Impact Factor:					
	ISRA (India) = 6.317	SIS (USA) = 0.912	ICV (Poland) = 6.630
	ISI (Dubai, UAE) = 1.582	РИНЦ (Russia) = 3.939	PIF (India) = 1.940
	GIF (Australia) = 0.564	ESJI (KZ) = 9.035	IBI (India) = 4.260
	JIF = 1.500	SJIF (Morocco) = 7.184	OAJI (USA) = 0.350

SOI: 1.1/TAS DOI: 10.15863/TAS
International Scientific Journal
Theoretical & Applied Science
p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)
Year: 2022 **Issue:** 02 **Volume:** 106
Published: 18.02.2022 **http://T-Science.org**

QR – Issue QR – Article

Akbarkhon Dilshodovich Dalerov
clinic «Zarmed Pratiksha»
Resident physician
Samarkand, Uzbekistan

DIRECT STENTING OF THE ANTERIOR DESCENDING CORONARY ARTERY (DESCRIPTION OF A CLINICAL CASE)

Abstract: *Aim: The goal of revascularization in stable angina is to increase survival and reduce symptoms of ischemia. Randomised trials have shown that direct stenting is associated with improved markers of reperfusion during primary percutaneous coronary intervention for stenosis of anterior descending coronary artery. However, data evaluating its impact on long-term clinical outcomes are lacking. The purpose of this study was to evaluate the efficacy and safety of stenting in patients with ostial stenosis of anterior descending coronary artery.*

Methods: The article presents a clinical case of anterior descending coronary artery stenting in a 57-year-old patient. The peculiarity of the patient was the presence of the anterior descending coronary artery - the ostial stenosis was 80%, then the stenosis in pr/3 was up to 95%, the distal bed was without hemodynamically significant stenoses. According to the anamnesis, physical examination and the results of instrumental examination, indications for direct stenting of the anterior descending coronary artery.

Results: Our data demonstrate the best results when performing direct stenting in patients with angina pectoris FC III. It has been previously proven that direct stenting in patients with stable coronary heart disease reduces the incidence of distal embolism with atherosclerotic plaque components.

Conclusions: In a contemporary, direct stenting during percutaneous coronary intervention is an effective and safe method of treating patients with FC III exertional angina and should be used whenever possible.

Key words: *stenosis of the anterior descending coronary artery, direct stenting, coronary artery disease, coronography.*

Language: *English*

Citation: Dalerov, A. D. (2022). Direct stenting of the anterior descending coronary artery (description of a clinical case). *ISJ Theoretical & Applied Science, 02 (106),* 280-287.

Soi: http://s-o-i.org/1.1/TAS-02-106-34 ***Doi***: crossref https://dx.doi.org/10.15863/TAS.2022.02.106.34

Scopus ASCC: *2700.*

Introduction

Ischemic heart disease is myocardial damage caused by impaired blood flow through the coronary arteries. The defeat of the coronary arteries is organic (irreversible) and functional (transient). The main cause of organic damage to the coronary arteries is stenosing atherosclerosis [1]. Factors of functional damage to the coronary arteries - spasm, transient platelet aggregation and intravascular thrombosis. The concept of "IHD" includes acute transient and chronic pathological conditions.

The annual mortality of patients with stable angina is almost 2%, and non-fatal MI occurs in 2-3% of patients annually. Patients with an established diagnosis of stable angina pectoris die from coronary artery disease 2 times more often than those without this disease. Men with angina, on average, live 8 years less than those who do not have this disease [3].

Stable coronary heart disease is characterized by episodes of a reversible discrepancy between myocardial oxygen demand and its delivery, most often through an atherosclerotically affected coronary bed. The clinical manifestation of such symptoms of ischemia/hypoxia is usually transient chest discomfort, which is induced by physical or psycho-emotional stress and is reproducible, but can also occur spontaneously. Stable angina is considered if its symptoms have been unchanged for at least 2 months. Stable angina also includes a stable condition following acute coronary syndrome (ACS), often

asymptomatic [1]. As well as a prolonged state of atherosclerotic vascular damage before the onset of symptoms.

