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ANGIOPLASTY OF CHRONIC OCCLUSION, BENEFITS AND CHALLENGE IN THE INTERVENTIONAL CARDIOLOGY

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ABCTRACT

Chronic occlusion is complete interruption of coronary blood flow, due to atherosclerotic plaque, involving more than 99% of the lumen of the vessel, lasting more than 3 months. Patients with chronic occlusion are presented with changing class angina. Pumping function of the heart can be normal, and segmental disorders in kinetics due to hibernating myocardium. We present a clinical case of 74 year old man, with typical chest pain during exercise, preserved pumping function of the left venricle and preserved segmental kinetics at rest. Coronary angiography was performed- chronic occlusion of the LAD was found, which was treated with PCI and stent implantation, with optimal final angiographic result: a TIMI-3 flow to the periphery of the vessel.

Key words: chronic total occlusion, angioplasty, CABG

Chronic occlusion is complete interruption of coronary blood flow, due to atherosclerotic plaque, involving more than 99% of the lumen of the vessel, lasting more than 3 months. Pathoanatomicaly is presented as rigid plaque with fibrocalcinosis (more than 50% of it is calcium and fibrin) [1].

Patients with chronic occlusion are presented with changing class angina. Well-developed collateral vessel net can provide adequate blood flow at rest and myocardial perfusion even in 90-95% stenosis, but not during increased oxygen requirements. Pumping function of the heart can be normal, and segmental disorders in kinetics due to hibernating myocardium. [2] Treatment options for coronary artery disease are medical therapy angioplasty and cardio-surgical revascularization. The incidence of chronic total occlusion (CTO) in patients with coronary artery disease is 20-40%.

CLINICAL CASE

We report a case of 74 year old man, with risk factors for ischemic heart disease- gender, age, hypertension, family history of heart disease. He was admitted in the clinic with a history of myocardial infarction, treated conservatively 8 years ago, without fibrinolysis. Since last four months with the occurrence of typical chest pain during exercise. Comorbidities: Permanent atrial fibrillation, Hypertension¬ IIIst.

Status: Good general condition. Respiratory system- vesicular breathing without wheezing. Cardio-vascular system- arrhythmia, HR- 60b./min. BP- 140/80 mmHg. Clear heart tones, without murmurs. Limbs- without edema, good pulse of peripheral arteries.

Laboratory results: CK- 74 u/l; CK-MB-11.9 u/l; Troponin- <0.19 ng/ml; Chol-3.59 mmol/l; HDL-1.23 mmol/l; LDL-2.04 mol/l; Trig- 0.70 mmol/l; Hb-117 g/l; Htc-37.8%; Er-4.73; Tr-225;

ECG at admission: atrial fibrillation, indifferent type axis, ST-depression in V5, V6, I, aVL, negative T wave in V5, V6, single ventricular extrasystoles, ventricular rate 60-70 beats/min.

Echocardiography found preserved pumping function, preserved segmental kinetics at rest.

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Dilated left atrium- 50mm. Mitral insufficiency up to I + degree. Aortic regurgitation I + degree, mild aortic stenosis with peak gradient- 27mmHg, mean gradient- 15 mmHg.

We performed veloergometer stress test, suspended after 1 min.17s., at 100W, due to fatigue, reached double product- 25 740. A descending ST-depression-2mm in leads V4-V6, I, II, aVL was registered. Conclusion: reduced functional capacity and limited coronary reserve.

In cardiologic consilium was decided to perform invasive assessment of coronary arteries. Coronary angiography findings: LCA: LM- without stenosis.

LAD- irregularities in the proximal segment, chronic occlusion in the middle segment after D1 **[figure 1]**, retrograde filling of the periphery by hetero-collaterals from the RCA **[figure 2]**. LCx- 50% stenosis in the proximal segment. OM2- occlusion in the ostio-proximal segment. RCA- irregularities, without stenosis. Right dominant type of coronary circulation. Left ventriculography- mild hypokinesia of anterior wall of left ventricle, preserved pump function. Angioplasty of LAD was performed.

