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ISCHAEMIC HEART DISEASE – SURGICAL TREATMENT AND POST-OPERATIVE COMPLICATIONS

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Abstract

Objective: The aim of this study is to evaluate post-operative complications after myocardial revascularisation in patients with very severe ischaemic heart disease. Men typically have a higher incidence of coronary disease than women. Ischaemic heart disease is characterised by reduced blood supply to the heart. The coronary arteries supply blood to the heart muscle, and since no alternative blood supply exists, a blockage in the coronary arteries reduces the supply of blood to the heart muscle. Myocardial infarction can cause very severe dysfunction of the left ventricle. In spite of new medical and surgical treatments, the number of patients with ischaemic disease is constantly increasing.

Patients and Methods: A group of 80 patients with ischaemic heart and myocardial infarction was observed, and 40 of them surgically treated in the period 2010–2013. In this study we evaluated only those surgically treated patients.

The results: Post-operative complications in patients surgically treated included: ICV 2.5% (1/40); bleeding 2.5% (1/40); arrhythmia 17.5% (7/40); pleural effusion 7.5% (3/40); mediastinitis 2.5% (1/40); sepsis 2.5% (1/40); acute renal insufficiency 2.5% (1/40); multiple organ failure 7.5% (3/40); and perioperative death 2.5% (1/40).

Conclusion: Surgical treatment of patients with severe ischaemic disease as a result of myocardial infarction can be performed with minimal operative and post-operative complications, especially in elective cases.

Key words: myocardial infarction, ischaemic heart disease, myocardial revascularisation

Introduction

Ischaemic heart disease is myocardial damage caused by a disproportion between coronary blood flow and myocardial oxygen demand, which occurs due to alterations in coronary circulation. These changes can constitute an acute or chronic condition.(1) Men are more likely to suffer from coronary heart disease than women.(2)

Myocardial infarction can be the result of coronary artery occlusion created by atheroma, embolisms or coronary artery spasms.(3-5) Infarction causes dysfunction of the left ventricle.(6-8) The problem of patients with impaired left ventricular function has been present for a long time, and was intensively studied in Europe in the early 1970s.(9)

Initial research during this period showed that left ventricular contraction dysfunction in patients with coronary artery disease presents irreversible damage to the heart muscle.(10) Patients with ischaemic heart disease often have other diseases that increase the risk of surgical treatment, and at the same time increase the mortality rate of this difficult group of patients.(11-14)

Cardiovascular disease (ischaemic heart disease) is the leading cause of death and hospitalisation in Bosnia and Herzegovina, at 53.4% (WHO 2009). Where cardiomyopathy was present (9.0%) and acute myocardial infarction 8.0%. Cardiovascular diseases are a global epidemic, both in Bosnia and Herzegovina and the rest of the world.

Methods and patients

This retrospective study included 40 patients with ischemic heart disease, who were surgically treated with aorto-coronary bypass grafting in the period 2010–2013. Preoperative preparation of all patients consisted of anamnesis, clinical examination, invasive and non-invasive diagnostic methods (ECG, ergometry, echocardiogram, catheterisation and heart scintigraphy). Echocardiogram was performed using the Vivid 7 apparatus (General Motors). Ultrasound examination in all patients confirmed the diagnosis of ischemic heart disease. This method determined the quality of left and right ventricular contraction, and abnormalities in myocardial wall motion. All patients underwent coronary angiography, but scintigraphy was performed only in patients who were electively surgically treated.

All patients were examined at the hospital, and supervised post-operatively in the intensive care unit of the Heart Center KCUS and BH Heart center Tuzla. Once indication for surgery had been established, 40 patients underwent surgery of which 10 were urgent cases. This surgery comprised myocardial revascularisation treatment (coronary artery bypass grafting).

All patients underwent myocardial revascularisation using the Stockert S3 machine for extracorporeal circulation (ECC). The standard surgical technique of myocardial revascularisation – coronary artery bypass grafting – included midline sternotomy, harvesting of the internal thoracic artery and simultaneous preparation of vein grafts from the left or right leg (v. saphena magna). The internal thoracic artery and greater saphenous vein were used in all surgically treated patients. Most patients received three aorto-coronary bypasses.

Results

Our study group consisted of 40 patients. Most of the patients in our group were men (82.5%, or 33/40) but some women were also included (17.5% or 7/40). (Table 1).

Table 1. Gender structure

Gender structure			Group
Gender	Male	N	Surgically Treated
		%	33
	Female	N	7
		%	17.5
	Total	N	40
		%	100.0

Surgically treated patients belonged to the age group of 59.8 ± 7.7 years, while the total range was 41-77 years.

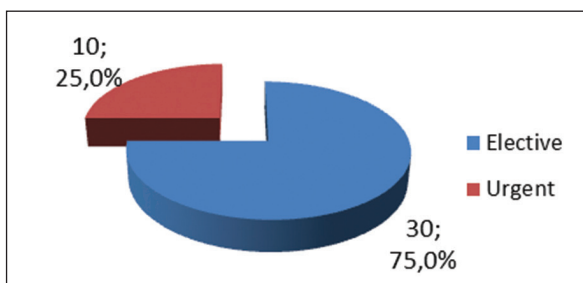


Diagram 1. Proportions of surgically treated patients, elective and urgent

Most of the patients surgically treated with aortocoronary bypass grafting (75%, or 30/40) underwent elective surgery, compared to 25% (10/40) of patients, who required urgent surgery.

