Modified surgical sequence in aortic and mitral valve replacement
with or without tricuspid valve repair or replacement

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Abstract

A mitral prosthesis, when implanted, can distort the aortic annulus, forcing to downsize the aortic prosthesis. Changing the sequence of tying the sutures (the aortic prosthesis first, then the mitral prosthesis) allows to insert an aortic true-sized prosthesis. In case of associated tricuspid valve surgery, the aortic prosthesis protrudes over the anteroseptal commissure area. The sutures on the tricuspid annulus can be passed before the aortic prosthesis is secured in place.

Keywords: Mitral and aortic valve replacement • Tricuspid repair

INTRODUCTION

When aortic and mitral valves need to be replaced, the mitral prosthesis (MP) is positioned first, followed by the aortic prosthesis (AoP) [1]. In case of associated tricuspid valve surgery, this procedure is performed last, sometimes after aortic unclamping. Sometimes, a MP may distort the aortic annulus, requiring AoP downsizing. The presence of an AoP may impair visualization of the tricuspid annulus at the level of the anteroseptal commissure, as it protrudes over this area.

We propose a modified surgical sequence to avoid downsizing of the AoP in patients with small aortic annuli (<21 mm) who undergo combined mitral and aortic replacement, and to facilitate tricuspid valve surgery when aortic valve replacement is needed.

SURGICAL STRATEGY

When combined aortic and mitral replacement is necessary, surgical sequence is modified as follows.

(i) Both native valves are explanted.
(ii) Valve sutures are placed on the mitral annulus as usual and are passed through the MP. The prosthesis is descended to the left atrium, but the stitches are not tied.
(iii) The aortic valve is replaced as usual, inserting a ‘true-sized’ prosthesis.
(iv) The MP is descended to the proper position and the stitches are tied.

Figure 1: The aortic valve is wedged between the mitral and tricuspid valves. Ao: aortic valve; M: mitral valve; Tr: tricuspid valve.
If tricuspid valve repair or replacement is needed, annular sutures are placed before the AoP is secured in place, tying the tricuspid device after AoP implantation.

CLINICAL EXPERIENCE

From May 2009 to March 2014, 34 consecutive patients with an aortic annulus ≤ 21 mm had mitroaortic replacement using this surgical strategy. Tricuspid valve repair or replacement was added in 13 and 2 patients, respectively. There was no difficulty in tying the stitches on the MP, and the initial sizing of the AoP was always maintained. No postoperative leak was detected at the level of the mitral prostheses. The sutures of the tricuspid device were always easy to be tied.

COMMENTS

The orifice of the aortic valve is strictly related to the orifices of the mitral and tricuspid valves, being wedged in between (Fig. 1). When the mitral valve is replaced, the MP can distort the aortic annulus and prosthesis downsizing may be required to replace the aortic valve. If the AoP is positioned first, visualization of part of the mitral annulus is impaired, making placement of the sutures for mitral replacement difficult.

Changing the sequence of tying (the AoP first, then the MP), but not of suture positioning (mitral valve sutures are passed before aortic valve sutures are tied) allows to insert a true-sized AoP. This modification of the conventional surgical sequence, first suggested by Schaff and Suri [2], is of particular importance in the presence of small aortic annuli.

As the tricuspid valve lies in a lower position, the AoP interferes with the tricuspid annulus at the level of the anteroseptal commissure (Fig. 2). This area becomes vertical and partially hidden by the rigid AoP, making suture placement on the tricuspid annulus sometimes challenging. However, if valve sutures are passed before the AoP is secured, any technical difficulties will be overcome.

In conclusion, when multiple valve surgery is needed, this strategy limits the reciprocal interference of the prostheses, in particular in the presence of a small aortic annulus.

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REFERENCES