

CASE REPORT

Unexpected entrapment during surgery of anomalous circumflex coronary artery arising from right coronary artery

Sağ koroner arterden köken alan çıkış anomalili sirkumfleks koroner arterin cerrahi sırasında beklenmeyen sıkışması

● María Elena Arnáiz-García, M.D.,¹ ● José María González-Santos, M.D.,¹
● María Elena Pérez-Losada, M.D.,² ● Javier López-Rodríguez, M.D.,¹ ● Javier Arnáiz, M.D.³

¹Department of Cardiovascular Surgery, University Hospital of Salamanca, Spain

²Intensive Care Medicine, University Hospital of Salamanca, Spain

³Department of Radiology, Aspetar-Orthopaedic and Sports Medicine Hospital, Al Buwairda St, Doha, Qatar

Summary– A patient with advanced rheumatic heart valve disease underwent aortic and mitral valve replacement with tricuspid ring annuloplasty. There was an anomalous left circumflex coronary artery (LCCA) arising from the right coronary artery (RCA) running along the anterior surface of an enlarged right ventricle (RV). During the immediate post-operative course, signs of inferior and lateral myocardial ischemia developed. An emergent coronary angiography revealed LCCA entrapment. An additional suture placed in the RV outflow tract used to optimize exposition of the aortic root during the aortotomy was determined to be the origin of the coronary entrapment. No similar case of LCCA occlusion has previously been reported. This is a description of successful management of this complication.

Özet– İleri derecede romatizmal kalp kapak tutulumu olan hastaya aort ve mitral kapak replasmanı ile birlikte triküs-pit halka anuloplastisi uygulandı. Hastada genişlemiş sağ ventrikülün (SağV) ön yüzeyi boyunca seyreden sağ koroner arterden (SağKA) köken alan çıkış anomalili bir sol sirkumfleks koroner arter (SSKA) mevcuttu. Ameliyattan hemen sonra, inferiyor ve lateral miyokart iskemisi belirtileri gelişti. Acilen yapılan koroner anjiyografi sol sirkumfleks koroner arterin sıkıştığını gösterdi. Aortotomi sırasında aort kökünün açınımını optimize etme amacıyla SağV çıkım yoluna yerleştirilmiş ilave bir sütürün koroner arteri sıkıştırdığı belirlendi. Daha önce SSKA oklüzyonu saptanan benzer bir olgu bildirilmemiştir. Burada bu komplikasyonun başarılı bir şekilde tedavisi anlatılmıştır.

Rheumatic heart valve disease usually indicates a need for multiple heart valve replacement surgery. Cardiomegaly and right ventricle (RV) enlargement are often present. Additional sutures for heart exposition are sometimes needed, but become a treacherous maneuver in the presence of a coronary artery with an anomalous course. Presently described is a case of entrapment during surgery of an anomalous left circumflex coronary artery (LCCA) arising from the right coronary artery (RCA).

Abbreviations:

IABP	Intra-aortic balloon pump
ICU	Intensive care unit
LCCA	Left circumflex coronary artery
RCA	Right coronary artery
RV	Right ventricle

CASE REPORT

A 79-year-old woman with a history of hypertension was admitted for surgical correction of chronic rheumatic heart valve disease. A mitral valve commissurotomy had been performed 30 years earlier. The patient had recently been diagnosed with severe aortic valve stenosis in whom both mitral stenosis and regurgitation and severe tricuspid insufficiency with severe pulmonary hypertension were also detected. Atrial fibrillation was present and she was categorized as New York Heart Association functional class III. A routine preoperative coronary angiography revealed an aberrant origin of the LCCA arising from the ostium of the RCA with an anterior course running

