Case Report

Emergency percutaneous coronary intervention to a rare coronary anomaly

Cara Hendry (MD)*, Farzin Fath-Ordoubadi (MD)

Manchester Heart Centre, Central Manchester Foundation Trust, Manchester, United Kingdom

A R T I C L E   I N F O

Article history:
Received 3 December 2011
Received in revised form 17 April 2012
Accepted 23 April 2012

S U M M A R Y

An anomalous single coronary artery is a rare finding, which occurs with a frequency reported to be between 0.024% and 0.066%. In this case report we discuss the presentation and percutaneous treatment of ongoing myocardial ischemia in a patient with previously undiagnosed isolated single coronary artery of Lipton type R-I, which is the rarest of the coronary anomalies and occurs with a frequency of <0.0008%.

Case report

A 63-year-old gentleman presented to his local hospital with a history of severe angina at rest. The only risk factor for coronary disease was a positive family history. Electrocardiography (ECG) revealed ST depression (Fig. 1). He had ongoing pain and ECG changes, and was transferred to our centre for emergency management where coronary angiography was undertaken by the right femoral approach. A 6F Judkins left-4 diagnostic catheter was selected. Multiple attempts to engage the left main stem were unsuccessful, and despite a large injection of contrast into the left coronary cusp, the left main stem (LMS) was not visualized. A 6F Judkins right 4 catheter was then used to cannulate the right coronary artery. This was seen to arise from the right coronary cusp, and on first injection the vessel was seen to have a severe lesion. However, the right coronary artery – or main coronary trunk – continued, initially following its usual course. It then bifurcated into the posterior descending branch, and the posterior left ventricular branch which ascended in the atrioventricular groove and was in continuity with the circumflex artery, ascending to the anterior base of the heart where the LMS is usually located. It then continued as the left anterior descending artery (LAD), which was underfilled as a result of the severe stenosis in the feeding limb (Fig. 2). This corresponds to Lipton Classification R-I [1], the rarest single coronary anomaly. Aortography excluded the presence of a left main coronary artery, and the patient had good left ventricular function.

In view of the severe lesion, recorded as 97% stenosis of a 5 mm reference vessel diameter on quantitative coronary angiography (QCA) and extensive area of myocardium at risk in the context of refractory ischemia the case was offered to the cardiac surgeons who declined to operate on the basis that there was a substantial operative risk due to ongoing ischemia, elevated cardiac enzymes and background of chronic obstructive lung disease. The decision was made to perform emergent percutaneous coronary intervention (PCI). The PCI was performed in the presence of a full surgical back up team (in the event of a procedural complication bail out surgery was offered).

A 6F Judkins right 4-guide catheter was used to engage the right coronary ostium. A floppy wire was passed via the circumflex to the LAD. The lesion was very heavily calcified and was predilated with a 4 × 10 mm balloon, then stented with a 5 × 24 mm bare metal stent deployed at 24 atmospheres. Post dilatation was then performed with a 5 × 15 mm non-compliant balloon (at 24 atmospheres). An excellent angiographic result was achieved (Fig. 3). The patient remained stable throughout the procedure, the remainder of his admission, and remains symptom-free to date.

Discussion

Single coronary artery is a rare entity found in between 0.024% and 0.066% [1–3] of cases undergoing cardiac catheterization. Angiographic classification of single coronary artery anomalies has been described by Lipton et al. [1], and latterly, this classification system has been modified by Yamanaka and Hobbs [2]. The R-I type according to the Lipton classification, is extremely rare, with a reported incidence of 0.0008% [4]. PCI to an anomalous single coronary artery has been reported previously in the literature [5–7], however, the case described as R-I morphology was of an atypical form in which a right superior perforator artery supplied the LAD.
which is not in keeping with the original description. The perforator branch would be protective in that instance.

Use of a percutaneous strategy in this case carries a high risk as the entire myocardium is served by a solitary vessel. Dissection or no reflow phenomenon would be catastrophic. In this instance the patient was declined cardiac surgery due to co-morbidity, but undoubtedly in the absence of co-morbid disease this would have been the treatment of choice. To our knowledge PCI to the single afferent right coronary limb of a true Lipton’s type R-I single coronary artery has not been described previously in the literature. This anatomical variation in itself does not predispose to coronary disease, but the two conditions may coexist. The excellent result from percutaneous treatment of our patient would suggest that where surgical treatment is not an option, PCI is a feasible treatment. However, the operator must be wary of the high-risk nature of pursuing this strategy, and the fact that the long-term results are unclear.

References