

Right coronary artery dissection during intraoperative ostium cannulation. Presentation of successful treatment

Śródoperacyjne rozwarstwienie prawej tętnicy wieńcowej w czasie kaniulacji jej ujścia

Krzysztof W. Michalak¹, Tomasz Moszura¹, Jan Z. Peruga², Jacek J. Moll³

¹Cardiology Department, Polish Mothers' Memorial Hospital, Lodz, Poland

²2nd Cardiology Department, Medical University of Lodz, Lodz, Poland

³Cardiosurgery Department, Polish Mothers' Memorial Hospital, Lodz, Poland

Abstract

Right coronary artery dissection related to medical procedures is a very rare life-threatening complication caused by a combination of vessel occlusion and myocardial ischaemia. This paper presents a case of dissection which occurred during a Ross cardiac surgery procedure. The complication was observed after proximal right coronary constriction on the cannula used to administer cardioplegia. The damaged part of the internal membrane was resected during the operation. We present a five-year follow-up of this patient.

Key words: dissection, right coronary artery, complications, conservative treatment, Ross procedure

Kardiol Pol 2011; 69, 9: 966–968

INTRODUCTION

We present a rare case of right coronary artery (RCA) dissection, which occurred and was diagnosed during a Ross cardiac surgery procedure.

CASE REPORT

A 13 year-old boy was admitted to the Cardiology Department with a suspected heart defect. He was in good condition, with a diastolic murmur near the aortic valve (3/6 on the Levine scale), heart ratio 95/min, and blood pressure 135/45 mm Hg. In echocardiographic (ECHO) examination, severe aortic regurgitation was seen (II/III degree) with inappropriate movement of the aortic cusps and aortic annulus widening. Over the subsequent two-year follow-up, left ventricle (LV) volume overload was observed, with good systolic function and ejection fraction of 66%. Because of worsening haemodyna-

mic tolerance of the defect, after a cardiosurgery consultation, the boy was qualified for a surgical procedure.

Aortic valvuloplasty was performed, but transoesophageal control echocardiography demonstrated aortic insufficiency. A decision to perform the Ross procedure with a pulmonary homograft was made. During routinely re-infused cardioplegia directly to the ostium of the RCA, constriction of the proximal part of the RCA was observed. When the end of the cannula was removed, dissection of the proximal RCA fragment was found, with local damage of intima. The damaged part of the internal membrane was resected during the procedure.

After surgery, periodic arrhythmias with positive reaction to lidocaine, and signs of myocardial ischaemia in the right ventricle (RV) leads of the electrocardiogram occurred, with significant increases of TnT and CK-MB. Control

Address for correspondence:

Krzysztof W. Michalak, MD, Department of Cardiology, Polish Mothers' Memorial Hospital, Research Institute, ul. Rzgowska 281/289, 93–338 Łódź, Poland, tel: +48 42 271 21 84, fax: +48 42 271 14 78, e-mail: krzysiekmichalak@interia.pl

Copyright © Polskie Towarzystwo Kardiologiczne

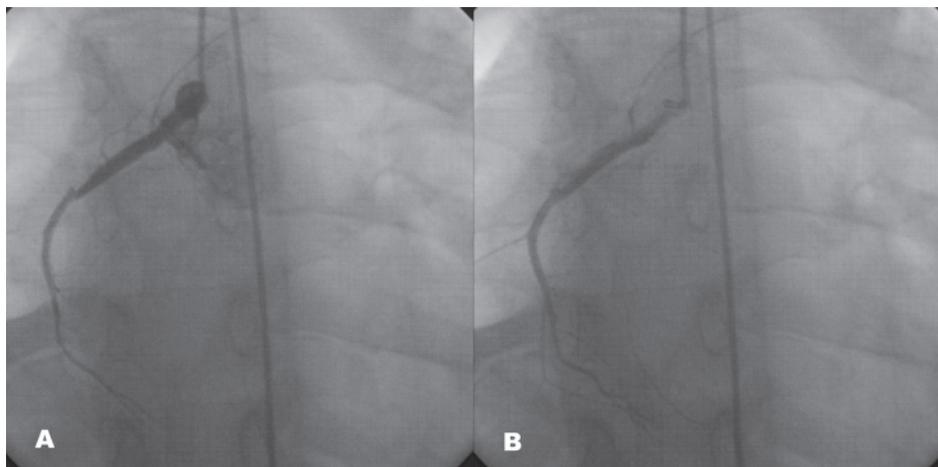


Figure 1A, B. Angiographic view. Right coronary artery proximal dissection with no stenotic changes and good flow through the vessel

