

## A case of successful surgical treatment of infected false aneurysms of the coronary artery after previous stenting

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Received 18 September 2017. Revised 13 December 2017. Accepted 15 December 2017.

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This article presents a case of surgical treatment of a false aneurysm and coronary-left atrial fistula developed after balloon angioplasty and stenting of the circumflex artery. The percutaneous coronary intervention has also led to the development of infective endocarditis of the mitral valve. So far, no descriptions of such complications have been met both in domestic and world literature. This unique clinical case could be useful for novice endovascular surgeons, while experienced cardiovascular surgeons might make use of it when choosing the tactics of surgical treatment.

**Keywords:** dissection; coronary artery; false aneurysm

**How to cite:** Skopin I.I., Kakhktsyan P.V., Aleksanyan G.G. A case of successful surgical treatment of infected false aneurysms of the coronary artery after previous stenting. *Patologiya krovoobrashcheniya i kardiokhirurgiya = Circulation Pathology and Cardiac Surgery*. 2017;21(4):87-91. (In Russ.). <http://dx.doi.org/10.21688/1681-3472-2017-4-87-91>

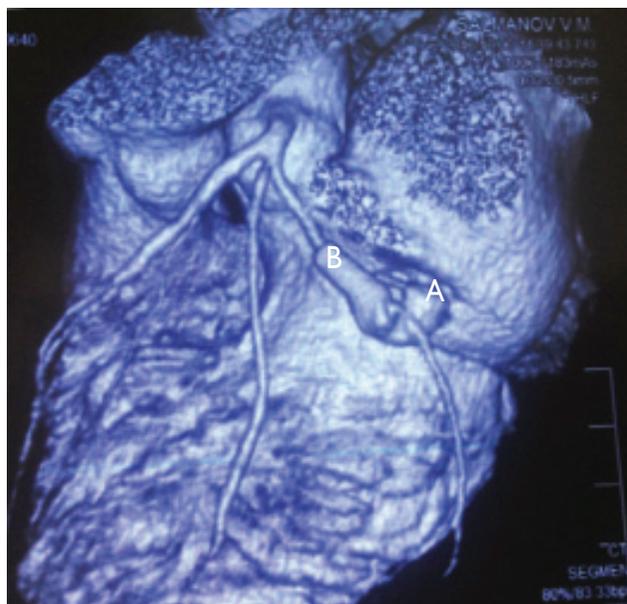
### Introduction

In recent years the number of institutions where coronary heart disease patients are treated by means of roentgen-surgical methods has been rapidly growing. However, the risk of life-threatening complications during percutaneous interventions on the coronary arteries remains high. According to various authors, the morbidity after coronary artery stenting accounts for 1.5–5%, with hospital lethality equaling to 0.5–1.5%. According to A.N. Bakoulev Scientific Center for Cardiovascular Surgery, the morbidity resulting

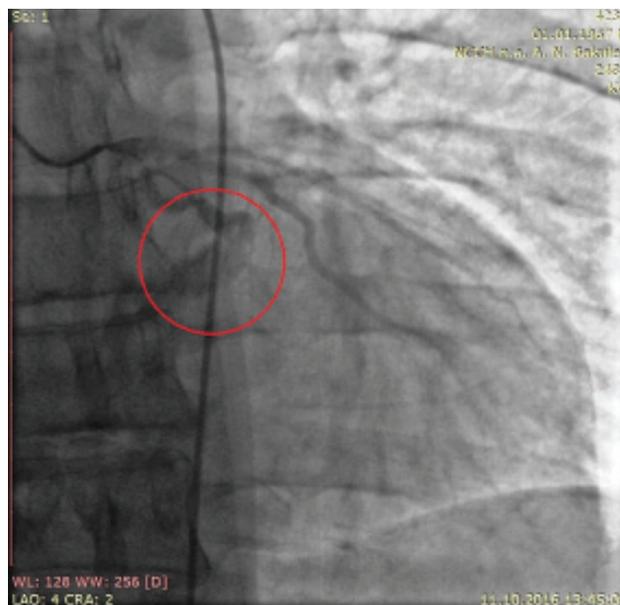
from using roentgen-endovascular technologies for treating coronary heart disease amounts to 4.4%, while the incidence of serious cardiac complications (myocardial infarction, stroke, urgent aortocoronary shunting, death) comes to 1.45% [1, 2].