During the questioning, depending on the physical activity tolerated, 4 functional classes of angina pectoris are distinguished (according to the classification of the Canadian Society of Cardiology):

-FC I- "Latent" angina pectoris. Seizures occur only under extreme stress

-FC II- Angina attacks occur during normal exercise: fast walking, climbing uphill, stairs (more than 1-2 flights), after a heavy meal, severe stress

-FC III- Attacks of angina sharply limit physical activity - they occur with a slight load: walking at an average pace of <500 m, when climbing stairs for 1-2 flights. Rarely, seizures occur at rest.

-FC IV- Inability to perform any, even minimal load due to the occurrence of angina pectoris. Seizures occur at rest. A history of often MI, heart failure.

Coronary angioplasty and stenting are generally accepted methods of treating patients with coronary heart disease. The development of new types of X-ray surgical instruments, stents, angiographic equipment, and the improvement of surgical techniques have led to the fact that coronary stenting has become a safe and effective method of myocardial revascularization, performed daily in ordinary medical institutions [2, 3]. Coronary angioplasty is most effective in isolated one- and two-vessel lesions of the coronary bed, however, there are types of coronary artery (CA) lesions in which coronary stenting is associated with a number of problems. For example, in case of an ostial lesion of the right coronary artery (RCA), the surgeon has to face certain difficulties. First of all, this is due to the structural features of the RCA orifice, the wall of which, in fact, is represented by the wall of the aorta. A special redistribution of connective tissue elements in this place gives the RCA orifice lesions special properties, such as rigidity during balloon dilatation and a high percentage of artery “regression” [6, 7]. In addition, this type of lesion creates problems for catheterization with a "guiding" catheter. Coronary angioplasty and stenting are generally accepted methods of treating patients with coronary heart disease. The development of new types of X-ray surgical instruments, stents, angiographic equipment, and the improvement of surgical techniques have led to the fact that coronary stenting has become a safe and effective method of myocardial revascularization, performed daily in ordinary medical institutions [2, 3].

Coronary angioplasty is most effective in isolated one- and two-vessel lesions of the coronary bed, however, there are types of coronary artery (CA) lesions in which coronary stenting is associated with a number of problems. For example, in case of an ostial lesion of the right coronary artery (RCA), the surgeon has to face certain difficulties. First of all, this is due to the structural features of the RCA orifice, the wall of which, in fact, is represented by the wall of the aorta. A special redistribution of connective tissue elements in this place gives the RCA orifice lesions special properties, such as rigidity during balloon dilatation and a high percentage of artery “regression” [6, 7]. In addition, this type of lesion creates problems for catheterization with a "guiding" catheter,

Coronary angiography is the "gold standard" in identifying and assessing the degree of damage to the coronary arteries. Indications for CAG in chronic coronary artery disease:

— Verification of the diagnosis of coronary artery disease in unclear cases;

— Determination of the tactics of myocardial revascularization in case of proven coronary artery disease:

- with the ineffectiveness of medical treatment of coronary artery disease;
- with a high risk of cardiovascular complications according to clinical data and the results of non-invasive studies.

For a justified CAG, it is necessary to take into account the entire range of data obtained during questioning, examination and non-invasive instrumental studies. Carrying out CAG is most justified in patients with an a priori high risk of death and severe cardiovascular complications, since in the course of the study in such patients a decision is usually made on the method of myocardial revascularization in order to reduce this risk [2]. With a low risk of cardiovascular complications, CAG is not advisable, since its results usually do not affect the course of treatment and, accordingly, do not change the prognosis. If necessary, CAG is supplemented with intracoronary ultrasound (IVUS).

In practice, the classification of atherosclerosis of the coronary arteries is used according to the number of affected vessels (single-vessel, two-vessel, three-vessel). It has been proven that the unfavorable prognostic role of stenoses in the proximal sections of the coronary arteries is higher than the role of stenoses in the distal areas [4]. Groups of patients with stenosis of the trunk of the left coronary artery and the proximal part of the anterior descending artery are distinguished separately. The proposed predictive index of coronary artery disease is based on the prevalence of atherosclerosis of the coronary arteries. The prognostic weight of signs of the severity of the lesion varies from 0 (intact CA) to 100 (stenosis of the LCA trunk)

The basis for the treatment of chronic coronary artery disease is the modification of avoidable risk factors and complex drug therapy. As a rule, they are carried out indefinitely. Non-drug methods of treatment include surgical revascularization of the myocardium: coronary bypass grafting and balloon angioplasty with stenting of the coronary arteries [5,6]. The decision on the choice of surgical treatment is made by the attending physician, endovascular

surgeon and cardiovascular surgeon, taking into account the total risk of complications, the state of the myocardium and coronary arteries, the patient's desire and the capabilities of the medical institution.

