

REVIEW

Management and Invasive Cardiological Review by Comparison of Percutaneous Coronary Intervention in Left Anterior Descending Artery with Drug Eluting and Bare Metal Stents

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ABSTRACT

Introduction: The dominant global public health challenge are non-communicable diseases. According to World Health Organization (WHO) data. The fifth leading causes of death in FB&H are diseases of the heart and coronary arteries: stroke, acute myocardial infarction, cardiac arrest, cardiomyopathy and essential hypertension. The prevention of these diseases has great importance in improving health in B&H. **Objective:** The aim of this study is in estimation of one-year survival and left heart systolic function after the treatment. After the data collection and evidence of their statistical value, the results of the research point to the profile of patients with a LAD disease in one-vessel coronary artery disease that should be subjected to PCI DES LAD and PCI BMS LAD, respectively, or creating guidelines for a better and more effective LAD treatment. **Material and methods:** The study was performed as retrospective/ prospective, clinically controlled for a period of three years. In this study was included 60 patients, which was followed in 12 months period. With the PCI BMS method was treated 63.3% and 36.7% of subjects were treated with the PCI DES in LAD. **Conclusion:** The number of complications in patients with one-vessel LAD coronary heart disease, treated with PCI DES and PCI BMS was statistically significant. One possible complication (4 patients) is due to the spread of the disease to other blood vessels. Due to possible complications in the treated or LAD with repeated stenosis, the complication in terms of restenosis of the previously placed stent in 75% are with BM stents justifying the use of drug eluting stent, while the progression of disease in patients (2 patients) indicates the need for detection and prevention of risk factors.

Keywords: drug eluting stent, bare metal stent, left anterior descending artery, acute coronary syndrome.

1. INTRODUCTION

Health management is faced with constant pressure from healthcare reforms and finding additional sources to align development to patient needs (1-3). Therefore, it is important to keep in mind the preservation of the most important goals of the health system: improvement and preservation of human health, responsibility for the expectations and demands of people seeking health care and fair (just) contribution of people (4). Global Changes in technology and transition in the health care system in the world, have increased the interest in efficient, rational and timely application of new evidence-based technologies and medicine, as well as high-quality health services (4). Quality and safety management in health care has therefore become one of the priorities in providing healthcare to

users and the health economy as one of the key segments. The dominant global public health challenge are non-communicable diseases. According to World Health Organization (WHO) data, non-communicable diseases dominated by heart and blood diseases are one of the leading diseases, while in the F B&H according to diagnosis, the fifth leading cause of death are diseases of the heart and coronary arteries: stroke, acute myocardial infarction, cardiac arrest, cardiomyopathy and essential hypertension (5-6). Therefore, prevention of these diseases has great importance in improving health and changing attitudes and behaviors of patients. The largest budget for health care in the F B&H is allocated to cardiovascular diseases, while 75% of heart diseases is represented by ischemic heart disease.

By studying the natural history of the

disease in order to make a decision on intervention cardiologic treatment with drug eluting stents and bare metal stents and taking into account the economic benefit and the evaluation of their results, the ability to quantify in the disease of coronary arteries the perfusion deficit and the role of the involved branch within this deficit (1). Two major coronary arteries (left coronary artery and right coronary artery) extend across the entire heart volume. The upper intraventricular branch or left anterior descending artery (LAD) continues the LM continuity. Coronary artery atherosclerosis is a progressive disease that begins early in life (2). If coronography indicate significant narrowing in the blood vessels of the heart depending on their degree and the severity of the illness it can be treated with the insertion of stents or, in severe cases, by surgical revascularization. The stents are actually small metal meshes that have a mesh structure and serve to break down the blood vessels narrowing and secure the blood vessel wall to provide a better flow of the blood. There are stents that are purely metal (BMS or bare metal stent), there are also stents that have in addition to metallic base a drug that is released in a given time period (5). BMS are on the world market up to four times cheaper than DES. Common for both types is that after embedding into the blood vessel, the metal base in it remains forever. There is also a recent generation of stents whose base is not metallic, enabling the stent to dissolve and completely disappear (biovascular scaffold or BVS) over a certain period of time.

