

Isolated Effect of Partial Left Ventriculectomy for Dilated Cardiomyopathy: A Case Report

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Abstract

A 38-year-old man underwent the Batista operation to treat end-stage dilated cardiomyopathy. There was no associated mitral regurgitation, so only partial left ventriculectomy was performed. The patient recovered successfully. His New York Heart Association (NYHA) class improved from IV to I, ejection fraction increased from 8% to 37% and left ventricular diastolic dimension decreased from 89 to 68 mm. Cardiac output and stroke volume increased from 3.8 to 6.7 l/min and from 52 to 85 ml/min, respectively. This case shows the isolated positive effect of partial left ventriculectomy without mitral valve reconstruction.

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Key Words

- Cardiac surgery
- Cardiomypathies (dilated)
- Heart failure
- Ventricular function
- Ventricular remodeling

INTRODUCTION

The Batista operation has become one of the treatments of choice for end-stage cardiomyopathy, but many questions still remain^{1–4}. The isolated effect of partial left ventriculectomy (PLV) is difficult to define in the clinical setting because most patients who undergo the Batista operation require concomitant mitral valve reconstruction for associated mitral regurgitation.

We demonstrate the isolated effect of PLV in a patient who underwent only PLV.

CASE

A 38-year-old man (173 cm, 66 kg, body surface area 1.79 m²) suffered the first onset of heart failure in March 1997. The diagnosis was idiopathic dilated cardiomyopathy. Several medical treatments including β -blocker and angiotensin converting enzyme inhibitors were given but finally failed. His preoperative clinical condition was New York Heart Association (NYHA) class IV with medication of carvedilol 20 mg, propranolol 15 mg, enalapril 10 mg, and furosemide 100 mg, daily. Preoperative parameters are shown in **Table 1**. There was no significant mitral regurgitation despite an enlarged left

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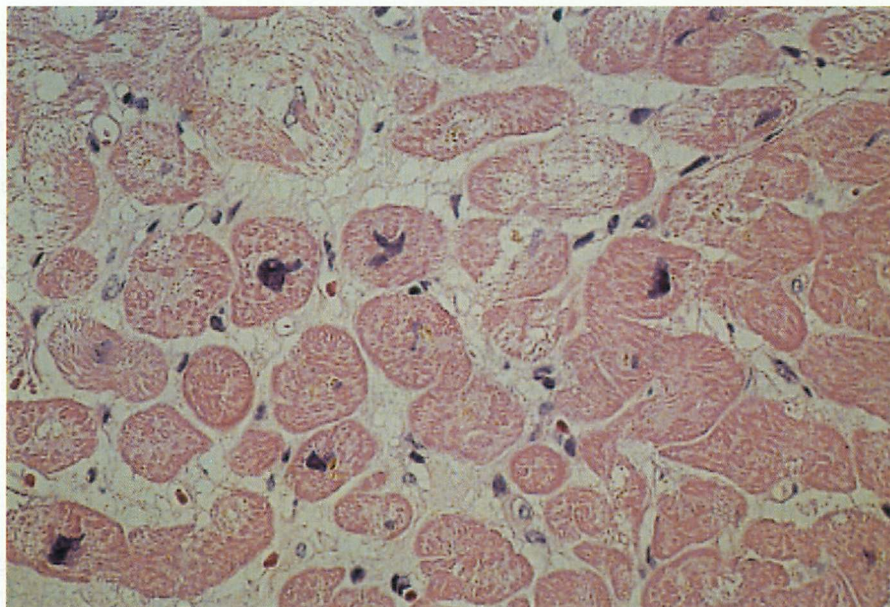
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Table 1 Preoperative and postoperative parameters

	Preoperative	Postoperative	
		1 month	6 months
Ejection fraction (%) *	8	30	37
Left ventricular diastolic dimension (mm)	89	67	68
Left ventricular end-diastolic volume (ml)	337	261	260
Left ventricular end-systolic volume (ml)	275	192	197
Cardiac output (l/min)	3.8	5.2	6.7
Stroke volume (ml/min)	52	65	85
Heart rate (beat/min)	74	80	79
Arterial blood pressure (mmHg)	88/57	93/67	89/64
Left ventricular end-diastolic pressure (mmHg)	17	11	7

*Measured by cardiac pool scan.

**Fig. 1** Photomicrograph of the resected myocardium

The myocytes show variation in size (mean transverse diameter: $20.0 \pm 3.1 \mu\text{m}$). Mild scarcity of myofibrils is observed in the myocytes, and interstitial fibrosis is present between individual myocytes. Hematoxylin-eosin stain, original magnification $\times 100$ (examined by Fumio Terasaki, MD, the Third Department of Internal Medicine, Osaka Medical College).

ventricle.

