

Modern approach in the treatment of myocardial infarction in the elderly

Abstract

Acute myocardial infarction is one of the most socially important diseases with a high rate of mortality and invalidisation. Elderly and old patients are in a risk group of morbidity and complications. But in patients of this group of age atypical forms of myocardial infarction are common. It usually makes diagnostics more difficult, because patients need a prolonged monitoring with using an additional examinations and dynamic observation. Modern scientific literature, that illuminating issues of application of pharmacological and endovascular treatment of acute myocardial infarction in with elderly and old age patients contains fragmented and, in some cases, contradictory data. The authors have taken an attempt to systemize all modern information in this field based on major studies and meta-analyses.

Keywords: myocardial infarction, acute coronary syndrome, unstable angina, percutaneous coronary intervention, aged

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Introduction

According to statistic, every year in Russian Federation about one million people die from cardio-vascular disease.¹ It's known, that ischemic heart disease plays the main role and causes 85% of death among all cardio-vascular diseases in elderly and old group of patients. Elderly age of patients with acute myocardial infarction (AMI) is associated with higher rate of mortality during hospitalization and in a long-term period.² Today enlargement trend in number of elderly and old patients with ischemic heart disease is noticed. It puts a priority the prevention of age-related diseases and health conditions of the elderly population.³

During involution, a number of changes in human organism are taking place. Adaptation reserves going less: a response on pathogenic factors goes down, immune system decreases, a frequency of addition pathology and its condition increases, metabolism of drugs changes.⁴ Unstable angina and AMI in elderly and old patients often goes atypically and characterizes several features. Higher atherosclerosis degree and longer ischemic heart disease are widely existed in elderly patients, which accompanied with collateral vessels formation.⁵

Due to collateral vessels, acute occlusion of one artery doesn't cause a cardiogenic shock, while in young people acute occlusion often causes a large ischemic zone, acute myocardial dysfunction, acute cardiac insufficiency and cardiogenic shock.⁶ In this situation late reperfusion therapy may lead to aneurism and more over – may lead to broke of myocardial tissue due to reperfusion damage.⁷ In elderly and old patients a frequency and duration of diabetes mellitus is also bigger.⁸ With time's passage it leads to micro- and macroangiopathy, which may become a reason of diffuse damage of coronary arteries and painless variant of AMI.⁹ As a result – the fewer patients feel pain, the less they call emergency and get necessary help.²

Methods

The main strategy in treating people with AMI is effective revascularization, using pharmacology method or interventional procedures. For the last 10years percutaneous coronary interventions (PCI) and stenting of infarct-associated artery became the main

standard methods in treating patients with AMI or unstable angina. Numerous of research tells us, that introducing of interventional methods significantly decreases the rate of mortality and increases quality of life parameters.¹⁰ Elderly patients become candidates for revascularization in majority of cases.¹ In field of gerontology it's interesting to determine, that there is much more good results of revascularizations among elderly patients, than among younger persons.² In TIME research study it was shown, that during revascularization the absolute risk of bleeding in elderly patients was paradoxically less, then in younger ones.¹¹ Moreover, the rate of mortality in the first 6month after revascularization in elderly was much miner, then in patients under 70years old, said in research Rana O. and co. 7.0% against 1.8% consequently.¹²

Together with technology development and increased accessibility in terms of modern medicine – the efficacy of treatment patients with AMI also grows. The results of meta-analyses De Luka L. and co. tell us, that during the last 10years a number of PCI and frequency of medical prescription increased.

Results

During the period of treatment a rate of mortality in the first 30days decreased from 14.6% [95% CI 9.9 – 20.4] to 9.5% [95% CI 7.7 – 11.6]. Using of interventional cardiology in patients with AMI for the last 10 years significantly increased – from 26.6% to 68.4% [p<0.0001]; a frequency of revascularization for this period raised from 9.9% to 51.7% [p<0.0001]. It's need to notice, that among 10983 patients, that were included in this research, 4350 [39.6%] were older, than 75years.¹³

It's no doubt, that adequate and comprehensive pharmacological therapy in patients with AMI is also very important. Drugs treatment is directed to several aims: recovery of blood clot, prevention of acute thrombosis in coronary arteries during PCI and early postoperative period [IIb-IIIa glycoprotein receptor blockers, bivalirudin, heparin]; drugs-accessed vasodilatation [prolonged and short-effective nitroglycerine, calcium antagonists]; preventing of myocardial and vessels remodeling [angiotensin converting enzyme inhibitors], reducing the necessary of oxygen in myocardial tissue [beta-

blockers], stabilization of atheromas [statins]. In special cases, when complications take place, it may be need to use drugs for stimulating contraction [phenylephrine, dopamine]; correction of bradycardia [atropine]; antiarrhythmic drugs [amiodarone, lidocaine]. It's also known, that elderly patients gets less medicines, than younger ones because poorer tolerability of drugs, a high degree of accumulation in the kidney and liver pathology, contraindications and lower adherence to treatment: beta-blockers are delivered in 55.9% against 71.2% [$p < 0.001$], statins – 44.3% against 62.3% respectively [$p < 0.001$].⁵ Despite this, the frequency of the appointment of recommended drugs in the elderly has increased in recent years. Thus, early administration of beta-blockers by hospitalization as well as using statins and dual antithrombotic therapy since 2001 to 2010 significantly increased in this group of patients [$p < 0.0001$].¹³

Elderly people have an increased risk of drugs side effects. Particularly it associated with high risk of bleeding in terms of using dual antiplatelet therapy and anticoagulants, as well as in case of hypotension, bradycardia and renal failure. Besides the high risk of bleeding, which often takes place in elderly patients, the medium dosage of antithrombotic medicines may be too high.¹⁴

Discussion

In case of using in elderly unfractionated heparin, enoxaparin, IIb/IIIa glycoprotein and P2Y12 receptor blockers, the risk of major bleeding also increases. Besides that, the risk of major bleeding is getting higher while a number of antithrombotic agents increases, including anticoagulants, aspirin, P2Y12 blockers and especially GP IIb/IIIa blockers as well as using femoral approach instead of radial approach during angiography and PCI.¹⁵ A frequency of major bleeding complications is also bigger in case of using too high dosage of drugs. We can widely see it in patients with a high risk of hemorrhage side effects, particularly in women, elderly and patients with chronic kidney disease.¹⁴ Using novel antithrombotic drugs during PCI makes it possible to reduce the risk of bleeding side-effects. Thus, according to ACUTY study, using Bivalirudin compared with combination of heparin and GP IIb/IIIa blockers significantly reduced a risk of major bleeding 6.2% against 9.8% accordingly; $p = 0.008$.¹⁶

Contrast-induced nephropathy is one of the most dangerous side-effect after PCI in patients with chronic kidney disease. In Kim J.H. trial was shown, that contrast-induced nephropathy significantly associated with high mortality rate during hospitalization 18.2% against 3.7%, $p = 0.001$.¹⁷ It's also important, that the age of patients wasn't a factor of high risk of contrast-induced nephropathy. It means that it's need to be very careful when using high dosage of contrast during PCI usually 3-4ml per 1 kg of body weight to prevent a toxic side effect on kidney.¹⁸

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Conflicts of interest

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