Revascularization

The goal of revascularization in stable angina is to increase survival and reduce symptoms of ischemia. Revascularization should be considered in patients at high risk of mortality; at low risk, it does not improve prognosis or increase life expectancy. Percutaneous coronary intervention (PCI). Advances in technology, equipment, stents, and adjuvant therapy make PCI a routine and safe procedure in patients with stable CAD and appropriate coronary anatomy.

The risk of death associated with the procedure in stable CAD is <0.5% [3,7].

General approaches for revascularization. The decision to perform revascularization in a patient should be made depending on the severity of coronary artery stenosis, the degree of ischemia, and the expected positive effect on prognosis and symptoms. It is difficult to give absolute recommendations for all situations due to the vast number of possible combinations. In this regard, in a particular clinic for a particular patient, decision-making, as a result of discussion, by consensus of opinions (Team), and not by one opinion, should prevail, in addition, an individual approach for each patient is preferable. Revascularization is indicated for chronic angina refractory to optimal medical therapy, when technically feasible, with an acceptable level of risk and a good life expectancy [8]. It may also be considered as first-line therapy in situations:

• after myocardial infarction;

• dysfunction of the left ventricle;

• multivessel lesion and/or large area of ischemia;

• lesion of the trunk of the left coronary artery (stenosis over 50%).

. Treatment effectiveness indicators.

• elimination of angina attacks completely or transfer of the patient from a higher FC to a lower FC while maintaining a good quality of life;

• reduction of risks of undesirable events.

The purpose of this study was to evaluate the efficacy and safety of stenting in patients with ostial stenosis of anterior descending coronary artery (ADC).

Clinical case:

Patient A. Age: born in 1965

Post date: 01/11/2022

Date of operation: 01/11/2022

Diagnosis before surgery:

Main: Ischemic heart disease. Angina pectoris FC III. (PICS 2019). SP Coronarography dated 04.01.2022

