New ideas - Cardiac general

Use of pericardial strip for reinforcement of proximal anastomosis in Bentall’s procedure

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Abstract

Bleeding from a proximal suture line is not uncommon following composite graft anastomosis in Bentall’s procedure. Passage of valve sutures through the pericardial strip, which is used to encircle the sewing ring of the composite graft, strengthens the repair. The strip can also be sutured to the left ventricular outflow tract in case of bleeding from proximal anastomosis in that particular region.

Keywords: Bentall’s procedure; Pericardial strip

1. Introduction

The Bentall procedure involves composite graft replacement of the aortic valve, aortic root and ascending aorta, with re-implantation of the coronary arteries into the graft. The Bentall procedure was first described in 1968 by Bentall and De Bono. Bleeding through the proximal anastomotic site is not uncommon. Various techniques have been described in the literature to prevent and control the bleeding.

2. Technique

We use a 1-cm broad and 10–12-cm long strip of pericardium to encircle the valve sewing ring of the composite graft. The 2-0 pledgeted Ethibond sutures are initially passed through the left ventricular outflow tract, just below the annulus in an everted manner encompassing the aortic valve leaflets. The sutures are then passed through the pericardial strip after passing through the valve sewing ring of composite graft (see Fig. 1). Once all the sutures are passed, the composite graft is lowered along with the pericardial strip to sit over the left ventricular outflow tract (see Fig. 2). The sutures are then tied over the pericardial strip covering the sewing ring of the composite graft.

A pericardial strip helps secure the knots and offers strength to the repair. The pericardial strip distributes the tension over the knots equally. In case of bleeding from the proximal anastomosis, the pericardial strip can be sutured to the left ventricular outflow tract. The authors used this technique in their last 10 cases.

3. Discussion

Bleeding from proximal suture line is notorious following composite valve replacement of the ascending aorta and root. This consumes lot of operative time, needs excess...
blood and blood products transfusion, which has its own implications and complications. Sometimes it leads to alarming postoperative drainage mandating re-exploration. Many modifications have been suggested to prevent this complication. Bentall and De Bono wrapped the graft with native aneurysm wall, but the idea was soon abandoned because of development of hematoma between the graft and the wrap [1]. Cabrol et al. suggested anastomosing covered native aneurysm to the right atrium, but the procedure was found to be complicated by the development of persistent aorta to right atrial fistula [2].

Copeland et al. used a annular and supra-annular aortic wall tandem suture-lines technique which consists of using interrupted mattress sutures to anchor the lower part of the valve sewing ring to the aortic annulus. The upper part of the sewing ring is then anchored with a running suture line to the cut-edge of the supra-annular aortic wall [3]. Khanna and Akhter claimed to achieve similar effects without cutting the aortic wall by applying a purse string using 3/0 polypropylene suture through the aortic wall just above the proximal suture line and taking it out of the aortic wall through a polytetrafluoroethylene pledget [4].

Reinforcement suturing of the proximal anastomosis as mentioned in different techniques, is essentially difficult and frustrating because of lack of space and poor visibility in that region. We propose the technique of encircling a sewing ring of valved conduit with a pericardial strip and passing anastomosis sutures through it. It is a simple and reproducible technique which confers strength to the repair. In a case of bleeding from the proximal anastomosis, the pericardial strip can be sutured to the left ventricular outflow tract. As one margin of the pericardial strip is already fixed to the sewing ring of the valved conduit, it becomes easy to suture only the peripheral margin to the left ventricular outflow tract in the region of bleeding.

In addition, the authors avoided resecting the aortic valve leaflets before passing sutures through left ventricular outflow tract. The aortic valve leaflets encompassed into the left ventricular outflow tract sutures gives strength to the repair.

References


eComment: Reinforcing the proximal anastomosis in Bentall’s procedure: before or after unclamping the aorta?

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We read with great interest the article by Mohite et al. [1] describing the use of a pericardial strip for reinforcement of proximal anastomosis in Bentall’s procedure. We agree with the authors on the fact that proximal anastomosis bleeding could represent an annoying complication following a modified Bentall’s procedure. As the authors noted in their article, several preventive techniques have been described in order to avoid such a complication, and all of these techniques are effective and are focussing around the same principle: covering the proximal sewing plane. Chen et al. [2] used a Dacron skirt; Copeland et al. [3] used the remnants of the ascending aortic wall and the authors describe using a pericardial strip for that same purpose, which seems logical. However, in their article, the authors noted that the pericardial strip was only sewn proximally to the left ventricular outflow tract, once proximal bleeding was detected.

Proximal bleeding during a Bentall’s procedure is only detected after unclamping of the aorta and sometimes only after weaning from cardiopulmonary bypass, when the heart begins pumping and the arterial blood pressure rises. Any bleeding occurring at that time, especially if arising from the posterior aspect of the proximal sewing plane is hard to repair, especially when the anastomosis of the left main coronary artery to the Dacron graft renders mobilization of the graft hazardous. Therefore, we think that the technique described by the authors loses a great deal of its value unless the pericardial strip is routinely anastomosed proximally to the left ventricular outflow tract, prior to removing the aortic cross-clamp.

We also would like to mention another word of caution concerning the aortic valve leaflets which the authors do not resect but rather encompass with the sutures, as one might fear any eventual interference with the mechanical leaflet of the aortic valve prosthesis.

References