Repair of Posterior Left Ventricular Aneurysm through Transatrial Approach

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ABSTRACT Repair of posterior left ventricular ischemic aneurysms implies an extracardiac approach to reshape the ventricular geometry frequently associated with mitral surgery. A transatrial technique was described for lesions following mitral surgery or for subvalvular idiopathic cases. A transmitral approach was used for ischemic or traumatic pseudoaneurysm. We describe a case of postinfarction posterior true aneurysm with associated mitral incompetence. Both lesions were treated through an intracardiac approach. The posterior mitral leaflet was detached posteriorly to close the aneurysm with a patch, and the valve replaced sparing all subvalvular apparatus. This technique seems to be safe and allows to treat both lesions avoiding ventriculotomy. doi: 10.1111/j.1540-8191.2009.00819.x (J Card Surg  root;**:**-**)

Left ventricular aneurysms are a documented complication of myocardial infarction. They generally involve the anterior wall but, occasionally, the inferior or posterior wall is affected and mitral incompetence may complicate the clinical pattern. Surgical repair implies: the incision of the aneurysm and its closure with a patch to reshape the ventricular cavity1,2 associated, when necessary, with mitral surgery. An intraventricular transmitral treatment was described for an ischemic pseudoaneurysm3 but not for true aneurysms. Other reports were presented for submitral idiopathic cases or for lesions following mitral surgery.4,5 We describe a case of postinfarction left ventricular true aneurysm of the posterior wall with associated mitral incompetence. Both lesions were repaired through a transatrial approach.

CASE REPORT

A 69-year-old man was referred with a history of previous posterior myocardial infarction. After two months he experienced increasing shortness of breath and underwent transthoracic echocardiogram. It showed a left ventricle with poor ejection fraction (30%). A huge aneurysm involved the inferior basal wall with akinetic surrounding segments (Figs. 1A and B). There was also a severe mitral incompetence due to leaflet tethering. Systolic pulmonary artery pressure was 35 mmHg. At admission the patient was on New York Heart Association class II under full medical therapy. He underwent coronary angiography that showed critical lesions on the anterior descending artery and on the diagonal branch, occluded circumflex and right coronary. Surgical repair was performed under cardiopulmonary bypass and myocardial protection with a single dose of Custodiol cardioplegia (Köhler Chemie GmbH, Aisbach-Hähnlein, Germany). Three distal coronary anastomoses were performed with left mammary artery to the anterior descending and with two saphenous vein grafts on the diagonal and marginal branch. A left atriotomy, behind the interatrial groove, was used to expose the mitral valve. It showed a severe regurgitation due to leaflets tethering and fibrosis of the papillary muscles. To expose the aneurysm, medial and central scallops of the posterior leaflet were detached a few millimeters from the annulus and gently retracted anteriorly. The aneurysm appeared located between the mitral annulus, the base of the medial papillary muscle, and the interventricular septum and extended 3-cm laterally. A 2 × 3-cm woven Dacron low porosity patch was sutured at the neck of the aneurysm with continuous 4/0 polypropylene suture (Figs. 2A and B). Mitral valve replacement was performed with a St. Jude Epic N°.29 (St. Jude Medical Inc., St. Paul, MN, USA) bioprosthesis. All the subvalvular apparatuses were preserved detaching the anterior leaflet and reimplanting both leaflets posteriorly. The patient was weaned from bypass with moderate inotropic support and intraortic balloon counterpulsation. He was extubated on the first postoperative day and the balloon pump removed on the second postoperative day. There were no complications and he was discharged home after two weeks.

CONCLUSIONS

Left ventricular aneurysm is a complication of myocardial infarction that generally involves the anterior wall. In few cases, it may arise from the inferior or
posterior wall and, if the papillary muscles are involved or displaced, it may generate mitral incompetence. Many authors suggested that the optimal surgical repair should be directed not only to remove the aneurysm but to reshape the ventricular cavity.\textsuperscript{1,2} This can be accomplished through an extracardiac approach using a patch to restore the original myocardial geometry and dimension. There are no reports in the literature of intracardiac repair of ischemic true aneurysms. A transatrial repair of a subvalvular left ventricular aneurysm following mitral surgery was described by Sutorius et al.\textsuperscript{4} In this case, they achieved a good exposure of the lesion removing the bioprostheses previously implanted. An interesting series of submural idiopathic aneurysms was presented by Antunes.\textsuperscript{5} In this case, the intracardiac correction was performed through the perianular wall of the left atrium since the lesion was located just under the posterior leaflet and bulged in the atrial cavity. A transmural closure of a posterior ischemic pseudoaneurysm was described by Jahangiri et al.\textsuperscript{3} The authors chose this option to avoid the dense pericardial adhesions. They exposed and closed with a patch the neck of the pseudoaneurysm by dividing the posterior mitral muscle. In our case, we did not use this approach because probably we could not achieve a good exposure of a large true subannular aneurysm. Furthermore, we preferred to leave the submural apparatus untouched. Our technique is similar to that employed by Miura et al.\textsuperscript{6} but they resected only the medial scallop of the posterior mitral leaflet to close a pseudoaneurysm, developed after radiofrequency catheter ablation of an accessory pathway. Nevertheless in their case the lesion was subannular and small since it was closed by direct suture. In our patient, we had to extend the resection to the medial and central scallops to achieve a good exposure and close the true aneurysm. This detachment of the posterior mitral leaflet allows the surgeon to perform either a repair or a valve replacement. In our case, severe anterior and posterior mitral tethering and poor left ventricular function pushed us to replace the valve, leaving both leaflets with the submural apparatus, as described by Garcia Fuster et al.\textsuperscript{7} Since posterior ischemic aneurysm often complicates with mitral regurgitation this transatrial approach could be considered an option to treat both lesions through the same way. Even if the mitral valve is continent, this surgical approach may avoid a ventriculotomy that, in posterior aneurysms, is a potential high-risk bleeding site, very close to the atrioventricular groove. In conclusion, this technique seems to be safe, and could be considered in these rare but complex clinical cases.
REFERENCES