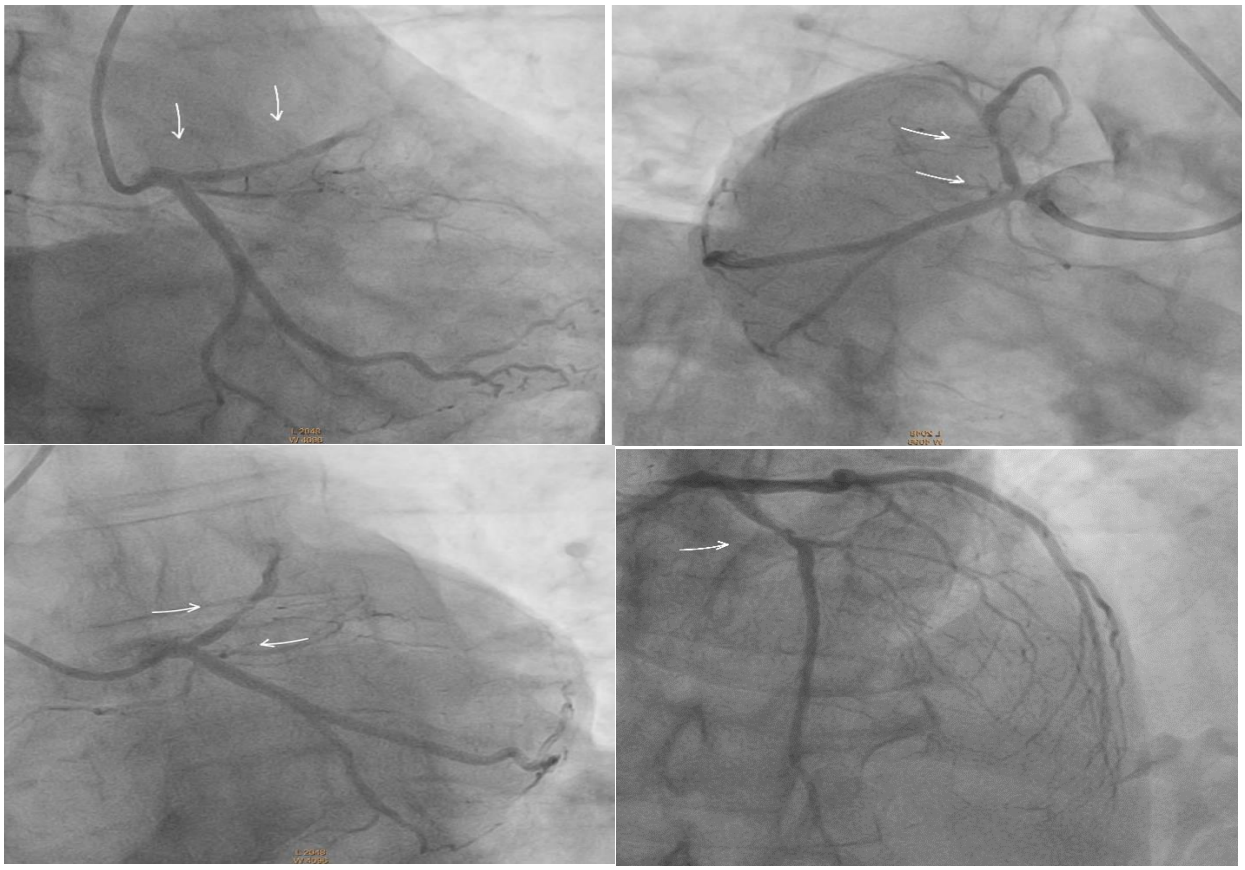

Figure 1. Coronary angiography: LCA-left coronary artery trunk is short, without stenoses.

Concomitant: Hypertension II Art. Degree of AH I. Risk IV. Diabetes mellitus type 2. stage of subcondensation.

Operation name: Direct stenting of the ADC.

Access: right radial artery (sheath 6F).

Coronary angiography dated 01/04/2022: RCA (right coronary artery) - without hemodynamically significant stenoses. PLB (posterolateral branch) - without hemodynamically significant stenoses. PIB (posterior interventricular branch) (RCA-right coronary artery) - without hemodynamically significant stenoses.

Anterior descending coronary artery (ADC) - ostial stenosis 80%, then stenosis in proximal/3 up to 95%, distal channel without hemodynamically significant stenosis. EB (envelope branch) - well developed.

LCA trunk is short, without stenoses. Anterior descending coronary artery ADC - ostial stenosis 80%, then stenosis in proximal/3 up to 95%, distal channel without hemodynamically significant stenosis. EB is well developed, without hemodynamically significant stenoses. OB (obtuse branch) - without hemodynamically significant stenoses.

Guide catheter JL 3.5-6F.

The coronary conductor “Whisper MS” 0.014”-180 cm was placed in distal/3 obtuse branch of EB. The second coronary conductor "Whisper MS" 0.014"-180 cm was placed in distal/3 ADC. Cylinder "Maverick Monorail" 2.5x15 was held in proximal/3 EB. Then the coronary stent "Ultimaster" 2.75x33 mm in size was placed in proximal/3 ADC. Simultaneous direct stenting of proximal/3 ADC with coronary stent "Ultimaster" 2.75x33 mm in size - 6 atm was performed. 2.61 mm. with dilatation proximal / 3 EB (envelope branch) coronary balloon "Maverick Monorail" 2.5x15 - 10 atm. 2.67 mm. Postdilatation of proximal/3 ADC as performed with a coronary balloon from a stent 2.75x33mm12 atm. - 2.84 mm.

