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Case Report

Subtotal occlusion of the right coronary artery by Cardioband and its successful intervention via retrograde approach. Interventional flashlight

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ABSTRACT

In recent years, transcatheter approaches have changed the therapy of valvular regurgitation. One of these new techniques is the Cardioband® tricuspid valve reconstruction system (Edwards Lifesciences Corp., Irvine, CA, USA), which allows an adjustment of the ring size but may cause a temporary deformation or even occlusion of the right coronary artery (RCA) due to its close proximity. We report on a patient with symptomatic and subtotal occlusion of the RCA after Cardioband implantation. The distortion was so sharp-cornered that antegrade recanalizations failed. Finally, the subtotal occlusion was re-opened via retrograde approach and this stent remained open in long-term follow-up. We think this complication should be known and considered when using the Cardioband system.

Learning objective: Transcatheter reconstruction of the tricuspid valve by Cardioband® can lead to subtotal occlusion of the right coronary artery, which is difficult to re-canalize.

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Introduction

In recent years, transcatheter approaches have changed the therapy of valvular regurgitation. One of these new techniques is the Cardioband (TM) tricuspid valve reconstruction system (Edwards Lifesciences Corp., Irvine, CA, USA) which allows an adjustment of the ring size but may cause an at least temporary deformation of the right coronary artery (RCA) due to its close proximity. This deformation has been reported as always reversibly [1] and no severe coronary obstruction has been published up to now. Here, we report on a symptomatic and subtotal occlusion of the RCA after Cardioband implantation.

Case report

Our patient is a 74-year-old man with advanced atherosclerosis that manifested for the first time with a cerebral insult and occlusion of the left medial cerebral artery in 2015. Two years later, stenoses of the left anterior descending, first diagonal, and right coronary artery and an occlusion of the right popliteal artery were each treated by stent implantation. The subsequent developing ischemic cardiomyopathy with

a left ventricular ejection fraction of 35 % led to implantation of an implantable cardioverter / defibrillator and transcatheter mitral valve reconstruction by Cardioband in 2018. Until 2020, a severe tricuspid regurgitation (TR) had developed and due to the reduced ejection fraction and the previous interventions the heart team decided against valve replacement and in favor of another transcatheter repair with the Cardioband system. As the previous procedures, this intervention was performed at a university hospital and the TR was successfully reduced from degree 4 to 1. After discharge, the patient complained of typical angina pectoris at lowest exercise level. A belated coronary angiography showed a subtotal occlusion of the distal RCA due to a very sharp distortion caused by the Cardioband (Fig. 1a). The mandatory coronary angiography before the heart team decision had excluded a stenosis in the RCA, which made it unlikely that a plaque shift aggravated the distortion. The patient consulted our tertiary hospital for its expertise in chronic total occlusions. Our first antegrade approach failed because the sharp angle of the stenotic segment prevented pushing of every wire, even with microcatheter support. The figures presented here show our second retrograde attempt 4 weeks later. The left anterior descending artery stent that covered the septal branch was re-dilated, the septal collateral passed by combined Sion (TM) wire and Caravel (TM) microcatheter (both Asahi Intecc Co., Seto, Japan), and slipped through the hairpin bend up to the RCA ostium. The wire tip was captured from the antegrade approach and externalized (Fig. 1b), followed

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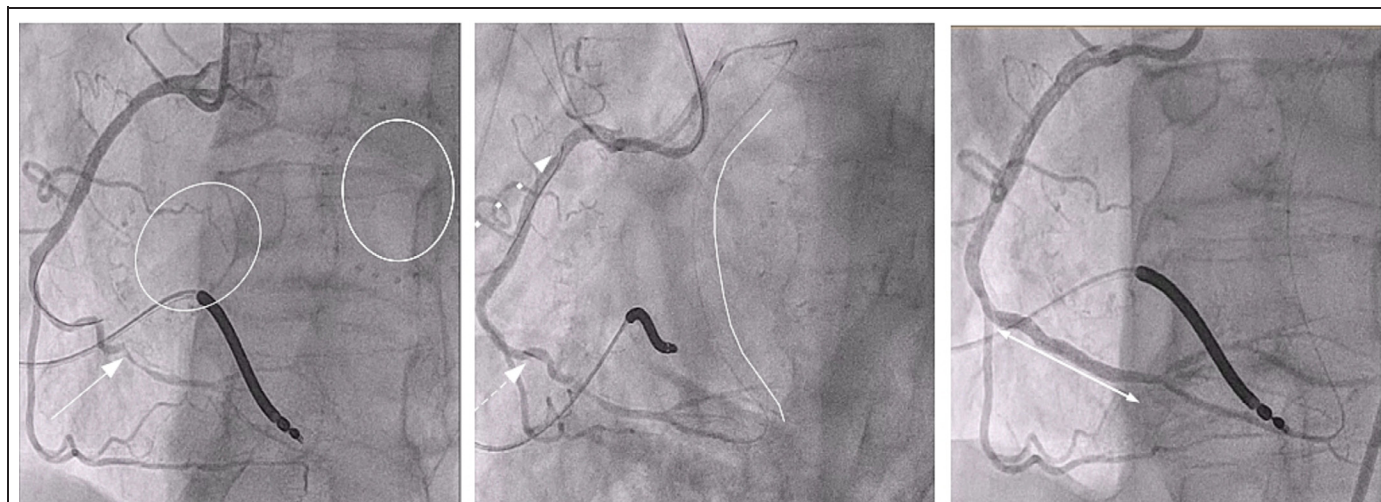


Fig. 1. Percutaneous revascularization of a chronic subtotal occlusion caused by Cardioband twisting the right coronary artery. (a) Initial situation. Ellipses: Cardiobands in tricuspid and mitral ring position. Arrow: subtotal occlusion. (b) Retrograde approach. Line: septal collateral. Dashed arrow: microcatheter tip. Dotted arrow: retrograde wire tip. (c) Final angiogram. Double arrow: Stent.

by dilation of the stenosis and implantation of a 3.0 mm drug-eluting stent (Fig. 1c). The patient was discharged the next day and remained free of angina pectoris over one year.

This complication of transcatheter TR repair has not been reported yet. A transient RCA deformation was seen in 14 of 52 patients [1], but all of them receded. A case report of an extravascular hematoma compressing the ramus posterolateralis dexter [2] illustrated the dangerous proximity of anchors and coronary artery. The first US Study over 30 days [3] reported only bleeding complications and the TriRepair study [4] described two stenoses in 61 patients, one of them requiring subsequent intervention. We think that an accompanying coronary angiography with finally retracted guidewire in the RCA could discriminate stenoses and distortions. However, “a word of caution” has been published concerning possible complications of the Cardioband as treatment for mitral regurgitation [5], and we think this warning should be extended to include tricuspid valve regurgitation.

Ethics approval and consent to participate

The article was published with written consent of the patient.

Consent for publication

The patient gave his written informed consent for the publication of this case report including the coronary angiogram.

Availability of data and materials

Angiography is available online.

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CRediT authorship contribution statement

DH and IA wrote the manuscript. DH, IA, SB, SZ, and JH assessed the patient. All authors read and approved the manuscript.

Declaration of competing interest

The authors have no conflict of interests to declare.

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