Surgery was performed in April 1998. A normothermic cardiopulmonary bypass was instituted through a midline sternotomy. Under the on pump beating heart, the left ventricle was incised and a large piece (9 cm longitudinal, 6 cm wide, 80 g weight) of left ventricular free wall between the anterior and posterior papillary muscle was excised including most of the apex. Then the ventricle was closed with 2-0 polypropylene continuous sutures

in 2 layers. Cardiopulmonary bypass time was 52 min and the total duration of the operation was 150 min.

The postoperative course was uneventful. The patient was extubated at 3 hr after the operation. Inotropic support was tapered off over a short period and no mechanical support was necessary. Clinical recovery was good and he was discharged on the 20th postoperative day after several postoperative examinations. Six months later, he returned

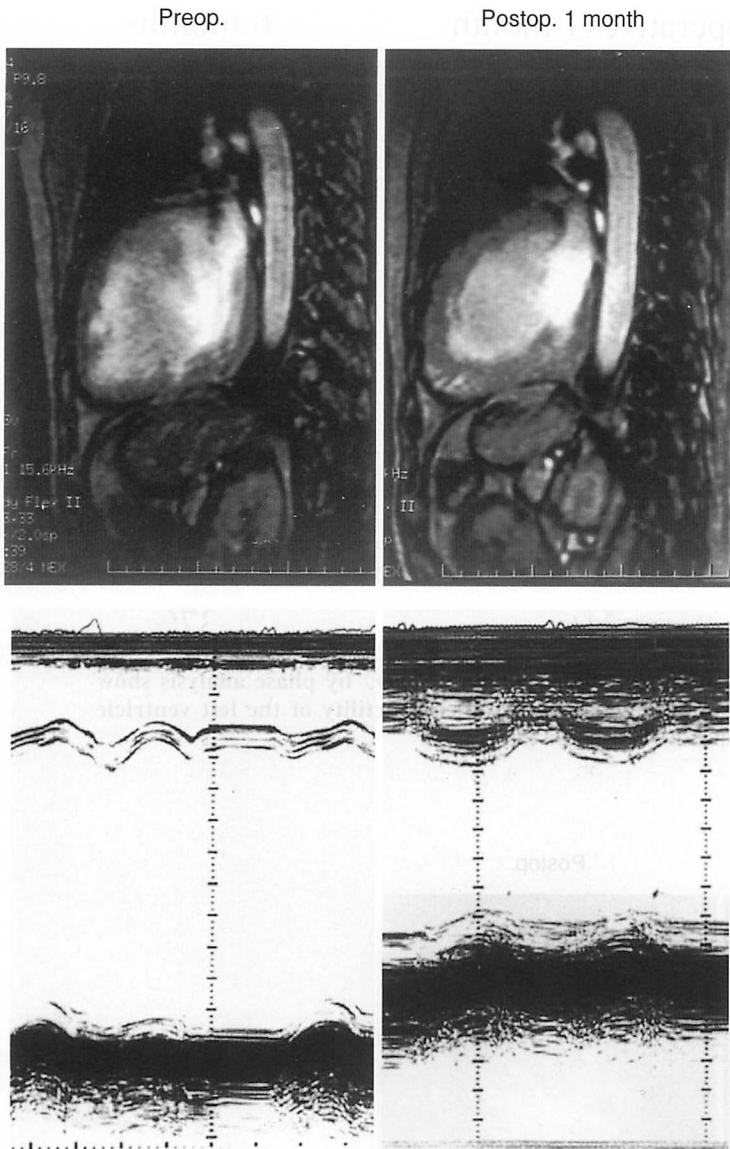


Fig. 2 Magnetic resonance imaging (MRI) left ventriculograms and M-mode echocardiograms before (*left*) and 1 month (*right*) after the Batista operation in a 38-year-old man

Upper: Right MRI shows the reduced size of the left ventricle with thickened wall after the operation.

Lower: Right echocardiogram shows decreased dimension (from 89 to 68 mm) and improved contraction postoperatively.

to the hospital for routine check-up. He was in NYHA class I with medication of amiodarone 100 mg, enalapril 5 mg, digoxin 0.25 mg and furosemide 60 mg, daily. The pathology of the excised left ventricular wall is shown in **Fig. 1** and the postoperative cardiac parameters in **Table 1** and **Figs. 2–4**.

