Case report

Eight years survival after partial left ventriculectomy

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Abstract

Remodelling the left ventricle by partial left ventriculectomy (PLV) has been proposed as an alternative surgical treatment for end-stage heart failure. We present the case of a patient with dilated idiopathic cardiomyopathy who underwent PLV and remains in NYHA functional Class I eight years after the surgery.

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1. Introduction

Heart failure is a growing source of morbidity and mortality in an ageing Western world. The gold standard surgical treatment of end stage heart failure is cardiac transplantation, however there are limitations due to exclusion criteria and donor shortage [1]. Partial left ventriculectomy (PLV), introduced by Batista in 1996, has been used to treat end stage dilated cardiomyopathies (DCM) of varying etiologies [2,3]. It has been suggested that by removing a slice of the wall of the dilated LV, the mass/volume ratio of the diseased myocardium may be re-established. Interest in this operation has however declined due to conflicting outcomes [1–4]. There are few long-term results, with no reports in the literature of survival beyond 5 years [5]. We present the case of a patient with DCM who remains in NYHA functional Class I eight years following PLV.

2. Case report

A 65-year-old man presented with an eight-year history of worsening dyspnoea. His symptoms of heart failure (NYHA functional Class III) were refractory to maximal medical therapy for more than two months prior to surgical referral. On physical examination he was in atrial fibrillation and had a systolic murmur consistent with mitral regurgitation. Transthoracic echocardiography, cardiac multiple gated acquisition (MUGA) magnetic resonance scan and direct coronary angiography, confirmed a diagnosis of idiopathic DCM. The echo measurements of left ventricular end diastolic diameter (LVEDD) and left ventricular end systolic diameter (LVESD) were 7.0 cm and 6.3 cm, respectively. The cardiac angiogram calculated the ejection fraction (EF) at 18%; it also revealed a concomitant 50% stenosis of the left anterior descending (LAD) artery. In view of his age, he was not offered a place on the heart transplant list. According to preoperative findings, he was scheduled for an intra-papillary PLV, which was carried out in February 1996. Intraoperative findings were of a grossly enlarged poorly contracting left ventricle, as well as a considerably dilated right atrium. Once on cardiopulmonary bypass, the apex of left ventricle was lifted upward and incisions were made lateral to the base of the antero-lateral papillary muscle and medial to the base of the posteromedial papillary muscle, leading to a lateral left intra-papillary ventriculectomy. In addition, mitral valve repair, and single saphenous vein graft to LAD artery were also performed. The mitral valve repair consisted of a single pledgeted edge-to-edge stitch. Postoperative recovery was complicated on day 1 by an episode of poorly controlled hypertension, followed by sudden bleeding. At emergency exploration, a tear in the ventricu-lotomy line was successfully managed with interrupted sutures reinforced with bovine pericardial patch. He made a full recovery and was discharged four weeks after surgery. Histological examination confirmed idiopathic DCM.

A transthoracic cardiac echocardiogram performed on postoperative day 7 showed overall improvement in ventricular function with an EF 45%, left EDD 6.0 cm and ESD 4.9 cm. Following discharge he was seen at 6 and 12 weeks post-operatively, and then at 6 months and yearly thereafter. After the first 6 weeks post discharge, with all wounds healed appropriately and with a stable sternum, the patients underwent 4 weeks of successful rehabilitation program. There was a gradual improvement of symptoms up to 6 months post-surgery, when the patient reached NYHA
functional class I, being at this stage able to walk more than a mile per day on average. Currently, he remains in NYHA functional class I with a remarkable exercise tolerance. The most recent cardiac MRI showed good global contractility, and wall thickening. LV dimensions were: EDD 6.2 cm and ESD 5.1 cm (Fig. 1A, B). This suggests that there has been an average only 0.2 cm dilation in LV size (both EDD and ESD) since surgery. Trans-oesophageal echocardiogram showed mild to moderate mitral regurgitation.

3. Discussion

Despite the success of transplantation, its Achilles heel is the persistent and worsening shortage of organ donors. In addition, the vast majority of those with end stage heart failure do not qualify for transplantation due to increasing age and co-morbidities [1-4]. Optimal medical treatment alone provides only a 16% survival benefit at one year, which declines within five years [5]. Alternative surgical options to treat this condition have been developed, including a variety of direct surgical approaches to restore normal geometry and size of the failing hearts including PLV, endo-ventricular patch-plasty, under sizing of the mitral annulus, cardiomyoplasty and prosthetic external constraints [1]. PLV has been shown to decrease early NYHA functional class, LVEDD and improve left ventricular function [1-6]. However there is little data describing long term clinical outcomes.

We recently published a review of the literature on early and late outcomes in all series of PLV reporting ≥ 15 patients [4]. Early outcome, as measured by in-hospital death, varied between 3.2% to 28%. Mid-term analysis of 386 cases resulted in 248 patients surviving, of whom 179 had sustained improvement in NYHA functional status, EF and no evidence of re-dilatation.

However most of these reports had duration of follow-up no longer than 36 months. Furthermore, late survival varied from 80% to 40%. There are many possible factors explaining these outcomes since differences were observed among selected series: patient selection, intraoperative assessment; surgical technique, including type of concomitant mitral valve surgery, and postoperative management of malignant arrhythmias [4].

There is also evidence that difference in long term benefit is dependent on different degree of myocyte hypertrophy and myocardial fibrosis. Minimal degree of myocyte hypertrophy and myocardial fibrosis has been associated with better late outcome [7], as also indicated in our case report. In conclusion, this case report seems to provide evidence of surprisingly long-term benefit following PLV. This suggests that not all has been understood about this controversial, and now almost completely abandoned, surgical procedure.

References