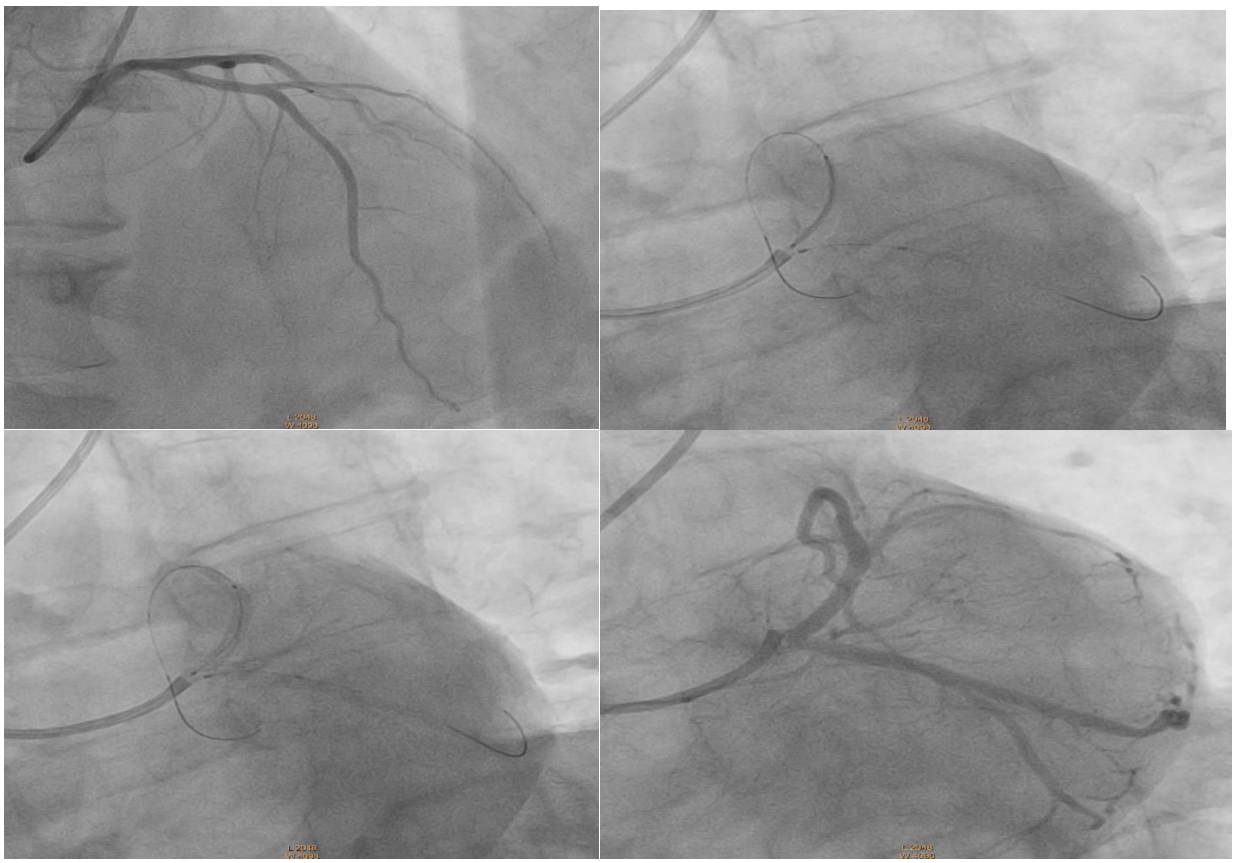

Figure 2. Simultaneously performed direct stenting proximal/3 Anterior descending coronary artery (ADC) with a coronary stent.

Control angiography showed a good TIMI III angiographic result.

The operation was completed without complications, a pressure bandage was placed at the puncture site, after which the patient was transferred to the ward in a stable condition.

Diagnosis after surgery:

Main: Ischemic heart disease. Angina pectoris FC II. (PICS 2019). SP Coronarography dated 04.01.2022

Concomitant: Hypertension II Art. Degree of AH I. Risk IV. Diabetes mellitus type 2. stage of subcondensation.

Results

Our data demonstrate the best results when performing direct stenting in patients with angina pectoris FC III. It has been previously proven that direct stenting in patients with stable coronary heart disease reduces the incidence of distal embolism with atherosclerotic plaque components (AP) [9]. When measuring the index of microcirculatory resistance after direct stenting, the probability of developing microvascular dysfunction decreased [10]. It is fair to assume that the described changes are also characteristic of patients with acute coronary syndrome, in whom, along with ASP components, a large amount of thrombotic masses is an additional substrate for embolism of the distal coronary bed. A number of studies have also shown that the achievement of the final TIMI-3 blood flow was more often observed in patients after direct stenting [5, 11]. A large meta-analysis of about 9,000 patients found that direct stenting was associated with better clinical outcomes and a higher angiographic success rate for PCI, and this is confirmed by our data [6]. Additionally, in a meta-analysis by C. Li et al. it was noted that direct stenting is associated with a decrease in mortality over 1 year of follow-up and a decrease in the incidence of the no-reflow phenomenon [7]. Despite a sufficient number of publications demonstrating the advantages of direct stenting, there are some controversies on this issue. First of all, this is due to the fact that the benefit of direct stenting was demonstrated only in 9 non-randomized analyses, however, data from 4 randomized trials did not show the benefit of this approach [6]. In particular, post-dilation of implanted stents was often performed in a number of studies, which can worsen the prognosis, more than 80% of patients had an initial blood flow of TIMI-3, when analyzing the results of interventions, patients with a final blood flow of TIMI-2 and TIMI-3 were evaluated together [12–14]. However, the main problem of all the conducted studies was the inaccurate calculation of the required number of observations and, as a result, the insufficient number of patients included in each group. Thus, in almost all studies, a decrease in mortality was noted with direct stenting, but this difference was statistically insignificant. All this dictates the need for a large randomized and well-designed study to determine the benefits of direct stenting. It should be noted that direct stenting cannot be performed in all patients with STEMI. It is not recommended to perform direct stenting in severe calcification, the presence of large lateral branches in bifurcation lesions, aorto-ostial lesions, and severe vessel tortuosity [4]. However, in more than 70% of cases, after passing a coronary conductor through the zone of thrombotic occlusion of the coronary artery, the TIMI-1–3 blood flow is determined [15].