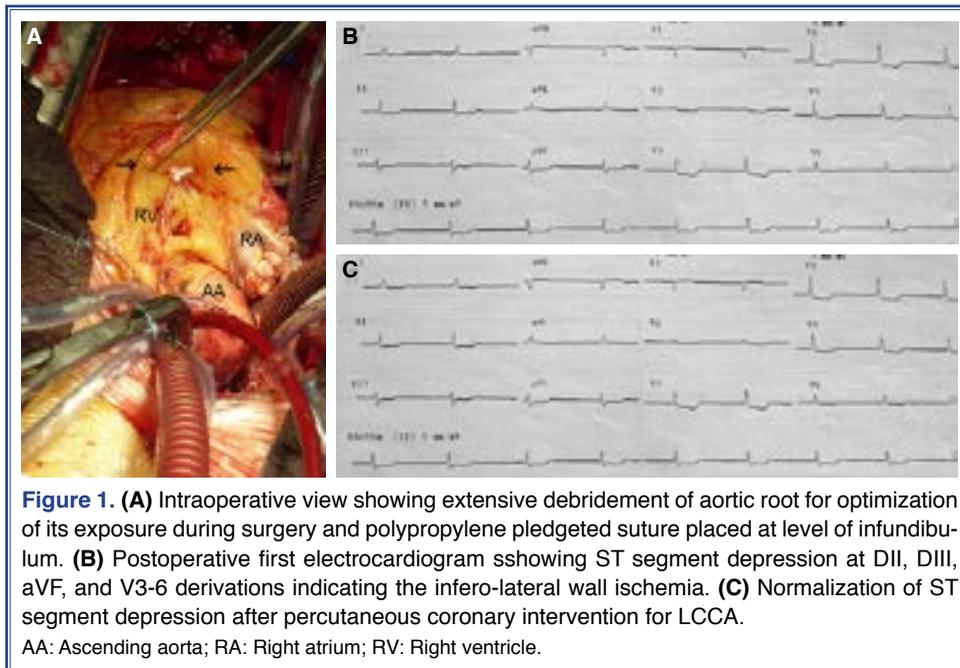
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Correspondence: Dr. María Elena Arnáiz García. Paseo San Vicente, 58-182. Salamanca 37007 Salamanca - Spain.

Tel: 0034923291263 e-mail: elearnaiz@hotmail.com

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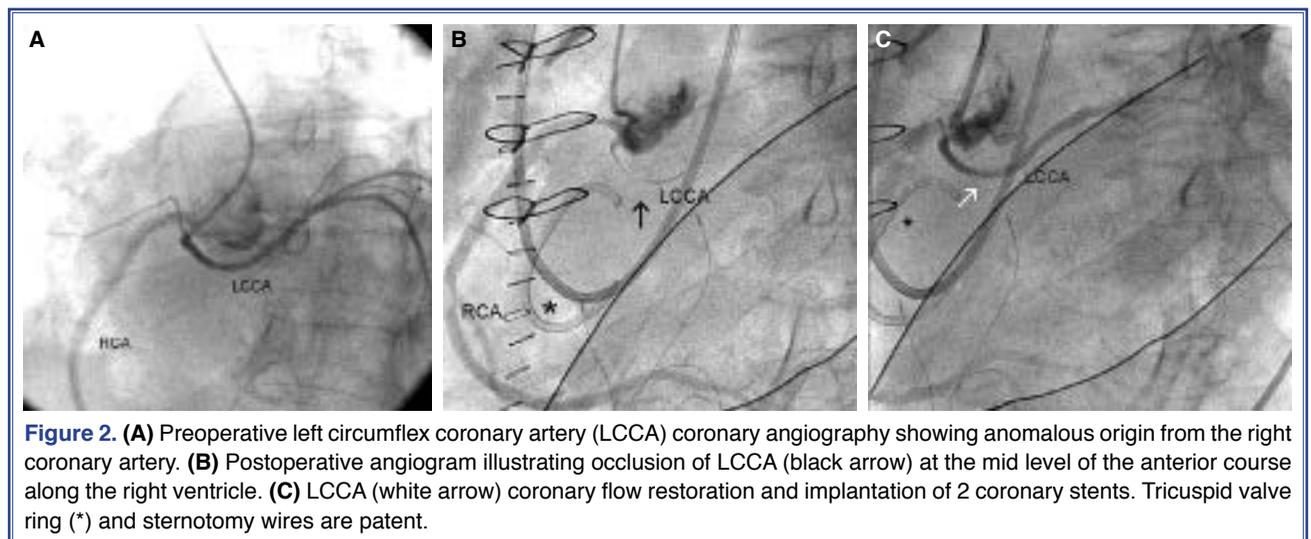


along the RV outflow tract. No coronary stenosis was identified.

