Case report

Video-assisted tricuspid valve surgery: a new surgical option in endocarditis on pacemaker

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Abstract

A patient presenting with a pacemaker lead infection and tricuspid regurgitation underwent a minimally invasive video-assisted tricuspid valve replacement. The valve was approached through a right anterior mini thoracotomy. Under thoracoscopic vision and peripheral cardiopulmonary bypass, a catheter was placed on the ascending aorta for antegrade cardioplegia delivery. A transthoracic aortic cross-clamp was introduced through the third right intercostal space. Tricuspid valve replacement added to the pacemaker leads ablation was exclusively performed under thoracoscopic vision, providing an excellent video-image in this reduced operative field. After 22 months of follow up, the patient is asymptomatic, the echocardiography showing a normally functioning valve. © 1999 Elsevier Science B.V. All rights reserved.

Keywords: Video-assisted cardiac surgery; Tricuspid valve surgery; Tricuspid endocarditis

In order to reduce the surgical trauma in a patient presenting with a tricuspid valve endocarditis, a new technique of minimally invasive video-assisted tricuspid valve replacement (TVR) performed through a mini thoracotomy, under peripheral cardiopulmonary bypass (CPB), transthoracic extravascular aortic cross-clamping and cardioplegic arrest is presented.

1. Case report

A 62-year-old man presenting with atrioventricular conduction disturbances underwent a permanent endovenous pacemaker (PM). Three weeks later, a PM leads infection (Staphylococcus hominis) occurred. Despite an adapted antibiotherapy, the patient developed a tricuspid endocarditis. Transthoracic and transoesophageal echocardiography (Fig. 1) revealed a voluminous (>10 mm) vegetation both on the PM lead and the tricuspid posterior leaflet with additional perforation and regurgitation. According to a previous report [1], the vegetation size and the valvular involvement by the infective process imposed a surgical lead ablation and an associated TVR. In order to reduce the surgical trauma in this infected and fragile patient, a minimally invasive video-assisted technique was decided.

The heart was approached through a right anterior mini thoracotomy (2.5 inch), performed in the fifth intercostal space, under thoracoscopic vision, providing an excellent video-image in this reduced operative field. After 22 months of follow up, the patient is asymptomatic, the echocardiography showing a normally functioning valve. © 1999 Elsevier Science B.V. All rights reserved.

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clamping, the cardioplegia was delivered, giving a conventional cardioplegic arrest.

Tricuspid surgery was exclusively performed under thoracoscopic vision. The right atrium was opened using endoscopic scissors and the thoracoscope was advanced into the right atrial cavity providing an excellent video-image of the intracardiac structures (Fig. 2). Leads and vegetations were first ablated. According to the aspect of the three leaflets (perforation on the posterior one, vegetations on the two others) contraindicating a partial or total preservation of the tricuspid valve, a TVR was recommended. The valve and the subvalvular apparatus were progressively resected. A raw of pledgeted stitches was placed on the tricuspid annulus and a ‘Mosaic’ bioprosthesis (Medtronic Inc., MN) size 27 was implanted. Knots were tied outside of the thorax and then pushed down with the aid of a knot pusher. Just before the right atrium suture line was completed, the right cavities were deaired. The aortic clamp was removed and after spontaneous defibrillation, the patient was progressively weaned from bypass without medical support. The aortic cross-clamp time was 90 min and the CPB time 120 min. The chest was closed in the usual fashion, over a couple of chest tubes introduced in the trocard holes.

The patient was extubated 11 h later and the ICU stay was 36 h. A secondary permanent PM was implanted on day 5 and the patient was discharged on day 8. After 22 months of follow up, the patient was in New York Heart Association class I without treatment and TTE revealed a normally functioning valve.

2. Comments

To the best of our knowledge no previous report concerns minimally invasive video-assisted tricuspid valve surgery.
Since the first reports dealing with minimally invasive valve surgery [2–7] several technical points remain still under debate such as the choice of the heart approach, the method of CPB, the technique of myocardial protection and aortic cross-clamping.

As the mitral, the tricuspid valve could be approached either through a parasternal incision [3] or a partial sternotomy [6]. As others [2,4,5,7], we prefer to approach the right heart through a mini thoracotomy. With the aid of video-assisted techniques, limited costal retraction is sufficient to perform TVR in this reduced operative field.

Contrary to a partial sternotomy, the anterior mini thoracotomy imposes the use of a peripheral CPB, obtained in our case by cannulation of the right femoral vessels and the right jugular vein, which was chosen to avoid a risk of potential mobilization of the vegetations. Another technique uses [8] a profound hypothermia, without superior vena cava cannulation which seems not to be recommended faced with the risk of venous congestion. An alternative could be the use of a two-stage cannula recently described for mitral valve surgery [6].

Aortic cross-clamping and myocardial protection are also controversial, a direct approach of the ascending aorta being impossible through a mini thoracotomy. Although the trans-thoracic aortic cross-clamping method has been previously described in minimally invasive mitral [6] or coronary bypass surgery [9], the same technique has not been reported for tricuspid disease. Other techniques use either a hypothermic fibrillatory arrest without aortic clamping [2,8] or an endoaortic clamp [5,7,10], risking potential complications related to improper placement of the balloon [5]. The technique of antegrade cardioplegia that we routinely use in minimally invasive valve surgery is similar to that used for conventional surgery. A retrograde cardioplegia cannula could be easily introduced under thoracoscopic vision into the coronary sinus after opening the right atrium, for completion of the myocardial protection if necessary.

The technique described in the present report is simple, safe and cost-effective. It is particularly indicated in an infected patient to reduce the surgical trauma. Results are qualitatively similar to those observed after a conventional approach with the advantages of limited chest wall trauma.

References