Coronary artery lesions in the group of patients with stenosis of the LCA orifice compared with lesions of the middle segment of the LCA were characterized by more pronounced rigidity and necessitated more aggressive post-dilation. In a number of studies, in 3 (7.1%) patients in the group of stenting of the LCA ostial lesion, the degree of residual stenosis was more than 10%, which was associated with incomplete deployment of stents [14]. Thus, angiographic success was achieved in 56 (100%) patients in the RCA middle segment stenting group and in 39 (92.9%; p=0.15) in the RCA orifice stenting group.

In 100% of patients, a decrease in the functional class of angina pectoris and elimination of ischemia were noted. In no case did not require emergency additional interventions. However, due to the incomplete achievement of angiographic success in the RCA orifice stenting group, direct clinical success was also achieved in only 92.9% of cases [17]. When comparing the results after 1 year, 100% survival was observed in both groups. At the same time, in group 1, 2 (3.6%) patients had angina recurrence, while in group 2, angina recurrence was detected in 1 (2.6%) patient (p = 0.82). However, this did not require repeated myocardial revascularizations in either group. After 3 years in the 1st group, the survival rate was 98.2%, while in the 2nd group it remained at the level of 100% (p=0.57). Angina recurrence in group 1 occurred in 3 (5.6%) patients, in group 2 angina recurrence also occurred in 3 (7.1%) patients (p=0.52). At the same time, repeated myocardial revascularization required 1 (1.8%) patient in the 1st group, as well as 3 (7.1%) patients in the 2nd group (p=0.48) [11,13,14].

A clinically important outcome for the analysis of the quality of life of elderly and senile patients was the transition of angina to a lower functional class (IV to III, IV to II, III to II) [8]. Thus, the patients were analyzed according to the principle of the “yes-no” effect. As a result, we obtained results indicating the absolute benefit of myocardial revascularization for this outcome. The effectiveness of myocardial revascularization was also evaluated from the position of influence on some additional clinical and instrumental indicators. There were no significant differences in such indicators as blood pressure, heart rate, total cholesterol. After myocardial revascularization, one can note a significant increase in TF values — by 94% (p<0.01), PFI time — by 59.2% (p<0.01) and DP — by 44.9% (p<0.01), which is an indicator of the increase in the coronary reserve of the heart adequately to the level of physical activity.

Discussion

In the last decade, the possibilities of endovascular surgery have improved significantly in terms of device technology, procedural techniques,

and pharmacological support. In particular, the widespread use of drug-eluting stents is a fundamental component of all these advances.

The introduction of drug-eluting stents into clinical practice significantly reduced restenosis rates and, as a result, the frequency of repeated revascularizations, but was associated with an increased risk of late stent thrombosis [8, 9]. Among all predictors of stent thrombosis, early discontinuation of DAAT is the most important factor. Although the absolute incidence of stent thrombosis is quite low, in most cases stent thrombosis leads to acute myocardial infarction and is accompanied by high mortality [10-12]. Since endothelialization of drug-eluting stent strata takes a rather long period and is the main pathological determinant of stent thrombosis compared to bare-metal stents [13–15], long-term DAPT is recommended by most consensus documents [16, 17]. However, long-term DAAT is associated with a dose-dependent balance between an increased likelihood of bleeding and a reduced risk of ischemic events [18]. Even after the publication of large clinical trials investigating DAPT after drug-eluting stent implantation, the optimal duration of DAPT remains a matter of debate.

