Complete aortic obstruction owing to the proximal dehiscence of a stentless root bioprosthesis

Siamak Mohammadi MD, Pierre Voisine MD, Patrick Mathieu MD, François Dagenais MD

A 67-year-old man was admitted for chest pain. Eighteen months earlier, he underwent replacement of his aortic root with a 29 mm Freestyle bioprosthesis (Medtronic Inc, USA) owing to annuloaortic ectasia.

Immediate postoperative and one-year echocardiograms and chest computed tomography (CT) examinations showed a well-functioning bioprosthesis, with no aortic root complications. The patient was asymptomatic until the recent onset of chest pain. A thallium myocardial scan showed mild ischemic changes in the inferoapical distribution. Coronary angiography demonstrated normal coronary arteries. However, contrast injection within the aortic root depicted complete obstruction of the ascending aorta during end-systole (Figure 1). A peak gradient of at least 80 mmHg was measured between the left ventricle and the ascending aorta. The CT scan was not conclusive.

At reoperation, one-half of the proximal anastomosis of the Freestyle root was dehiscd. During systole, the surrounding tissues, mainly the pericardium, created a 'cul-de-sac' around the Freestyle prosthesis, with the inward displacement of the dehiscd Freestyle graft creating the aortic occlusion. With the Freestyle graft expanded in diastole, the space between the Freestyle wall and the surrounding tissue was minimal, thus explaining the absence of a pseudoaneurysm on CT. No signs of infection were present. A modified Bentall procedure, using a custom composite stented bioprosthesis

graft, was performed. The postoperative course was uneventful and the patient was free of complications 12 months after the surgery.

DISCUSSION

The present case described sterile dehiscence following a root replacement with a Freestyle bioprosthesis. The primary operation was performed with a running Prolene suture (Johnson and Johnson, Ethicon Division, USA) for each sinus. Although the dehiscence was not present on echocardiography and chest CT at 12 months, a small dehiscence probably went unrecognized. In such circumstances, the pericardium wrapped around the Freestyle graft and created a cul-de-sac between the pericardium and the Freestyle prosthesis wall. The pressure within the cul-de-sac with each systole increased tension on the proximal suture line, thereby contributing to the extension of the dehiscence of the proximal suture line. Eventually, complete dehiscence of the proximal suture line, with invagination of the Freestyle prosthesis within the ascending aorta, may have supervened. In the present case, a prompt reoperation with complete replacement of the Freestyle root allowed for a successful outcome. This complication might have been minimized by the use of interrupted sutures for the proximal suture line during the initial Bentall operation.

Figure 1 Aortogram depicting full Freestyle root (Medtronic Inc, USA) expansion during diastole (A), partial occlusion of the aortic root during early systole with only minimal opacification of the aortic root (white arrow) (B) and complete aortic occlusion of the ascending aorta during end-systole (white arrow) (C)

Department of Cardiac Surgery, Laval Hospital, Quebec City, Quebec

Correspondence: Dr François Dagenais, Department of Cardiac Surgery, Laval Hospital, 2725 chemin Ste-Foy, Quebec City, Quebec G1V 4G5.

Telephone 418-656-4717, fax 418-656-4707, e-mail francois.dagenais@chg.ulaval.ca

Received for publication February 16, 2006. Accepted March 15, 2006