Post-operative complications such as prolonged ventilation (>8 hours) were present in 15% (6/40) of patients who were older, and who had chronic obstructive pulmonary disease before surgery. Arrhythmia was present in 17.5% of patients (7/40) who had a heart rhythm disorder prior to surgery (bigeminy or atrial fibrillation). Cardiac troponin enzymes were positive in 15% (6/40) of patients. These were patients who were in a state of acute myocardial infarction at the time of surgery.

Neurologic deficit was present in 2.5% (1/40) of patients. It appeared on the third post-operative day in one elderly patient who had a cerebrovascular insult four months prior to surgery.

Sepsis was present in only one patient, or 2.5% (1/40). This patient was in the intensive care unit, and was operated on as an urgent case (acute infarction). Acute renal

failure was present in 2.5% (1/40) of the patients. Mediastinitis was present in 2.5% (1/40) of the patients. Multiple organ failure was present in 2.5% (1/40) of patients. All of these complications (sepsis, acute renal failure, mediastinitis, and multiple organ failure) were present in the same patient.

Pleural effusion was present in 7.5% (3/40) of patients. Only two patients required pleural puncture, as the third patient's effusion was small. Pneumothorax was present in only one patient (2.5%, 1/40). This patient was drained on the fourth post-operative day.

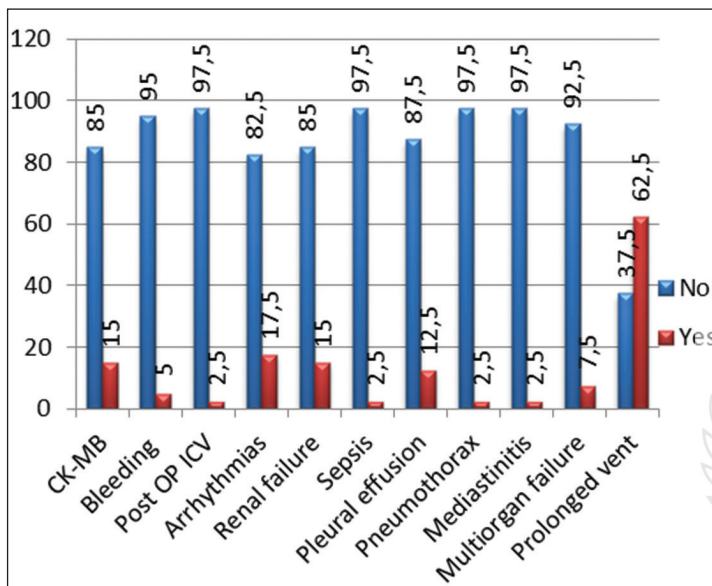


Diagram 2. Post-operative complications

Discussion

Referral for coronary artery bypass grafting in patients with severe dysfunction of the left ventricle, and early after acute myocardial infarction, presents a dilemma to the cardiovascular team. It has long been maintained that surgery at this stage carries substantial operative risks. Recent reports, however, suggest that such estimates of operative mortality and complications may be unduly pessimistic.(15)

Patients with ischaemic heart disease and left ventricular dysfunction are typically very serious cases, with many factors of morbidity. In one study it was found that the majority of patients with ischaemic heart disease who have had myocardial infarction are often smokers with chronic obstructive pulmonary disease, chronic renal insufficiency, gastrointestinal complications, and cerebrovascular insult. For this reason, medical treatment is recommended.(16-18)

This study supports the claim that the scale of myocardial viability determined by scintigraphy is a significant component of prognosis in patients with coronary artery disease and LV dysfunction, both in their functional status and post-operative results. (19) Most of the patients in our study who were treated surgically did so electively (75%, or 30/40 patients), while 25% (10/40) patients were urgent. Urgent surgery is itself hazardous, and increases the risk of operative mortality to 14.8%.(20-23)

Many studies have concluded that age is a factor: there is increased hospital mortality in patients over 70, with left ventricular dysfunction and reduced ejection fraction.(24)

Revascularisation of the heart is the standard treatment for patients with severe three-vessel coronary artery disease, and LM stenosis reduces the risk of acute myocardial infarction and cerebrovascular insult. Surgical treatment of coronary artery bypass reduced the mortality rate as a result of acute myocardial infarction.(25)

In our study we had only one case of perioperative mortality (2.5%, or 1/40).

In some studies, 11% to 14.8% perioperative mortality is evidenced in patients with severe left ventricular dysfunction.(26-28)

Improved operating results are likely influenced by better myocardium protection and improved post-operative care.(29)

It is concluded that 63% (30) of patients who were surgically treated have a survival rate of 5 years.

Conclusion

Myocardial revascularisation with aortocoronary bypass grafting can be performed safely in patients with severe ischemic heart disease and dysfunction of the left ventricle, with acceptable post-operative complications and mortality. Careful patient selection for revascularisation would confer maximum benefit to patients in this relatively high-risk group. We believe that improvements in cardiac anesthesia, surgical technique, extracorporeal perfusion, perioperative care, and post-operative management have contributed significantly to more encouraging outcomes.

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