Repair of perivalvular leakage without re-replacement of prosthetic valves

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Abstract

Perivalvular leakage after valve replacement is an awkward complication, and is liable to recur if re-replacement of a prosthetic valve is attempted. We describe an alternative way to repair perivalvular leakage by plastering the crack resulting from left-atrial degeneration around the prosthetic cuff using an equine pericardial roll. Our technique, which does not involve re-replacement of the prosthetic valve, is an easy, timesaving, and cost-effective method. The pericardium is useful for covering the crack between the prosthetic cuff and the hard left-atrial wall.

Keywords: Perivalvular leakage; Pericardial roll; Hemolytic anemia; Prosthetic valve

1. Introduction

The incidence of perivalvular leakage (PVL) after valve replacement, excluding infective endocarditis, is reported to be 7% [1]. There are various symptoms of PVL such as dyspnea on exertion, edema in the lower extremities, and hemolytic anemia. The independent risks for PVL are a continuous suture and annular calcification [1,2]. The mortality after conservative therapy is higher than that after surgical intervention (conservative = 26% vs redo = 12%) [3]. However, there is a possibility of new PVL developing in another part of the valve, if valve re-replacement is performed. Recently, percutaneous or trans-apical repair for PVL has been reported [4,5]. However, its performance should be limited to critically ill patients. Thus, local repair of PVL under direct vision could be the best option compared with either valve re-replacement or catheter intervention.

2. Technique

We describe how to repair PVL in the mitral position. After left atriotomy, we did not observe a neo-epithelium, which usually covers the prosthetic cuff, on the crack in the anterior lateral side of the mitral annulus owing to PVL. A double-armed 2/0 braided suture without a pledget was placed from the left atrium just outside of the prosthesis into the left ventricle (Fig. 1(A)). When the needle was identified through the mechanical valve orifice, it was picked up with a thin needle holder to avoid damaging the leaflet. Provided that a pair of stitches could be passed through the same orifice, no valve rotator was needed to place the mechanical leaflet parallel to the crack. The pair of stitches was tied with a pledget, which was then placed below the mitral annulus (Fig. 1(B)).

The left-atrial endocardium around the PVL is usually so hard that it is difficult to adapt the prosthetic cuff and the left-atrial endocardium. A pair of stitches in part of the left atrium was placed in the pericardial roll and then in the prosthetic cuff, so that the crack between the prosthetic cuff and the left-atrial endocardium was completely covered with the pericardial roll after completion of the tying (Fig. 2). It was usually necessary to place two or three pairs of these stitches to plaster the PVL completely.

We used this method for two cases of PVL after valve replacement. The first case was a 76-year-old male who underwent a third mitral valve replacement with a mechanical valve for PVL 7 years previously and showed severe hemolytic anemia caused by relapse of PVL. The second case was a 61-year-old female, who had PVL of a mechanical valve in the mitral and aortic positions after a third mitral valve replacement and aortic valve replacement (21 mm). Repair of PVL was performed for the mitral position only in the first case, and for the aortic and mitral positions in the second case. No residual leakage has appeared in both cases and the hemolytic anemia has not been observed for 2 years.

3. Comment

In valve re-replacement for PVL, the epithelialized portion on the prosthetic cuff, which had been completely

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healed, must also be excised to explant the former prosthesis. New PVL in other parts of the valve was observed after re-replacement of the prosthesis in our cases. Therefore, repair of PVL could have the advantage of preventing new PVL compared with re-replacement of the prosthesis.

If the left-atrial wall is hard, it can be difficult to bring the prosthetic cuff and left atrium together using the technique reported by Moneta and colleagues [6]. Therefore, we applied an equine pericardial roll as a pad to plaster the crack as a modification. This technique can also be applied to a prosthesis in the aortic position and for a bioprosthesis in each position. In conclusion, our technique, which does not involve re-replacement of the prosthetic valve, is an easy, time-saving and cost-effective method. The pericardium is useful for covering the crack between the prosthetic cuff and the hard left-atrial wall. This technique appears to be very beneficial in some patients.

References


