Original Article

MULTIVESSEL DISEASE AS A PROGNOSTIC FACTOR FOR MORTALITY IN STEMI PATIENTS

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Summary

The main objective of this analysis was to define the influence of multivessel disease involvement compared to single vessel disease on mortality rates in STEMI patients. The retrospective study included 549 patients, hospitalized with STEMI in St. Ekaterina University Hospital (age - 62.66±12.56; women - 31.3%) from 01.06.2008 to 30.06.2011. One-vessel disease was found in 232 patients (44%) as compared to two-vessel disease in 165 patients - 31% and multivessel disease in 130 patients - 25%. There was LM stenosis (>30) in 11 patients (2%); ostial lesion in 33 patients (6.3%); presence of Ca in 37 patients (7%). A stent was implanted in 484 patients (91.8%), and GP IIb/IIIa was used in 400 patients (75.9%).There was significant increase in mortality rates in patients with multivessel disease: 15.6% - 46 patients, compared to one-vessel disease - 6.5% (15 patients) (p<=0.01). Both early (30 days) and late mortality (one year) rates were higher in the multivessel group (6.8% vs. 2.6%, p<=0.05 and 10.2% vs. 3.9% (p<=0.0510), respectively. Multivessel disease is associated with higher mortality rates in STEMI patients, which may further alter clinical course and decision making.

Key words: STEMI, mortality, multi-vessel disease

Introduction

Worldwide, coronary artery disease (CAD) is the single most frequent cause of death. Over seven million people die every year from CAD, accounting for 12.8% of all deaths. Every sixth man and every seventh woman in Europe will die from myocardial infarction. STEMI is the deadliest form of CAD. The in-hospital mortality of unselected STEMI patients in the national registries of the ESC countries varies between 6% and 14%. In the settings of STEMI, clinical outcome and survival rates vary significantly according to the baseline risk profile of each patient, determined by the presence of certain variables. So far, limited information is available with regard to the angiographic parameters that may influence patient prognosis [1, 2].

Patients and Methods

We analyzed all patients over 18 years old,

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hospitalized with chest pain and ST-elevation on ECG, with a diagnosis of AMI with ST-elevation – STEMI (STEMI is defined as having typical ischemic chest pain for more than 20 min, ST elevation in at least 2 consecutive ECG leads), treated with primary angioplasty for a period of 3 years.

We performed 532 primary PCI in 527 patients. We analyzed only the first event in patients admitted more than once for pPCI (N=5). Our treatment protocol is based on the European Society Guidelines and on the American College of Cardiology Guidelines. In each patient, ECG, blood samples and echocardiography were obtained as fast as possible and angiography and interventional treatment were performed. All patients received a loading dose of Aspirin and Clopidogrel (300-600 mg). During the angiogram, an angioplasty of the target lesion was performed and patients were treated with GP IIb/IIIa antagonists based on the operator's opinion. Coronary artery segments were classified according to the CASS (Coronary Artery Surgery Study) trial system, modified by Bypass Angioplasty Revascularization Investigation (BARI) Study Group.

The coronary artery diameter and the degree of the stenosis were measured with the functions for quantitative assessment of the coronary arteries, QCA - Quantitative Coronary Analysis was performed when necessary. It allowed for an accurate assessment of the diameter, the lesion length and the vessel size, after catheter-based calibration.

After the procedure patients were transferred to an intensive care unit for 24h, after which they were then transferred to a general ward.

The data regarding the demographic information, medical history, risk factors and all other medical data of the patients were taken from a computer register where the information about the procedure was saved.

New onset or worsening heart failure is defined by information based on clinical, ECG and echocardiographic data.

According to our protocol, patients underwent medical check-up after the first, third, sixth month and one year after the procedure. The check-up included history taking, laboratory test, ECG, echocardiography, and stress-test if appropriate.

The basic characteristics of the patient population are summarized in Table 1.

Table 1. Basic characteristics of the patient population.

All patients	527
Age	62.66±12.56
⩾ 60 years	61.8% (326)
Women	31.3% (165)
AH	87.7% (462)
Dyslipidemia	67.4% (355)
Smoking	50.1% (264)
Obesit y	26.6% (140)
Diabetes mellitus	27.1% (143)
Family history	23.7% (125)
Previous AMI	14.5% (62)
Previous PCI	5.1% (27)
Thrombolysis	2.5% (13)
Previous CABG	1.7% (9)
Previous ischemic insult	6.6% (35)
Shock	5.3% (28)

The majority of patients were men and there was a high incidence of risk factors for ischemic heart disease – arterial hypertension, dyslipidemia, smoking, and diabetes mellitus. The patients with a previous unsuccessful fibrinolysis were referred for rescue PCI.