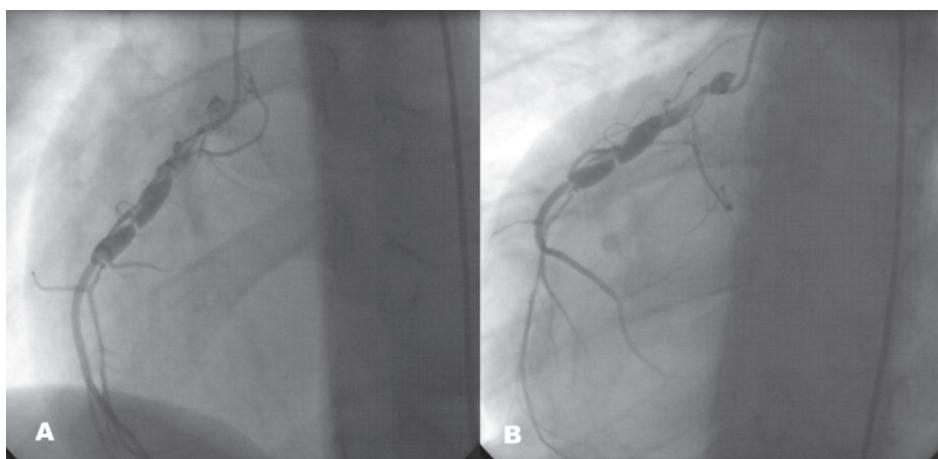


Figure 2A, B. Angiographic view. Right coronary artery proximal dissection with aneurysmatic changes and right ventricle-supplied arteries beginning from spurious lumen. Good blood flow through the vessel — TIMI 3

transthoracic ECHO showed mild aortic regurgitation with a decrease of LV diastolic diameter without myocardial dyskinesia.

In post-operative coronarography, we found a proximal, spiral dissection about 25 mm long, which began in the ostium and ended after the diagonal artery. No systolic disturbances or stenotic changes were found. There was unrestricted blood flow through the RCA (TIMI 3) with good peripheral perfusion (Fig. 1). Because of the angiographic view and the patient's good clinical condition, we decided not to implant a stent into the dissected part of the vessel. After the procedure, the patient received low molecular weight heparin for six days. Then, pharmacological therapy was administered (beta-blocker: propranolol, and anti-platelet: clopidogrel).

Control heart catheterisation was performed after one year. The angiographic view showed about 30 mm long proximal part of RCA with dissection and aneurysmatic changes. Unrestricted blood flow through the vessel (TIMI 3) and complex lesion with significant stenosis in the pro-

ximal and medium parts of the dissection was visible. Some of the RV-supplied vessels began from the spurious lumen of the aneurysm, so stent implantation, which could have helped stabilise the dissected part, could have caused occlusion and RV ischaemia (Fig. 2). The length of the dissection, as well as the significant reduction of coronary artery diameter in the junction between the normal and the dissected part of the vessel, led us to decide against stent implantation. Moreover, the child remained in unremarkable condition and ECHO revealed only discrete systolic disturbances of the RV. After taking all the information into account, we decided to continue pharmacological therapy without interventional procedures.

The next coronarography was delayed because of no changes in the patient's clinical condition or in the echocardiographic image. It was eventually performed two years after the previous one. The majority of the dissection changes had dropped out because of pharmacological treatment (Fig. 3). The proximal part of the RCA was entirely free from dissec-

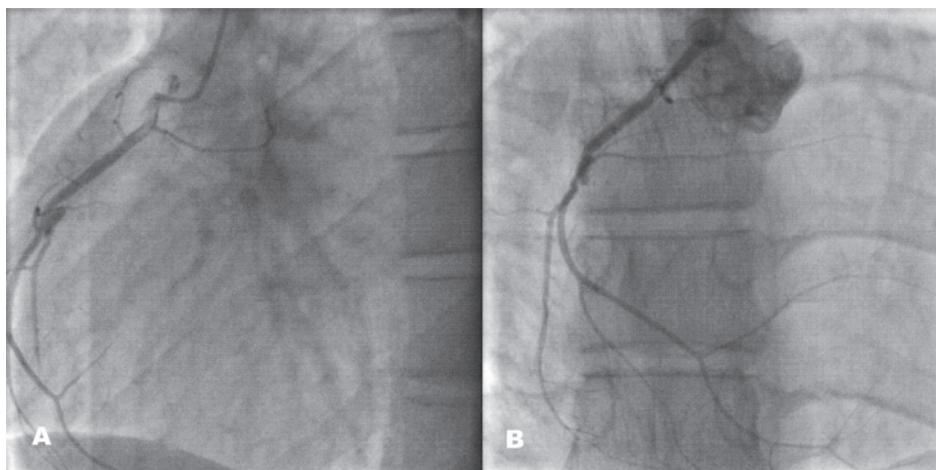


Figure 3A, B. Angiographic view. Right coronary artery — proximal part free from dissection and without aneurysmatic changes. Short residual changes remain in bifurcation of right coronary artery

tion. Short residual changes remained in the bifurcation of the RCA. Some RV-supplied arteries were occluded by a true lumen wall pressed to the wall of the spurious aneurysm.

