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Case Report

A case of acute myocardial infarction with anomalous origin of the right coronary artery from the contralateral aortic sinus

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ABSTRACT

Anomalous coronary anomalies are technically challenging. We describe the case of a 48-year-old male who suffered an acute inferior wall myocardial infarction due to thrombotic total occlusion in an anomalous right coronary artery arising from the contralateral aortic sinus.

Keywords: Anomalous right coronary artery, Inferior wall myocardial infarction, Guide catheter, Guide wire, Total occlusion

INTRODUCTION

An anomalous right coronary artery (RCA) with aberrant origin from the contralateral aortic sinus is a rare cardiac entity.[1] It has a prevalence of 6-27% among all coronary anomalies. Although infrequent, such coronary anomalies pose significant technical challenges to interventionalists owing to their complex anatomy and course.[2] Systematic planning and selection of appropriate catheters are critical in order to achieve effective outcomes.

CASE REPORT

A 48-year-old male with a past history of hypertension presented to the emergency room (ER) with complaints of severe central chest pain of 1 hour duration. In the ER, electrocardiography revealed an acute inferior wall myocardial infarction. The patient was immediately shifted to the cath lab and taken for primary angioplasty. On coronary angiography, RCA was not seen arising from right coronary sinus, on further examination it was seen arising from the contralateral left aortic sinus (Figure 1 A and B). There was total occlusion of mid-RCA with heavy thrombus burden. As the patient was experiencing acute chest pain, immediate angioplasty was planned. We tried to cannulate with Amplatz (Cordis, Waterloo, Belgium) and hockey stick (Cordis, Waterloo, Belgium) catheter but it was unsuccessful, as these catheters were not providing enough back-up support to pass the guidewire. Next, the RCA was cannulated with a left extra back-up (EBU) 3.5 (Medtronic, MN, USA) guiding catheter, which provided good support and the lesion was crossed with a fielder FC (Asahi Intecc, Japan) guide wire (Figure 1 C). The lesion was pre-dilated with a 2x12 mm compliant balloon. Thrombus aspiration was done owing to high thrombus burden. Next, a 3.5x23 mm Xience prime everolimus-eluting stent (Abbott vascular, CA, USA) was deployed (Figure 1 D). Post dilatation was done using 3.5x12 mm NC balloon. Good TIMI III flow was achieved post procedure (Figure 1 E).

DISCUSSION

Catheter selection for intervention of anomalous RCA was investigated by Sarkar et al in 24 anomalous RCA series.[3] The series reported identification of appropriate hardware according to type of anomaly. Type A (above the sino-tubular plane) take-offs were successfully cannulated with the FL3.0 (Boston scientific, MN, USA) catheter in 3 of 4 cases. Type B (below the ostium of left coronary artery) take-offs were successfully cannulated with the FL3.0 (Boston scientific, MN, USA) and FL3.5

(Boston scientific, MN, USA) catheters in 2 cases each of 5 cases. Type C (between the left coronary artery and the midline) take-offs were successfully cannulated with the VL 3.5 (Boston scientific, MN, USA) catheter in 5 of 8 cases. Finally, type D take-offs (along the midline) were successfully cannulated with the AL-1, AL-3, and JR 4 (Cordis, Waterloo, Belgium) catheter in 1 case each of 3 cases. A similar study was conducted in India by Mullasuri and colleagues on 17 anomalous RCA cases.[4] Type A (above the ostium of the left coronary artery) take-offs were successfully canulated with a JL 5.0 catheter in 6 of 8 cases. Type B (below the ostium of the left coronary artery) take-offs were successfully cannulated with an EBU 3.5 catheter in 2 of 3 cases. Type C (along the midline) take-off was successfully cannulated with AL-1 (Cordis, Waterloo, Belgium) catheter in 4 of 5 cases.