The most commonly encountered cardiac complications of iatrogenic percutaneous coronary interventions include acute or threatening occlusion, coronary artery perforation, heart tamponade, coronary artery dissection, stent dislocation/migration, no-reflow phenomenon,





**Fig. 1.** Multislice computer tomography: a false aneurism of the circumflex branch (A) distally to the stent (B)



**Fig. 2.** A circumflex branch aneurism ruptured into the left atrium

dissection of Valsalva sinuses [1]. Such complications are associated, on the one hand, by technical errors of an operating surgeon, techniques and systems used in a clinic, while, on the other hand, they can be caused by anatomic features of coronary circulation (expressed calcinosis and tortuosity of coronary arteries, presence of occluding vascular disease).

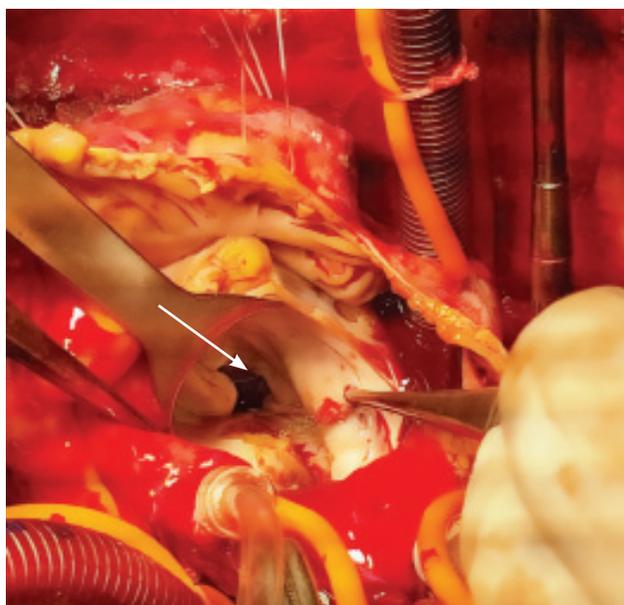
The first case of coronary artery dissection in a 42-year female was described as early as 1931 by H. Pretty [3]. Coronary artery dissection is a rare disease but it is this pathology that dominates in the structure of causes responsible for acute or threatening occlusion of the coronary arteries following percutaneous coronary intervention [1, 4]. According to Western Denmark Heart Registry, this pathology is more frequent in an anterior interventricular branch of the left coronary artery [5].

Another rare iatrogenic complication during roentgen-endovascular interventions is an aneurism of the coronary arteries. The literature shows that this complication occurs in 0.3 to 6.0% patients and more often than not these aneurisms are false ones resulting from previous coronary artery dissection [6–10].

Our article looks at a clinical case of treating a false aneurism of the left circumflex coronary artery distally to the stent with a fistula connected with the left atrial cavity and complicated by infectious endocarditis. The aneurism and subsequent coronary-left atrial fistula developed because of coronary artery dissection during balloon angioplasty.

### Case presentation

Three months before his admission to A.N. Bakoulev Scientific Center for Cardiovascular Surgery, a 49-year patient had undergone



**Fig. 3.** Intraoperative photo

circumflex branch and right coronary artery stenting in July 2016 (outside the Russian Federation). He had been discharged in a satisfactory state, however, some time later he had developed a temperature rising to 39 °C and felt a pressing heart pain.

On admittance, the patient was in a critical condition because of cardiac pathology and an infectious process. *Pseudomonas aeruginosa* was detected in the blood cultures and he was prescribed appropriate antibacterial therapy. Echocardiography showed sinus rhythm with a heart rate of 88 bpm, incomplete right bundle branch block, cicatricial changes along the lower wall and infectious endocarditis of the mitral valve.

