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Restrictive Mitral Annuloplasty in Dilated Cardiomyopathy

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Summary

Moderate to severe mitral insufficiency importantly affects short-term survival in patients with end-stage dilated cardiomyopathy (DCM). Restrictive mitral valve annuloplasty is possibly an alternative strategy. Since 1998, 11 patients with DCM and mitral insufficiency underwent restrictive annuloplasty at our institution. Restrictive mitral anuloplasty may represent an alternative or bridge to transplantation in some patients.

Introduction

The presence of mitral insufficiency (MI) in dilated cardiomyopathy (DCM) represents an adverse prognostic indicator for short-term survival [1,2]. Volume left ventricular (LV) overload worsened by MI increases wall tension and myocardial stretching, determining apoptosis of myocytes [3]. Heart transplantation (HTX) represents first-choice therapy [4,5]. In recent years alternative surgical options, including LV reduction and restrictive mitral valvuloplasty (RMV) [6,7] have been investigated. RMV has improved short and medium-term survival and NYHA class [8-10].

Material and Methods

Between October 1998 and January 2000, 11 consecutive patients

with DCM underwent RMV at our Institution. All patients had been hospitalized at least once during the preceding 6 months for CHF, 2 were listed for HTX, 2 presented contraindications for HTX (2 due to coexisting clinical states, 1 for age). Patients' characteristics are listed in Table 1. Contraindications to RMV included diagnosis of mitral valve disease prior to CHF advanced symtoms, and coexisting moderate-to-severe aortic valve incompetence. Preoperative pharmacologic pre-treatment consisting of maximized ACE-inhibitor therapy prosecution, infusion of intravenous dopamine and, when tolerated, reduction of diuretics. After initiation of dopamine infusion, all patients repeated preoperative transthoracic echocardio-graphy at our Institution, to determine IM pathophysiology and degree, LV diameters and wall thickness, global and segmentary LV function. In all patients a preoperative coronary angiogram, left ventriculogram and right heart cathterization were obtained. Preoperative IABP was initiated in 4 cases. Surgery was performed through median sternotomy using standard CPB techniques. Myocardial protection was achieved with antegrade/retrograde cold blood cardioplegia with normothermic induction [11]. RMV consisted of annuloplasty with implantation of a rigid Carpentier-Edwards ring, mean undersizing was 4.8 ± 2.1. Left endoventriculo-plasty was associated in 3 cases and 3 patients underwent coronary revascularization. Oral ACE-I (through the nasograstric tube) were started 6 hours postoperatively, dopamine infusion was maintained for the first 6 postoperative days in all patients.

Table 1

PREOPERATIVE DATA	
Male / Female	7 / 4
Age (years)	62 ± 6
Etiology: ischemic / idiopathic	6/5
EDV (ml)	232 ± 35.3
EF	0.24 ±0.04
NYHA class	3.4 ± 0.57
MI (1-4)	3.3 ± 0.48
Parsonnet Score	17 ± 7.2
Listed for HTX	2
Preop. mechanical ventilation	2
Tracheostomy	1
IABP	4

Results

There was 1 (9.1%) hospital death. Mean duration of mechanical ventilation and intravenous catecholamine support after operation were 3.1 ± 3.4 days and 8.4 ± 4.6 days respectively. Postoperative IABP

Table 2

POSTOPERATIVE DATA	
Hospital death	1
Delayed sternal closure	1 (48 hours)
Reoperation for bleeding	1
Postoperative IABP (days)	1.2 ± 0.91
Mechanical ventilation (days)	3.1 ± 3.4 (range 1-12)
Intravenous inotropes (days)	8 ± 6.67
Pneumonia	1
Hospital stay (days)	25 ± 15
EF at discharge	0.32 ± 0.07
EDV at discharge (ml)	189 ± 32

duration was 1.2 ± 0.9 days (9 patients). One patient underwent delayed sternal closure 48 hours after operation. Postoperative data are summarized in Table 2. At a mean 9-month follow-up (range 5-15), 9 are in I-II NYHA class and 1 patient died of CHF, 6 months after operation, awaiting for HTX. The patient who did not survive at operation and the one who showed irreversible progression of CHF were those in the poorest preoperative conditions.

Conclusions

The incidence of CHF has increased four times during the last decade, due to optimization of medical therapy, increasing advanced age population and more accurate diagnosis [11]. Consequently, more patients reach the advanced state of disease and, thus, refractory to medical therapy. Because HTX represents the therapeutic gold standard of this clinical picture [3,4], an increasing population, without a parallel increase of donor organs, of such patients are listed. This also influences results of HTX itself [12,13], and has gradually given rise to the delineation of more restrictive criteria for HTX listing [13] and the development of "alternative surgical options", including implantation of left ventricular assist devices/ artificial hearts [14], cardiomyoplasty [15], left ventriculoplasty [6], and correction of associated MI [7]. This chapter of cardiac surgery has developed also because of an increasing population of patients presenting with absolute or relative contraindications to HTX. RMV is a relatively straightfarward and low-risk technique that has given good early-to-medium term results in terms of survival and follow-up NYHA class. Preliminary experience has been primarily directed to patients with idiopathic DCM, but the technique may represents a possible option also in case of ischemic DCM. Indications for RMV are unclear, but an aggressive approach in NYHA III-IV patients, particularly in the presence of adverse outcome prognostic indicators despite optimal medical therapy [13], is probably

advisable. Pharmacologic pretreatment with intravenous dopamine, tailoring of ACE-inhibitors, diuretic restriction and IABP when needed has been adopted in all patients. In this respect, it should be remarked that sympathetic activity is increased in CHF [16] and, consequently, low-dose cathechol-amine support is often ineffective; indication for preoperative dopamine infusion in such patients must consider this pathophysiologic aspect of advanced CHF. It is diffilcult to define contraindications for operation related to a too advanced state of CHF, but patients with multiple risk factors are certainly at very high risk for surgical correction and multi-organ failure represent the absolute contraindication to surgery. RMV may represent an alternative or bridge to HTX in some patients. Optimal patients'selection and medium-to-long term results are unknown.

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