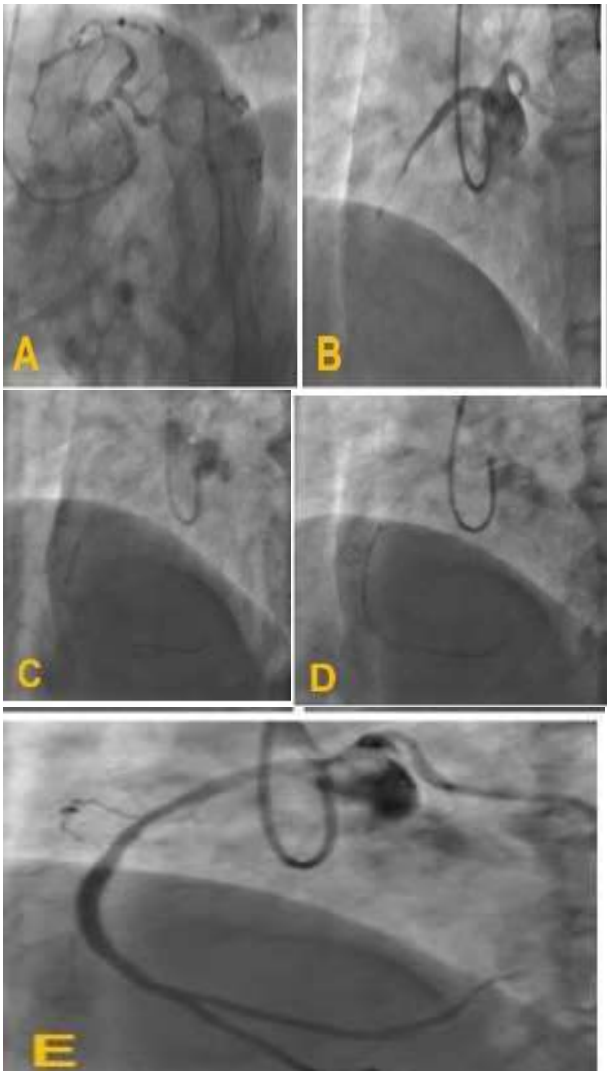

Figure 1: Coronary angiography (A) left coronary artery; (B) anomalous right coronary artery (RCA) with mid total occlusion; (C) the guide wire crossed anomalous RCA which was then pre-dilated with short length balloon; (D) Xience stent negotiated and deployed at mid RCA; (E) final TIMI flow.

Nanjappa et al described 6 cases of anomalous RCA.[2] Similar to our case, 5 patients suffered from inferior wall myocardial infarction due to mid-RCA total occlusion discovered on coronary angiography. In the first and second cases, after failed attempts to cannulate the anomalous RCA with multiple catheters, even catheters with modified curves, the lesions were successfully canulated with a TIG 5F (Terumo Corporation, Japan) diagnostic catheter. Double length coronary exchange wire was then adopted in both cases, after which a 6F JR (Cordis, Waterloo, Belgium) guide catheter was used in the first case. However, cannulation with this catheter was still not feasible in the second case, so a short balloon was dilated within the lesion and used as an anchor to cannulate the guide catheter. In the third and four cases, multiple attempts at cannulation of anomalous RCA through transfemoral were in vain. Crossing over to right radial access was a deliberate manoeuvre to use the contralateral aortic wall as support to cannulate the anomalous RCA. EBU 3 and AL-1 catheters were then successfully used to cannulate the lesion in these cases, respectively. In the fifth case, cannulation with JL 4, JL 5, EBU 3 catheters were unsuccessful. However, success was achieved with AR-2 (Cordis, Waterloo, Belgium) guide catheter.

Aberrant origin or location are distinctive of anomalous coronary arteries. These aspects present obstacles to the interventionalist whilst engaging the guide catheter and establishing backup support. The type of guide catheter and guide wire used to cannulate the lesion play a pivotal role in the success of the intervention. Moreover, appropriate guide wires and guide catheters can further facilitate reduced radiation exposure and contrast use, optimal angiographic visualization of the lesion, and successful device delivery. Hence, judicious selection of hardware should be made taking into account anatomical factors such as anomaly origin, location, take-off angle, presence of calcium, and acuity of the lesion. However, several failed attempts to engage the lesion may necessitate modification in either hardware, technique, or vascular access route.

CONCLUSION

Guide catheter selection is the most important aspect of anomalous coronary artery stenting. EBU guiding catheter can give good support in selected cases of RCA arising from left coronary sinus.

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