2. OBJECTIVE

The aim of this study was to evaluate the effect of treatment of atherosclerotic changes in patients with single-vessel disease of the LAD, the PCI method using two different types of stents, the DES and BMS. In the study the emphasis is placed on the economic viability of the above-mentioned procedures by comparing stents with regard to quality and economic viability. Results of this study will be used for the establishment of guidelines in the further course of treatment of the disease. The main goal was to prove the better results in patients which was treated with PCI drug eluting stent in LAD compared to patients treated with BMS.

3. MATERIAL AND METHODS

The study was conducted as retrospective/prospective, clinically controlled for a period of three years. In this study were included 60 patients, which was followed in period for 12 months. With the PCI BMS method was treated 63.3% and 36.7% of subjects were treated with the PCI DES in LAD.

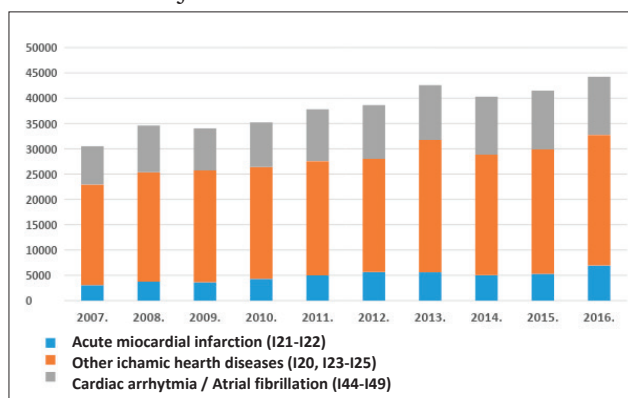


Figure 1. Diagnosed diseases according to ICD-10 in F B&H, 2007-2016.

The group of subjects is patients of the Clinical Center of the University of Sarajevo. Data processing is performed in IBM Statistics SPSS 20 Software; a comparison between groups is performed using X^2 -test with determination of correlation coefficient, and Student T-test.

This chart show that the ischemic heart disease growth and each year more and more patients suffer from ischemic heart disease. This indicates a significant problem that must be prevented and taken as a serious problem in the future.

	Number	%	X^2	SD	Results
BMS	38	63.3	1.46	1.21	t=1.72 sig. p<0.05 r=0.314
DES	22	36.7	1.97	1.02	t=1.94 sig. p<0.05 r=0.518
TOTAL	60	100.0	1.26	1.16	t=1.64 sig. p<0.05 r=0.414

Table 1. Number of embedded stents using PCI technique

In this table was showed number of patients who were treated with BMS and DES. In our country the number of patients treated with DES was 36,7%, and patients treated with BMS was 63,3%. Each year the number of patients treated with DES was rising, which is the same as in the centers in developed countries.

Complications	Number	%	Result
Without complications	56	93.3	t=1.21 sig. p<0.05 r=0.217
After 6 months symptomatic, performed ergometry, followed by myocardial scintigraphy. Repeated coronography revealed in stent stenosis in LAD and 70% stenosis in RCA. Performed PCI DES LAD and PCI BMS RCA.	1	1.7	t=2.17 sig. p<0.05 r=0.416
During follow-up repeated angina like symptoms, positive ergometry, repeated coronography subclusion in front of stent, performed PCI DES LAD	1	1.7	t=2.14 sig. p<0.05 r=0.416
During follow-up repeated angina like symptoms, a positive ergometric test, repeated coronography-two-vessel coronary disease with a significant stenosis at RCA 80%, PCI RCA is performed, the stents in LAD passable.	1	1.7	t=2.14 sig. p<0.05 r=0.41
During the follow-up repeated angina like symptoms, a positive ergometric test. On recatheterization: the present subclusion of the LAD immediately after the departure from LM. Patient underwent cardiac surgery by CABG NoI	1	1.7	t=2.14 sig. p<0.05 r=0.41
Total	60	100.0	t=1.02 sig. p<0.05 r=0.16

Table 2. Complications in patients treated with PCI technique

At this table was showed differences between patients treated with DES and patients treated with BMS. without complications was 56 patients, or 93,3%. 6,7 % or 4 patients had some of complications. One patient were symptomatic, with typical sign of angina. After ergometry test, we perform recoronarography with 70% stenosis in RCA and in stent stenosis in LAD (previously treated with BMS). Both of lesion were treated, in RCA with BMS and with DES in LAD. Other patient also has angina symptoms, after recoronarography we found proximal in stent subocclusion (also treated previously with BMS). We are performed DES insertion. On the other patient after period of 6 months we found neatly passable previously inserted DES stent in LAD and new stenosis in RCA coronary artery.