COMMENT

Use of the Batista operation began in December 1996 in Japan to treat end-stage dilated cardiomyopathy¹⁾. Thirty patients have been treated and the results were reported recently²⁾. The early results of this particular procedure have been reported from several institutes^{3–5)}, but the details of the isolated

PLV effect are still unclear because concomitant mitral valve reconstruction masks it in many patients. We fortunately had a rare opportunity to perform only PLV in a patient with severe heart failure and enlarged left ventricle unassociated with significant mitral regurgitation in idiopathic dilated cardiomyopathy. As shown here, his cardiac parameters and clinical status have clearly improved following PLV.

The effect of PLV depends on 2 factors: Based on Laplace's law, by decreasing the diameter of the left ventricle with PLV, wall tension reduces and the ventricular contraction becomes efficient; and the biological factor of myocytes and interstitial fibrosis. If the left ventricle is entirely deteriorated

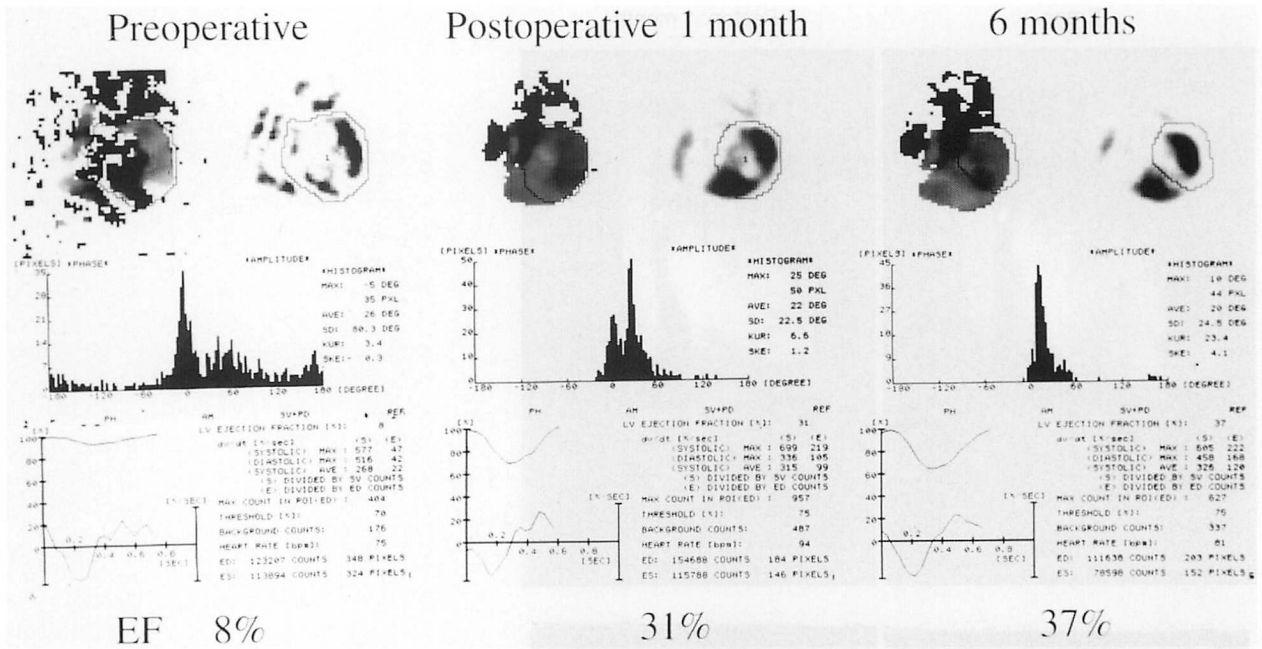


Fig. 3 Histograms in multigated acquisition technique scanning (Upper) by phase analysis show improved synchronicity (middle) and obvious increased contractility of the left ventricle (lower) after the Batista operation in a 38-year-old man