During the first month, 452 patients turned up for a follow-up check, on the third month – 364 patients, on the 6th – 286, on the first year – 230 patients. Respectively, there were 24, 21, 19, 20 repeated conventional angiograms – the main reasons being planned interventional revascularization in multivessel disease, positive stress – test and/or typical chest pain, despite optimal medical therapy or emergent angiogram.

Results

Based on the fact that during different periods of time there are different factors influencing

mortality rates, we define three types of mortality rates as – in-hospital mortality, mortality during the first month, and mortality during the first year.

Table 2. Cumulative mortality rates during the first month, during the first year and in-hospital

In-hospital	4.9% (26)
During the first month	2.6% (13)
During the first year	11.8% (62)

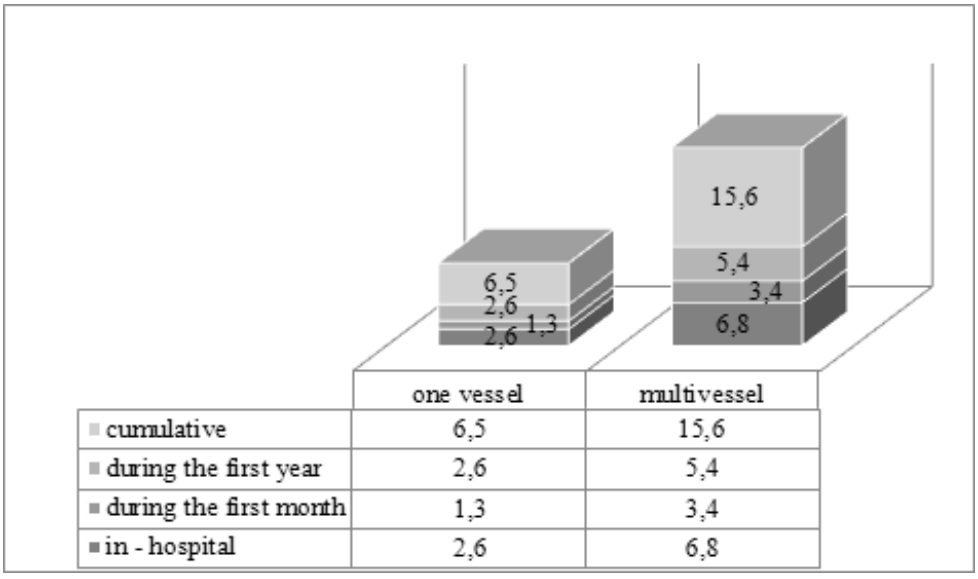

Figure 1. Mortality rates in one-vessel and multivessel disease

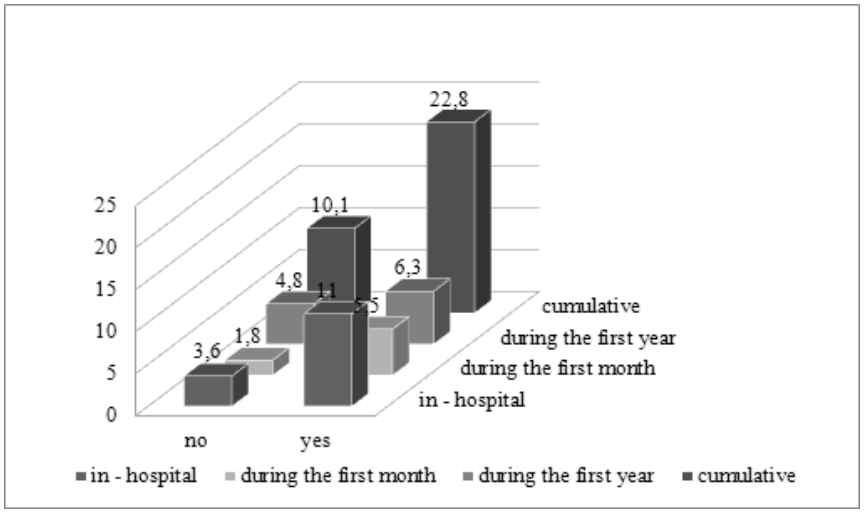

Figure 2. Mortality rates in patients in relation to complete revascularisation

There was a significant increase in mortality rates in patients with multivessel disease: 15.6% (46 patients), compared to one-vessel disease – 6.5% (15 patients), p<=0.01.

Both early (30 days) and late mortality (one year) rates were higher in the multivessel group (6.8% vs. 2.6%, p<=0.05) and (10.2% vs. 3.9% p<= 0.0510), respectively.