Oral coronary lesions differ from other types of lesions in their high rigidity and high incidence of calcification. A special place is occupied by aortic lesions of the coronary artery, in which the specific structure of the aortic wall causes great resistance during balloon dilatation, leading to more frequent elastic collapse of the artery. In the pre-stent era, the immediate results (angiographic success) of angioplasty were significantly worse than with angioplasty of lesions localized in other segments of the coronary artery.

The main reason for this was the high degree of rigidity of the lesions and the high degree of elastic collapse of the artery, as a result of which a high percentage of residual stenosis remained, coronary artery dissections, acute arterial thrombosis, and myocardial infarction often occurred. In the long-term period, a higher percentage of recurrence of myocardial ischemia was observed, and repeated myocardial revascularization was more often required. Subsequently, as techniques and instruments in interventional cardiology improved, as well as with the introduction of stents (including drug-eluting stents), the number of intraoperative complications decreased, and the percentage of immediate angiographic success increased. Numerous clinical studies have confirmed these positions. However, it remains unclear how the use of modern instrumentation, in particular drug-eluting stents, affects the immediate and long-term results of angioplasty of ostial coronary lesions compared with stenting of lesions in other segments of the coronary artery. When comparing the immediate results in our study, we see that angiographic success is achieved in a smaller number of cases with stenting of ostial lesions. This is primarily due to incomplete deployment of stents due to the rigidity of the lesions. However, there were no statistically significant differences in the results obtained. When studying the direct clinical effect of stenting, in all patients in both groups, a decrease in the functional class of angina was observed in the absence of significant complications.

It should be noted that similar data on the advantage of coronary stenting over basic therapy were also obtained in a number of large studies [9,10]. Thus, in the ACIP study during a two-year follow-up, mortality in groups of patients receiving drug treatment was 6.6%, in the group of patients who underwent myocardial revascularization; this indicator was equal to 1.1% [9]. In the RITA 2 study, the number of deaths and myocardial infarctions in the PCI group during the observation period was 6.3%; in the drug treatment group — 3.3% (p=0.02), and percutaneous interventions also caused a more significant reduction in symptoms in patients with severe angina [10]. On the other hand, according to the TIME study, long-term survival in patients with stable angina pectoris of class II and above (Canadian classification) aged over 75 years was similar in the PCI and medical treatment groups, although in both groups there was a decrease in angina symptoms and improvement in quality of life. life [11]. The COURAGE study, one of the largest studies completed to date, found no significant differences in the incidence of major CV events, with the exception of a lower incidence of angina attacks in the invasive treatment group in the first years of follow-up. However, it should be noted that the COURAGE study did not include patients at high risk. Thus, the possibility of extending the data of the COURAGE study to the general population of patients with chronic CAD seems to be very limited [12].

Conclusion

Direct stenting during percutaneous coronary intervention is an effective and safe method of treating patients with FC III exertional angina and should be used whenever possible.

When analyzing the incidence of cardiovascular mortality and the likelihood of survival during the first year after myocardial revascularization, a 3.3% decrease in the risk of "total mortality" and a 2% decrease in the probability of non-fatal infarction can be noted. Over a period of 12 months, a significant decrease in the frequency of hospitalizations, an improvement in the clinical course of stable angina pectoris, and an increase in the coronary reserve of the heart after revascularization were established in comparison with standard basic therapy.

According to echocardiography, after coronary stenting, there was a significant increase in the left ventricular ejection fraction at the end of the

observation period in patients versus patients who received standard therapy. In our own study, we can say about the insignificant advantage of coronary stenting in the prevention of cardiovascular death and non-fatal heart attack. This problem requires further development in order to develop a clear clinical assessment, and if the benefits of coronary artery stenting outweigh the risks, this method can be recommended to elderly and senile patients with stable exertional angina. The main factors that determine the choice of treatment method, however, should remain the individual cardiovascular risk and severity of CHD symptoms [13,14].