Multislice computed tomography detected a false aneurism of the circumflex artery distally the stent, with a fistula connected to the left atrial cavity (Fig. 1).

Coronarography of the middle third of the circumflex branch showed a previously implanted

stent (the stent was distinctly overexpanded) and the aneurism communicating with the left atrial cavity behind it (Fig. 2). The right coronary artery in its proximal third was narrowed down to 40%, in its middle third the previously installed stent (also stretched out) was identified without the signs of restenosis and in the distal third a prolonged narrowing down to 90% was observed.

Based on the unbiased status, laboratory and instrumental methods of examination, a decision was made to perform coronary artery bypass surgery on the obtuse marginal branch and posterior interventricular branch of the right coronary artery, to excise the coronary-left atrial fistula and to do mitral valve plasty.

Surgery was performed under extracorporeal circulation, pharmaco-cold cardioplegia (2000 ml of Custodiol Solution) and systemic hyperthermia down to 28 °C. Intraoperatively, expressed adhesion was observed in the pericardial region, which required relatively long cardiolysis. The mitral valve was approached using a Girodon technique. A 0.5 × 0.5 cm coronary-left-atrial fistula was visualized between the left atrial appendage and the mitral valve fibrous ring. Around the periphery of the fistula there were multiple pink vegetations—visually signs of active infectious endocarditis (Fig. 3).

The vegetations were dissected. The previously implanted stent was visualized, exposed and removed. The circumflex branch inside the fistula was sutured and secured in front of and behind the aneurysmal expansion. Custodiol in a volume of 200 ml was administered into the aortic root, there was no drain in the fistula area. The fistula was treated with two antiseptics and eliminated with two pledgeted mattress sutures. While inspecting the mitral valve, no signs of infectious damage were observed (leaflets unchanged, no vegetations), however, the fibrous ring was moderately expanded. Suture annuloplasty of the valve was done. Coronary artery bypass grafting

was performed on the obtuse marginal branch and posterior interventricular branch of the right coronary artery. The surgery was a success, the extracorporeal circulation time was 230 min and aorta cross clamping ran to 103 min.

No complications were observed in the postoperative period. The patient was transferred to the general bed ward at day 2 and at day 10 he was discharged in a satisfactory state to a medical hospital for antibiotic treatment.

### Discussion

This case demonstrates what serious complications might occur when stenting coronary arteries. Notwithstanding a wide use of roentgen-endovascular interventions and their transfer from the category of super sophisticated operations to routine clinical practice, percutaneous coronary interventions remain challenging procedures requiring highly qualified operating surgeons. Currently, there are no international guidelines for managing such patients and medical centers offer drug, surgical or interventional treatment, while the choice of tactics is determined, first of all, by diagnostic and therapeutic potentials of a given clinic.

Most authors think that the best option for treatment of coronary artery dissection is its stenting. Stent implantation enables surgeons to quickly press the damaged parts of the intima and middle coat, as well as those that prolapse into the artery lumen, thus creating continuous support for the vascular wall and maintaining blood flow in the dissection region [6–10].

### Conclusion

Our case required open surgery because of the presence of active infectious endocarditis and mitral valve insufficiency. The tactic of surgical treatment in such situations could be as follows: the old stent, as a nidus of infection, should be removed, the coronary artery in its location is sutured inside the fistula and secured in front of and behind the aneurysmal

section. To check drainage, a hydraulic test is done, meticulous treatment with antiseptic solutions is performed and coronary artery bypass grafting is carried out.

### Funding

The study did not have sponsorship.

### Conflict of interest

Authors declare no conflict of interest.

### Author contributions

I.I. Skopin, P.V. Kakhktsyan were involved in choosing tactics of the surgical treatment.

I.I. Skopin revised the article.

P.V. Kakhktsyan performed the surgery, searched the literature.

G.G. Aleksanyan is the physician, collected data for the article.

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