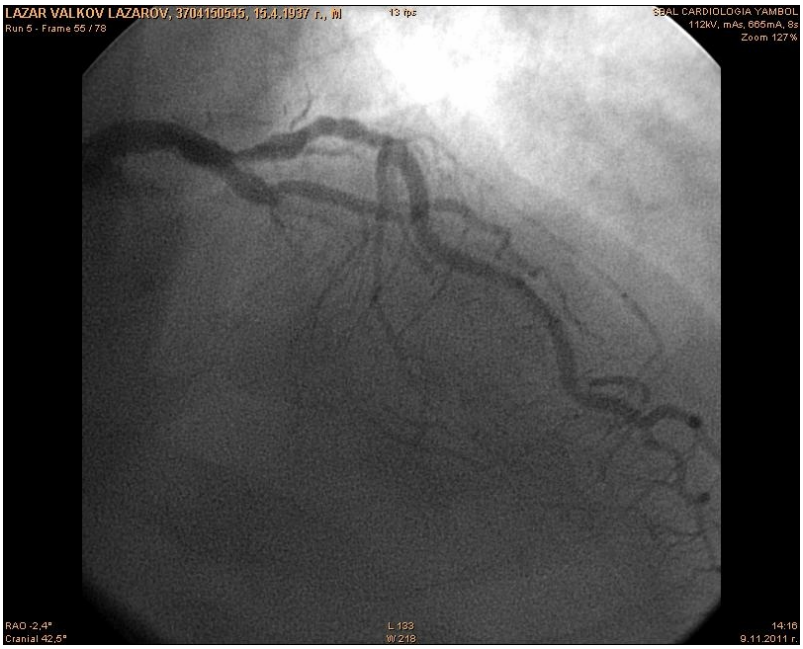
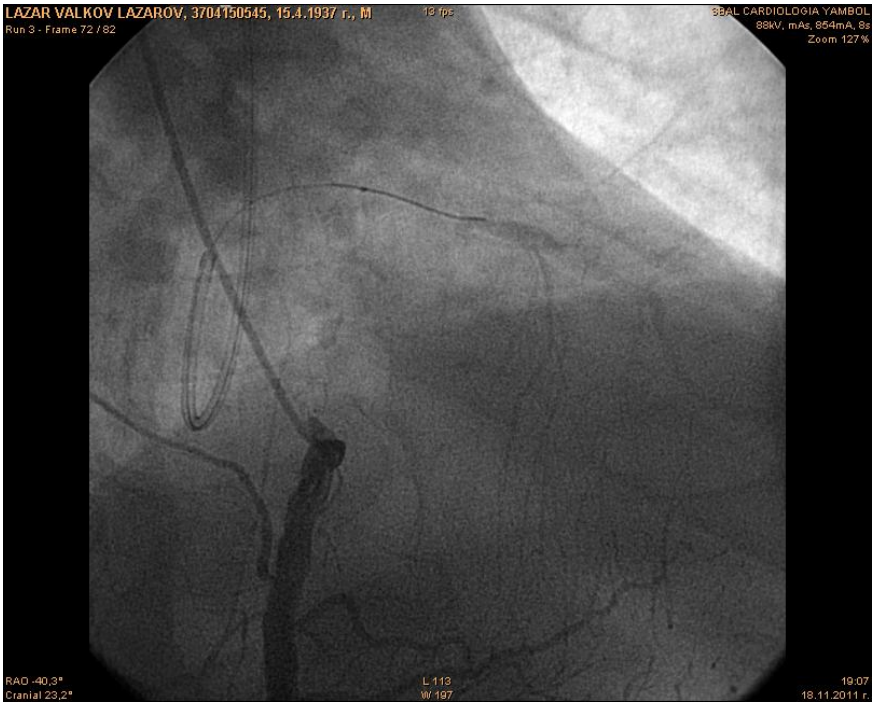


