Detection of abnormal circumflex artery from the right coronary sinus in a patient scheduled for root aneurysm repair

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INTRODUCTION

Around 5% of patients undergoing coronary angiography are diagnosed with a variant of aberrant coronary arteries. Malignant variants of this anomaly have been shown to result in 19% of sudden cardiac deaths in young athletes [1]. It is speculated that aberrant coronaries taking an anomalous course between the great arteries are squeezed between the pulmonary artery and the aorta during exercise or development of pulmonary hypertension. The most common anomaly diagnosed in adults is the ectopic right coronary artery from the left coronary sinus. A comparable anomaly with the circumflex artery from the right coronary sinus is among the most common variations and usually does not result in a dangerous entrapment of the coronary artery. However, during surgical interventions, these anomalous coronaries can result in significant complications. Especially, aortic valve opera-

Figure 1: During coronary angiogram, a small-sized right coronary artery with normal origin and left anterior descending artery with an isolated origin in the left coronary sinus were visualized, while the perfusion of the lateral wall was missing. An ectopic ostium was searched for. The large image presents the contrast agent injection in the ectopic circumflex coronary artery with its origin in the right coronary sinus. One can imagine the dorsal run across the aortic annulus before entering the normal artery's course.
sions and valve-sparing aortic root remodelling or replacement procedures can be complicated by obstructions of the ectopic coronary ostium or the proximal course near the annulus [2]. We report such a case in order to discuss the therapeutic options if root aneurysm repair is required in a patient with an aberrant coronary artery.

CASE DESCRIPTION

A 45-year old male patient suffered from progressive dyspnoea resulting from aortic valve insufficiency. Owing to an aortic root aneurysm of 5.6 cm, he was scheduled for elective root repair. The patient had a tricuspid aortic valve with thin and non-calciﬁed cusps. Echocardiography revealed severe central aortic regurgitation due to a cusp coaptation defect secondary to aortic root aneurysm. In the preoperative coronary angiography, it was hardly possible to visualize the large circumﬂex artery arising from the right coronary sinus. The right coronary artery was very small. No signs of coronary artery disease were found (Fig. 1). Coronary computed tomography conﬁrmed a circumﬂex artery with a separate ectopic ostium in the right coronary sinus (Fig. 2). The circumﬂex artery originated from the right coronary sinus in close proximity to the commissure between the non- and the right coronary sinus. The dorsal run around the annulus between the aortic root and the left atrial roof led the artery to the oblique sinus where the normal contribution to the perfusion of the lateral and inferior wall was maintained. The initial plan for classical valve-sparing root repair was questioned because of the need of extensive skeletonization of the aortic root with possible harm to the artery. Also, prosthetic valve and root replacement (Bentall procedure) with reimplantation of all three ostia is a possibly dangerous procedure in the setting of a coronary artery crossing the dorsal aspect of the annulus with probable distortion of the artery during suture and prosthesis placement.

Conflict of interest: none declared.

REFERENCES


Treatment solution by Siepe et al.

Treatment of choice for the detection of abnormal circumﬂex artery from the right coronary sinus in a patient scheduled for root aneurysm repair

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Our surgical plan for the presented challenging case was a valve-sparing [1]. Whenever a preparation of the vessel is impossible or the vessel is damaged, we decide upon proximal closure of the vessel and bypass grafting plus prosthetic root replacement.

We have intraoperatively achieved to prepare a very long segment of the circumﬂex including the artery’s part crossing the annulus. Approximately 8 cm of the vessel were released from adhesions until it entered the oblique sinus and vanished in the left atrioventricular groove just before the base of the left atrial appendage. This long mobilization seemed necessary to prohibit later kinking during reimplantation. With the abnormal artery secured, we were able to proceed with skeletonization of the root and valve-sparing root replacement (David I) (Fig. 1). A straight 34-mm Dacron tube graft was used and the valve reimplanted in a usual fashion. The left anterior descending artery and the right coronary artery were reimplanted in a classical fashion. For reimplantation of the circumﬂex artery, we chose a long sling run across the tube graft ending at the right lateral and distal part of the prosthesis (Fig. 2). The direct postoperative TEE revealed a competent valve and normal left ventricular (LV) function. The postoperative course was uneventful. At 3 months postoperatively, the patient is in a healthy condition; echocardiography revealed normal LV function without aortic valve insufﬁciency, and the coronary CT highlights good function of the reimplanted ectopic circumﬂex artery.

Conflict of interest: none declared.

Figure 2: To plan root replacement in the setting of anomalous coronary run, the CT scan revealed the ectopic ostium of the circumﬂex artery in the right coronary sinus separated from the right coronary artery and in close relation to the commissure between the right- and non-coronary sinus. Starting from there, the circumﬂex artery took a long dorsal run crossing the annular level.

Figure 1: An image taken from the surgeon’s view of the skeletonized circumﬂex artery as well as the isolated small right coronary and left anterior descending artery. The aortic root is already resected and the tricuspid aortic valve is prepared for reimplantation in a tube graft.