In control ECHO, remaining mild aortic insufficiency was shown, with systolic disturbances of the right and the intra-ventricle septum. These changes did not impact upon haemodynamic stability.

DISCUSSION

Intra-operative traumatic damage to the coronary artery is a very rare complication that may occur during cannulation of the coronary ostium. Rapid coronary spasm increases the probability of intima damage, which may cause local dissection of the vessel and rapid progression of dissection, with occlusion of the coronary artery.

Irrespective of the initial cause, coronary artery dissection is potentially dangerous. It entails a detailed diagnosis, and in any suspected case, immediate control catheterisation. A decision as to appropriate treatment cannot be made until after a coronarography [1–3].

In cases of local changes localised in one vessel and in its wide fragment, the procedure of choice is angioplasty with stent implantation into the dissected part of the coronary artery [4–7]. In cases of multi-vessel changes when dissection is diffused in the distal parts of the coronary artery, open surgery (coronary artery banding graft) is preferred [4, 8, 9].

Much debate has been associated with coronary dissection without vessel and true lumen occlusion, with acceptable peripheral perfusion and satisfactory patient conditions. The procedure of choice for such a patient appears to be conventional treatment: beta-blockers to reduce shear forces and an anti-platelet to reduce thrombosis [10].

As described in the case report, the initial coronarography did not reveal the significant restriction of RCA flow (Fig. 1). Taking into consideration that the damaged part of the RCA intima was cut down during surgery, there was a chance of spontaneous regression. We also took the patient's age and

his good clinical condition into account. Of course we cannot exclude that stent implantation at that time would have prevented the progression of dissected vessel part and aneurysmatic changes (Fig. 2).

Some parts of the RV vessels were closed spontaneously during dissection regression, which was shown in the third coronarography (Fig. 3). In the authors' opinion, such a slow and spontaneous occlusion gave time for the creation of collateral vessels, which prevented RV ischaemia.

Conflict of interest: none declared

References

1. Sohrabi B, Kazemi B, Aslanabadi N. Percutaneous treatment of catheter-induced dissection of the right coronary artery and adjacent aortic wall. *J Invasive Cardiol*, 2007; 19: 199–202.
2. Bulum J, Strozzi M, Smalcelj A. Spontaneous and catheter-induced secondary coronary artery dissection: a single-centre experience. *Acta Cardiol*, 2008; 63: 203–206.
3. Hobelmann A, Pham JC, Hsu EB. Case of the month: right coronary artery dissection following sports-related blunt trauma. *Emerg Med J*, 2006; 23: 580–581.
4. Unal M, Korkut AK, Kosem M, Ertunc V, Ozcan M, Caglar N. Surgical management of spontaneous coronary artery dissection. *Tex Heart Inst J*, 2008; 35: 402–405.
5. Bryniarski L, Dragan J, Dudek D. Dissection of the right coronary ostium and sinus of Valsalva during right coronary artery angioplasty. *J Invasive Cardiol*, 2008; 20: E277–E280.
6. Maeder M, Ammann P, Angehrn W, Rickli H. Idiopathic spontaneous coronary artery dissection: incidence, diagnosis and treatment. *Int J Cardiol*, 2005; 101: 363–369.
7. Vale PR, Baron DW. Coronary artery stenting for spontaneous coronary artery dissection: a case report and review of the literature. *Cathet Cardiovasc Diagn*, 1998; 45: 280–286.
8. Shirakawa Y, Matsumiya G, Ohtake S, Sawa Y, Kagisaki K, Matsuda H. Emergency operation for spontaneous coronary artery dissection in a young female. *Asian Cardiovasc Thorac Ann*, 2002; 10: 58–60.
9. Lemke P, Schwab M, Urbanyi B, Hellberg K. Spontaneous dissection of the coronary arteries: a rare cardiologic diagnosis. *Herz*, 1999; 24: 398–402.
10. Choi JW, Davidson CJ. Spontaneous multivessel coronary artery dissection in a long-distance runner successfully treated with oral antiplatelet therapy. *J Invasive Cardiol*, 2002; 14: 675–678.