Conflict of interest

The authors state that this work, its theme, subject and content do not affect competing interests

References:

1. Montalescot, G., Sechtem, U., Achenbach, S., et al. (2013). ESC guidelines on the management of stable coronary artery disease: the Task Force on the Management of Stable Coronary Artery Disease of the European Society of Cardiology. *Eur Heart J*, 2013-34, pp.2949–3003.
2. (2012). *Recommendations for the diagnosis and correction of lipid disorders for the prevention and treatment of atherosclerosis of the National Society for Atherosclerosis (NOA)*.
3. (2012). *Recommendations for the diagnosis and management of patients with stable coronary artery disease of the American College of Cardiology (ACC) and the American Heart Association (AHA)*.
4. (2013). *Recommendations for the management of stable coronary heart disease of the European Society of Cardiology*.
5. Rogers, C., Parikh, S., Seifert, P., & Edelman, E.R. (1996). endogenous cell seeding. Remnant endothelium after stenting enhances vascular repair. *Circulation*, 94: 2909–2914.
6. Cuisset, T., Hamilos, M., Melikian, N., et al. (2008). Direct stenting for stable angina pectoris is associated with reduced periprocedural microcirculatory injury compared with stenting after pre-dilation. *J Am Coll Cardiol*, 51:1060–1065.
7. Mockel, M., Vollert, J., Lansky, A.J., et al. (2011). Comparison of direct stenting with conventional stent implantation in acute myocardial infarction. *Am J Cardiol*, 108(12): 1697–1703.
8. Azzalini, L., Millan, X., Ly, H.Q., et al. (2015). Direct stenting versus pre-dilation in ST-elevation myocardial infarction: a systematic review and meta-analysis. *J Intervent Cardiol*, (28): 119–131
9. Loubeyre, C., Morice, M.C., Lefevre, T., et al. (2002). A randomized comparison of direct stenting with conventional stent implantation in selected patients with acute myocardial infarction. *JACC*, 39(1):15–21.
10. Sabatier, R., Hamon, M., Zhao, Q.M., et al. (2002). Could direct stenting reduce no-reflow in acute coronary syndromes? A randomized pilot study. *American heart journal*, 143(6): 1027–1032.
11. Gasior, M., Gierlotka, M., Lekston, A., et al. (2007). Comparison of outcomes of direct stenting versus stenting after balloon predilation in patients with acute myocardial infarction (DIRAMI). *Am J Cardiol*, 100(5):798–805.
12. Valgimigli, M., Campo, G., Malagutti, P., et al. (2011). Persistent coronary no flow after wire insertion is an early and readily available mortality risk factor despite successful mechanical intervention in acute myocardial infarction: A pooled analysis from the STRATEGY (Single High-Dose Bolus Tirofiban and Sirolimus-Eluting Stent Versus Abciximab and Bare-Metal Stent in Acute Myocardial Infarction) and MULTISTRATEGY (Multicenter Evaluation of Single HighDose Bolus Tirofiban Versus Abciximab With Sirolimus-Eluting Stent or Bare-Metal Stent in Acute Myocardial Infarction Study) trials. *JACC Cardiovasc Interv*, 4: 51–62.
13. Levine, G.N., Bates, E.R., Blankenship, J.C., et al. (2015). ACC/AHA/SCAI focused update on primary percutaneous coronary intervention for patients with ST-elevation myocardial infarction: an update of the 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention and the 2013 ACCF/AHA guideline for the management of ST- elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. *J Am Call Cardiol*, 2015.

14. Bulgakova, E.S., Tvorogova, T.V., Rudenko, B.A., & Drapkina, O.M. (2018). Carotid artery stenting in a patient with initial sinus bradycardia: a case report. *Rational Pharmacotherapy in Cardiology*, 14(3): 356-360. DOI: 10.20996/1819-6446-2018-14-3-356-360.
15. Rissanen, V. (1975). Occurrence of coronary ostial stenosis in a necropsy series of myocardial infarction, sudden death, and violent death. *Br Heart J*, 37: 182-191.
16. Stewart, J.T., Ward, D.E., Davies, M.J., & Pepper, J.R. (1987). Isolated coronary ostial stenosis: observations on the pathology. *Eur Heart J*, 8:917-920.
17. Vaquerizo, B., Serra, A., Ormiston, J., et al. (2012). Bench top evaluation and clinical experience with the szabo technique: New Questions for a Complex Lesion. *Catheter Cardiovasc Int*, 79:378-389.
18. Wong, P. (2008). Two years experience of a simple technique of precise ostial coronary stenting. *Catheter Cardiovasc Int*, 72:331-334.