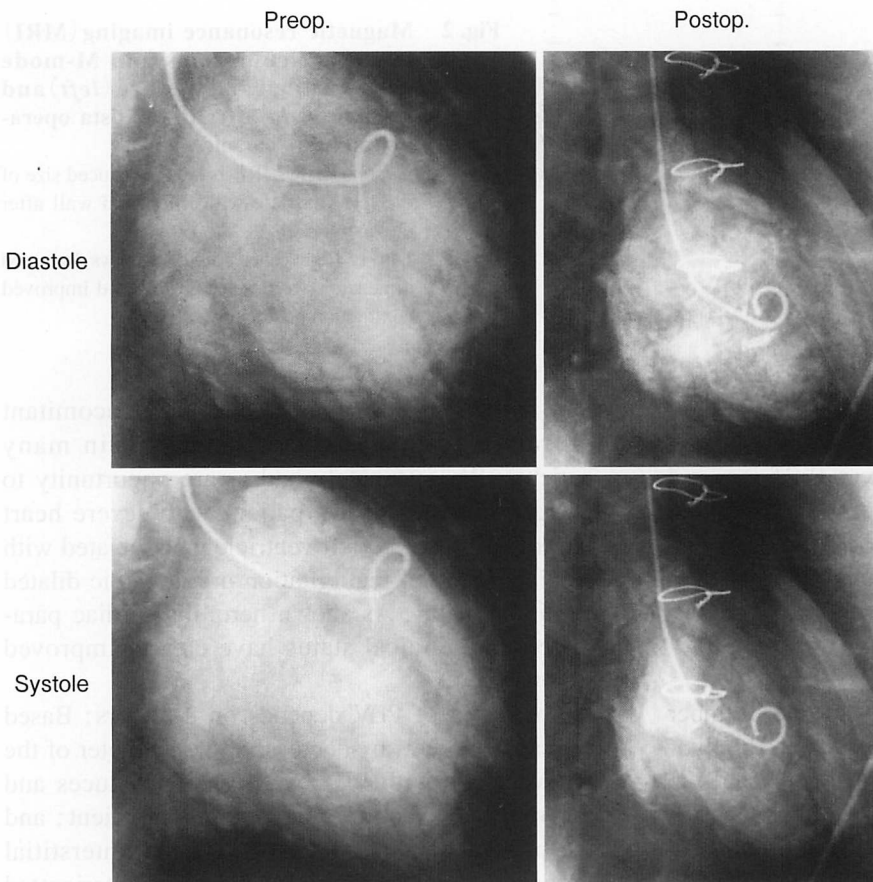


Fig. 4 Left ventriculograms before and after the Batista operation in a 38-year-old man. Preoperative ejection fraction was 10% with enlarged left ventricle (left) and was increased to 32% 6 months after the operation (right). No significant mitral regurgitation was noted at either time.

with severe myocyte loss and widespread fibrosis, the operation will not work. If the antero-septal area of the left ventricle is severely damaged and the postero-lateral area is relatively good, cardiac function may become worse if PLV is performed between the 2 papillary muscles at the postero-lateral area.

We think that the patient reported here was very

suitable for PLV in terms of extent of disease and appropriate timing of the operation. We also noted that improvement of synchronicity shown by the histogram of multigated acquisition technique scan is a favorable sign of improved cardiac function. Although many questions still remain, PLV is effective in selected patients suffering from end-stage cardiomyopathy.

要 約

拡張型心筋症に対して単独左室部分切除を施行した1例

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僧帽弁逆流を伴わない拡張型心筋症症例（38歳，男性）に対して単独左室部分切除術を施行し，左室部分切除術単独の効果を評価した．前後乳頭筋間の左室自由壁を切除して，左室内径を89から68mmに縮小した．術後経過は順調で，左室駆出率は8%から37%へ増加し，心拍出量，1回拍出量はそれぞれ3.8から6.7l/min，52から85ml/minへと増加した．臨床症状はNYHA分類Ⅳ度からⅠ度へ改善し，6ヵ月後に社会復帰した．本例の結果から，弁手術を施行しない左室部分切除術単独による左室縮小術の心機能に及ぼす効果が示された．

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References

- 1) Suma H, Horii T, Ichihara T, Hisamochi K, Takuma S, Iwahashi K: New surgical procedure for patients with dilated heart and end-stage cardiac failure (Batista procedure). *J Cardiol* 1997; **29**: 117-122 (in Jpn with Eng abstr)
- 2) Suma H, Isomura T, Horii T, Sato T, Kikuchi N, Iwahashi K, Hosokawa J: Two-year experience of the Batista operation for non-ischemic cardiomyopathy. *J Cardiol* 1998; **32**: 269-276
- 3) Batista RJ, Verde J, Nery P, Bocchino L, Takeshita N, Bhayana JN, Bergsland J, Graham S, Houck JP, Salerno TA: Partial left ventriculectomy to treat end-stage heart disease. *Ann Thorac Surg* 1997; **64**: 634-638
- 4) McCarthy PM, Starling RC, Wong J, Scalia GM, Buda T, Vargo RL, Goormastic M, Thomas JD, Smedira NG, Young JB: Early results with partial left ventriculectomy. *J Thorac Cardiovasc Surg* 1997; **114**: 755-763
- 5) Moreira LF, Stolf NA, Bocchi EA, Bacal F, Giorgi MC, Parga JR, Jatene AD: Partial left ventriculectomy with mitral valve preservation in the treatment of patients with dilated cardiomyopathy. *J Thorac Cardiovasc Surg* 1998; **115**: 800-807