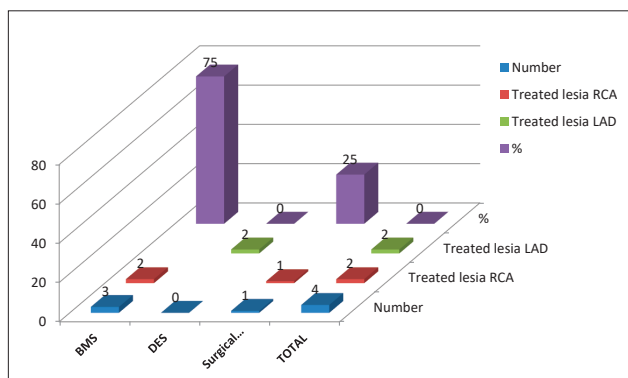


Figure 2. Comparison of complications and intervention between patients with BMS and DES stent.

During this monitoring period, all DES stents were without significant in stent stenosis. In three of patients found stenosis in other coronary vessels (RCA).

4. DISCUSSION

Percutaneous coronary intervention with a drug eluting stent on LAD (PCI DES LAD) is a procedure of choice for single-vessel coronary artery disease - left anterior descending (LAD) in relation to percutaneous coronary intervention with bare metal stent at LAD with changes in ostium by type of severe stenosis and chronic type occlusion.

Complications occurred in the treated LAD in form of repeated stenosis of the previously embedded stent (3 patients), which in percent is 75%, are on BM stents, and additional funds were allocated for 4 patients, each treated with the BMS method.

Percutaneous coronary intervention is the procedure of choice for acute myocardial infarction (5). Diabetes mellitus is an indication for DES embedding and plays a significant role in the selection of treatment procedures between these two methods in isolated single-vessel coronary artery disease (2). The assessment of the appropriate method is solely in the hands of an experienced intervention cardiologist who will always think about the quality of revascularization.

Significant is importance of the financial effect application each of the methods in comparison to classical cardiovascular treatment (CABG surgery with cardiopulmonary bypass).

As in previous years, leading causes of the death of the population of the Federation of Bosnia and Herzegovina are cardiovascular diseases (SDR higher than the EU average). This situation is related to today's lifestyle and poor living habits, such as smoking, improper diet, excessive alcohol consumption and physical inactivity, leading to obesity, elevated blood pressure and elevated fat in the blood or diabetes and high blood pressure. One of the primary goals of health care and management promotion is to systematically introduce measures such as:

Support to the development of systemic approach to programs for preventing and monitoring the leading risk factors for the most frequent illnesses at the level of FBiH, in particular cardiovascular diseases, through the improvement of records, documentation and evaluation, as well as the availability of preventive health services at the level of Primary Health Care /Family Medicine teams (6,7,8,9,10).

Cardiovascular diseases are the leading cause of morbidity

and mortality in the world, with 29% of total annual mortality. It is estimated that by 2030, 23.6 million people will die annually of heart disease, or every two seconds in the world will cause a death due to cardiovascular disease (8-10). Cardiovascular diseases are the cause of death in our country, especially in younger age population, according to data from the FBiH Public Health Institute. Ischemic heart disease (IHD) in cardiovascular disease amount to 42%. Myocardial infarction is the leading cause of mortality in Western Europe with an intrahospital mortality rate of 6-13%, or 30%-40% when extrahospital mortality is considered.

5. CONCLUSION

Increased participation of public health in initiating intersectorial promotional interventions at the local community level with a goal on changing habits and behavior of the population related to leading risk factors (smoking, alcohol, unhealthy nutrition, physical inactivity, mental health and oral health).

Participation of public health in the development of acute coronary syndrome network of Bosnia and Herzegovina for the better and more efficient treatment of patients already suffering from ischemic heart disease. The acute coronary syndrome network of Bosnia and Herzegovina would also reduce the economic deficit in drug consumption because patients treated within optimal time frame due to ACS (120 min.) by interventional cardiologic procedure (PCI with emphasis on the drug eluting stent) have reduced necrosis of the heart muscle itself and improved left ventricular systolic function after 6 months, which would also contribute to economic benefits and lower financial funds for further medical treatment of these patients.

- **Authors contribution:** All authors equally participated in all phases of preparing of this study. Final proof was made by the first author.
- **Conflict of interest:** none declared.

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