Fig. 1

Fug. 2

Indications for PCI of LAD: 6F arterial introducer in the right femoral artery and 5F arterial introducer in the left femoral artery, with guiding catheter XB LAD 3.5/6F was intubated the ostium of LM, with diagnostic catheter JR 4/5F was intubated the ostium of RCA- for retrograde contrast filling, coronary wire PT2 MS 0014 " with the support of balloon XTRM-summit 1.1/10mm was passed through the occlusion to the periphery of the LAD **[figure 3]**. Predilatation of the occlusion with balloon XTRM-summit 1.1/10mm., inflated from proximal to distal with 18 and 6 atm. Dilatation with balloon Maverick 2.0/12mm., inflated with 16 atm. Second coronary wire Runthrough 0.014 " disposed to the periphery of D1. After that implantation of coronary stent Integrity 3.5/18mm., inflated with balloon to 18atm. Optimal final angiographic result: a TIMI-3 flow to the periphery of the vessel. Residual 50% ostial stenosis of D1 **[figure 4].**



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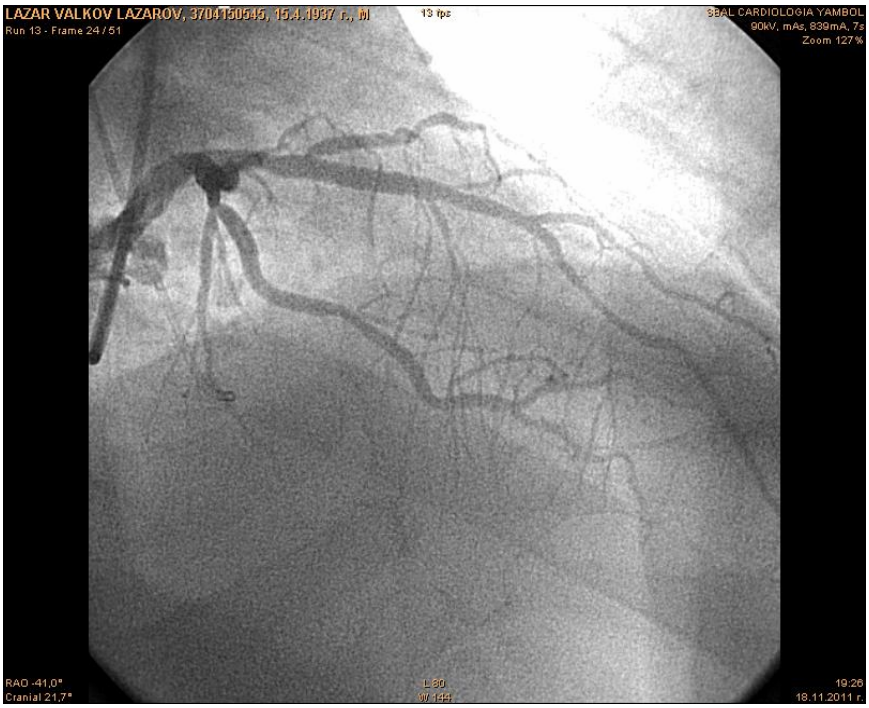

Fug. 2

DISCUSSION

We present a clinical case of 74 year old man, with typical chest pain during exercise, with a history of previous AMI, preserved pumping

function of the left venricle. Coronary angiography was performed- chronic occlusion of the LAD was found, which was treated with PCI and stent implantation, concomitant chronic occlusion of OM2.

The incidence of chronic total occlusion in patients with coronary artery disease is 20-40%, successful revascularization is between 47% -72% and the incidence of major complications is similar to those with PCI of not completely occluded vessels.

Why the chronic occlusions should be treated?

1. Relief of ischemic symptoms.

In three large studies 70% of the patients with successful angioplasty of chronic total occlusion were asymptomatic 1-4 years after the intervention. [2]

2. Improvement of left ventricular function.

Although the few data, the successful angioplasty may be improves myocardial relaxation and regional segmental disorders. There are no reliable evidences of improving the global pump function – the data from the literature is discrepant. [2]

3. Reduction of the predisposition to arrhythmias. [3]

4. Improving tolerance to collateral occlusion. [3]

5. Reducing the need for CABG. In most studies show that successful revascularization of the chronic total occlusion reduces the need for CABG by 50-70%. [3]

6. Improving long-term prognosis.

CONCLUSIONS

The benefit for the patient comes from the improving of the myocardial perfusion and relief of the symptoms of angina, improving the quality of life in long term and reducing the necessity of CABG.

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