Coronary stenting for iatrogenic stenosis of the left main coronary artery post-aortic valve replacement: an alternative treatment?

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Abstract

Iatrogenic coronary ostial stenosis after aortic valve replacement is a rare, life-threatening complication, which may follow implantation of either a mechanical or a biological prosthesis. Historically, this condition has been treated by urgent coronary bypass surgery but is associated with high morbidity and mortality, due to the hazards of early repeat sternotomy. We report a case of iatrogenic coronary ostial stenosis successfully treated with stenting and discuss the advantages of percutaneous intervention over coronary bypass surgery.

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1. Introduction

Iatrogenic coronary ostial stenosis (ICOS) is a rare but life-threatening complication. Involvement of one or both coronary ostia has been reported with isolated left main stem (LMS) stenosis being the most frequently described [1,2]. The true incidence of the condition is unknown but may be as high as 3.4% [3]. Presentation is typically with symptoms of acute myocardial ischaemia, ventricular arrhythmia or heart failure within 6 months of cardiac surgery [4]. The most likely mechanism is traumatic injury of the coronary ostia caused by intubation for antegrade cardioplegia with rigid or self-inflating balloon-tipped cannula [2,4,5].

Historically, this condition has been treated by urgent coronary bypass surgery but, due to the hazards of early repeat sternotomy and difficulties in protecting hypertrophied myocardium during surgery, is associated with high morbidity and mortality [4]. We describe a case of ICOS in a patient with normal preoperative coronary angiography, who was successfully treated with implantation of a drug-eluting stent.

A 63-year-old male underwent isolated replacement of the aortic valve with a 20-mm Bicarbon Overline mechanical prosthesis (Sorin, CO, USA) for symptomatic severe aortic stenosis. Coronary angiography showed a normal LMS, and mild non-obstructive atheroma in other vessels (Fig. 1(A)). Myocardial protection with intermittent, direct coronary, cold cardioplegia was used by antegrade route following cannulation of both coronary ostia with flexible, balloon-tipped cannulae. The patient made an uncomplicated recovery and was discharged on day 7 taking warfarin, furosemide and perindopril.

He was well following surgery until 3 months later when he presented to hospital with a non ST-elevation myocardial infarction. International normalised ratio was therapeutic at 2.7. Cardiac catheterisation revealed a severe lesion in the proximal LMS (Fig. 1(B)) and mild non-flow-limiting atheroma in other coronary vessels. In view of haemodynamic instability, a decision was made to proceed immediately with percutaneous coronary intervention. The LMS lesion was directly treated with a 4 × 16 mm Taxus Liberte drug-eluting stent (Boston Scientific, Massachusetts, USA) and post-dilated with a 4.5-mm non-compliant balloon. The final angiogram showed good stent deployment and no residual dissection (Fig. 1(C)). The chest pain settled immediately and he was discharged 2 days later, being prescribed clopidogrel for 12 months in addition to aspirin, warfarin and a statin. He remained asymptomatic at 8 months and surveillance angiography with intravascular ultrasound showed a widely patent LMS with good stent apposition and mild intimal hyperplasia, suggesting endothelialisation. He remains well at follow-up of 30 months.

2. Discussion

Patients with ICOS typically present within 6 months of aortic valve surgery with symptoms of myocardial ischaemia, infarction, left ventricular failure or arrhythmia. The
diagnosis is usually confirmed with selective coronary angiography; however, multi-detector computed tomography may also be used with a high degree of accuracy [2]. Retrospective analyses of surgical cohorts undergoing aortic valve replacement suggest an incidence between 0.3% and 3.4% [3,4]. The true figure, however, remains unknown as the syndrome can result in sudden death [6]. The most probable mechanism is injury to the coronary ostia caused by catheters used for antegrade cardioplegia delivered via the coronary ostia [2,5]. Some authors have postulated that development of ICOS is the result of an immunological reaction to heterografts [2,7]; however, its occurrence after mechanical valve implantation makes this less likely [4]. A genetic predisposition may also exist and it has been suggested that the e4 allele might predispose patients to a pathologically increased proliferative repair response after arterial injury [8].

Historically, the only treatment for ICOS was by surgical revascularisation and while some have reported good outcomes following bypass grafting, others have documented high rates of morbidity and mortality [3,4]. Presentation with NSTEMI. Repeat coronary angiography showed a severe proximal stenosis of the LMS (LAO cranial projection). (C) Left coronary angiogram, post deployment of a 4 × 16 mm Taxus Liberte drug-eluting stent (LAO cranial projection).

In conclusion, ICOS is a rare but life-threatening complication of aortic valve surgery. Although traditionally treated by coronary bypass surgery, an increasing body of evidence suggests that percutaneous intervention for ICOS with drug-eluting stents is a safe and effective treatment and may often be preferable to surgery in haemodynamically unstable patients.

References


