trombolizės terapijos komplikacijos nėra retos ir turi įtakos gyvenimo kokybei, stacionarizavimo trukmei, išeitims ir mirštamumui. Dažniausios komplikacijos – kraujavimas į kaukolės ertmę, smarkus kraujavimas iš injekcijos vietos, nosies ar makšties, periferinės hematomos.

Metodai. Lietuvos sveikatos mokslų universiteto Kauno klinikų Intensyviosios terapijos skyriuje buvo atliktas retrospektyvus tyrimas. Išanalizuota 83 pacientų, kuriems 2007–2011 m. buvo taikyta trombolizės terapija, medicininė dokumentacija. Visi pacientai buvo gydyti intravenine Alteplazės infuzija.

Įtraukimo kriterijai: diagnozuota ŪMI, PATE ar ŪII ir taikyta trombolizinė terapija.

Rezultatai. 72,3 % (n = 60) pacientų sirgo masyvia PATE, 13,3 % (n = 11) – ŪMI ir 14,4 % (n = 12) – ŪII. 8,4 % (n = 7) pacientų patyrė kraujavimo komplikacijas: 2,4 % (n = 2) kraujavo iš nosies per ar iškart po trombolizės terapijos, 3,6 % (n = 3) kraujavo injekcijos vietoje ir 1,2 % (n = 1) patyrė daugybines odos kraujosruvas. 11,7 % (n = 7) masyvios PATE grupės pacientų pradėti gydyti trombolitiniais vaistais išorinio širdies masažo metu ir tik vienas iš jų patyrė kraujavimą į pleuros ertmę. ŪMI ir ŪII grupėse nebuvo nei vidinio, nei išorinio kraujavimo požymių. Hospitalinis mirštamumas po trombolizės siekė 20,5 % (n = 17).

Išvados. Trombolizės terapija dažnai yra vienintelis efektyvus būdas gydant ūmias, gyvybei grėsmingas būkles – ŪMI, PATE ar ŪII. Dažniausios komplikacijos – kraujavimas į kaukolės ertmę, smarkus kraujavimas iš injekcijos vietos, nosies ar makšties, periferinės hematomos. Prieš pradedant trombolizę reikėtų įvertinti komplikacijų rizikos veiksnius. Tyrimas rodo, kad mūsų ligoninės duomenys ryškiai nesiskiria nuo pateikiamų pasaulio literatūroje.

Raktažodžiai: alteplazė, trombolizė, komplikacijos, intensyviosios terapijos skyrius, trombolizinė terapija