Aortic and mitral valve replacement and a tricuspid annuloplasty were performed. Epicardial adhesences were released with a conventional mid sternotomy, and standard cardiopulmonary bypass was established. The RV was severely dilated, covering the proximal aorta. An extensive debridement of the aortic root was necessary to perform a low aortotomy. An additional polypropylene 4/0 pledgeted suture was placed at the outflow tract of RV to optimize the exposition of the aortic root (Fig. 1a). The aortic valve

was replaced with a 21-mm Labcor Supra porcine bioprosthesis (Labcor Laboratórios Ltda., Belo Horizonte, Brazil) and the mitral valve was replaced with a 31-mm Labcor TLPB porcine bioprosthesis (Labcor Laboratórios Ltda., Belo Horizonte, Brazil). Tricuspid annuloplasty was performed using 30-mm tricuspid-physio ring (Edwards Lifesciences Co., Irvine, CA, USA).

The patient was easily weaned from cardiopulmonary bypass under external ventricular pacing due to slow spontaneous ventricular activity. Intraoperative echocardiography demonstrated well-functioning



bioprostheses. Systolic function appeared to be preserved in both ventricles. A polypropylene pledgeted suture placed in the RV outflow tract to improve aortic root exposure was smoothly knotted. The LCCA was not visible along the epicardial surface due to an intramyocardial course. The patient was transferred to the postoperative intensive care unit (ICU) without vasoactive drug support.

However, upon arrival at the ICU, spontaneous electrical activity revealed extensive ST-depression in the DII, DIII, aVF, and V3-V6 leads suggesting ongoing inferior and lateral ischemia (Fig. 1b). Following manifestation of a low cardiac index, a dobutamine infusion was initiated (10 mcg/kg/minute). An intra-aortic balloon pump (IABP) was inserted and coronary angiography was immediately ordered. An anomalous origin of the LCCA from the RCA had been preoperatively confirmed (Fig. 2a). The postoperative angiogram showed occlusion of the LCCA, kinked with the suture placed to expose aortic root (Fig. 2b; Video 1, 2*).

Percutaneous revascularization was attempted due to the patient's hemodynamic stability and placement of 2 drug-eluting stents successfully restored LCCA flow (Fig. 2c, d; Video 3, 4*). The patient initially needed inotropic (dobutamine 5 mcg/kg/minute) and vasoactive (noradrenaline 0.044 mcg/kg/minute) support, but once the LCCA was opened, an electrocardiogram illustrated normalization of the ST deviation (Fig. 1c). The IABP was removed 24 hours after the percutaneous procedure.

The patient had a favorable cardiological evolution. Four years after the surgery, the patient remained asymptomatic.

DISCUSSION

Advanced rheumatic heart valve disease frequently manifests with multiple valves affected. Valve replacement and repair techniques have been shown to be safe and effective techniques with few related complications.^[1-2] However, there are exceptional references of coronary injuries related to valve surgery, mostly associated with the mitral valve and LCCA entrapment, or tricuspid annuloplasty causing RCA occlusion.^[1-4]

Coronary artery anomalies are present in approximately 0.6% to 1.3% of coronary arteriographies

performed. Anomalous origin of the LCCA from the right sinus of Valsalva or right coronary ostium is one of the most common anomalies found (0.4%).^[2-4] Complications related to acute coronary occlusion should be considered in cases of postoperative refractory hypotension, arrhythmias, ischemia on electrocardiogram, or acute postoperative ventricular dysfunction.^[1-4] These complications can especially occur in the presence of anatomical variations, an intramyocardial coronary course, cardiomegaly, ventricle remodeling, or a dilated pulmonary artery, when the anatomical relationships change. In this context, every maneuver must be considered potentially harmful and, if expendable, should be avoided. Suspicion and prompt diagnosis is crucial for assure successful outcomes.^[1-4]

Management remains controversial. A conservative attitude is an option overall for patients with hemodynamic stability. However, an aggressive approach has been suggested as a way to avoid future heart damage or complications.^[3,4] Once a diagnosis is confirmed, a percutaneous approach is a rapid and effective option. In cases where that is not possible or a failed procedure, surgical revascularization with coronary artery bypass grafts resolves ischemia and promotes a successful postoperative evolution.^[1-4]

To the best of our knowledge this is the first reported case of entrapment of an aberrant LCCA originating from the RCA occurring during surgery when the anterior course of the LCCA led to unexpected postoperative occlusion.

**Supplementary video file associated with this article can be found in the online version of the journal.*

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