Discussion

Development and widespread adoption of primary percutaneous coronary intervention (PCI) is a significant advance in the treatment of acute myocardial infarction (AMI), leading to a significant reduction of early and late mortality,

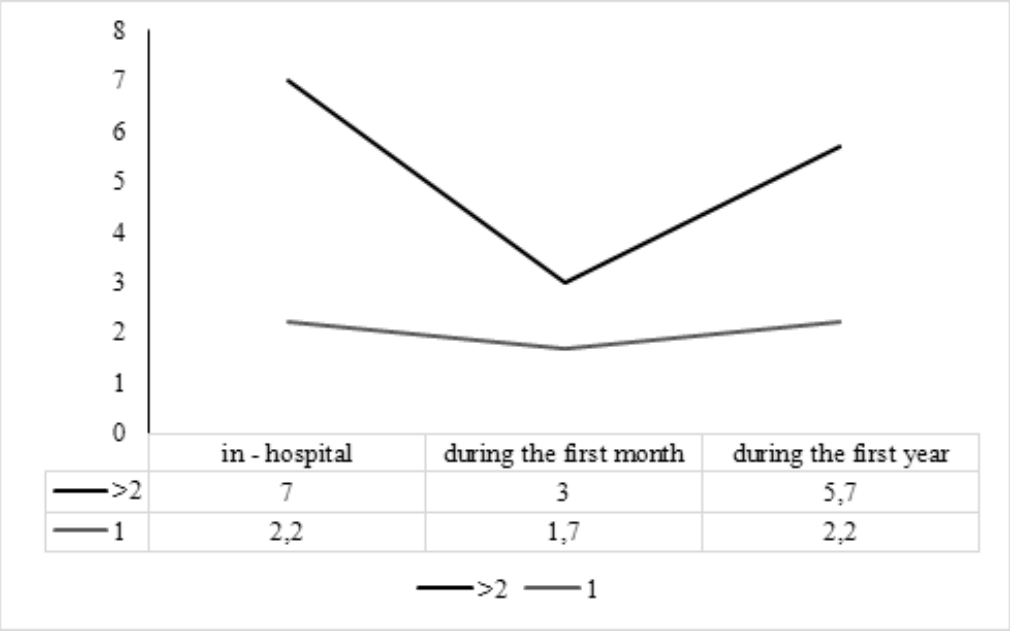

Figure 3. Number of vessels with >70% lesions and mortality rate

as compared with pharmacological reperfusion. About 40-65 percent of all STEMI patients have multivessel disease [3-7], with increased mortality and morbidity rate, as well as decreased reperfusion success rates, regardless of the type of reperfusion strategy performed [3, 8-10]. Urgent coronary angiography identifies non-target vessel lesions in about 50% of all STEMI patients [3-7]. Multivessel disease leads to a worse clinical outcome [11-14].

Neither the use of GP IIb/IIIa blockers nor the use of intracoronary stents decrease the bad prognostic value of multivessel disease [11].

According to current guidelines, only a target lesion angioplasty should be performed in patients with multivessel disease [12]. In the vast majority of patient with STEMI and multivessel disease there are increased death and MACE rates, regardless of successful reperfusion and FAST-PCI.

Despite the limited information about the long-term prognostic value of multivessel disease in STEMI patients treated with PCI, there is a growing tendency to perform additional revascularization and therapeutic strategies.

Patients with multivessel disease had more co-morbidities and other risk factors, including worse LV systolic function and higher ischemic rates before the acute event, all of these leading to a worse prognosis [15].

The majority of trials with STEMI patients have shown that in the case of multivessel disease, there are increased rates of arterial hypertension, diabetes mellitus and previous myocardial infarction [3, 11, 14]. In addition, patients with multivessel disease have longer pain duration, which also has a negative predictive value. They are usually older, most of them with diabetes, visceral neuropathy and sensory disorders, which lead to a higher pain threshold [16-19].

There is increased stent implantation rate in patients with one-vessel disease. This is probably due to the predominantly thrombotic nature of the target lesions in this group. In addition, patients with multivessel disease present with more severe coronary artery disease and need urgent surgical revascularization more often. In these patients, balloon angioplasty is often a bridge to CABG [15].

Although our results are from a single-center study, they could be globalized for the whole Bulgarian population, because of the significant unification of all catheterization laboratories in our country.

Conclusion

Multivessel disease is associated with higher mortality rates in patients with STEMI, which may additionally alter the therapeutic strategy in this subgroup.

We identified new factors which increased the early and late mortality rates – incomplete revascularization, more than 2 vessels with more than 70% stenosis.

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