Proposal for bail-out procedures - Valves
Use of Alfieri stitch technique in a patient with hypertrophic obstructive cardiomyopathy

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Abstract

Systolic anterior motion of the anterior mitral leaflet plays an important role in the dynamic outflow tract obstruction encountered in patients with hypertrophic obstructive cardiomyopathy. Here we present a 58-year-old male patient who was successfully treated with a myectomy procedure applied along with the edge-to-edge Alfieri stitch technique. The use of the Alfieri technique provides satisfactory short-term results and can be considered as an alternative adjunct to abolish systolic anterior motion.

Keywords: Alfieri stitch technique; Edge-to-edge technique; Systolic anterior motion; Hypertrophic obstructive cardiomyopathy

1. Introduction

The Morrow procedure is the surgery of choice in patients who had the diagnosis of hypertrophic obstructive cardiomyopathy (HOCM) [1]. Recently, we learned that the systolic anterior motion (SAM) of the anterior mitral leaflet and the mitral-septal contact play much more important roles than previously thought in the development of dynamic left ventricular outflow tract (LVOT) obstruction [2]. With this knowledge, attention has been recently directed to the reconstruction of the redundant anterior mitral valve leaflet and many surgeons started to use longitudinal and/or vertical plication techniques along with a myectomy procedure during the surgical intervention [3,4]. The Alfieri edge-to-edge stitch technique is a simple way of mitral valve repair which can be used safely in a variety of situations. This modality has been sporadically tried by some surgeons to abolish SAM in patients with HOCM [5]; but, its use has not gained widespread acceptance in this challenging patient population. In this report, we present a patient in whom SAM could be successfully abolished by the edge-to-edge Alfieri stitch technique.

2. Case report

A 58-year-old male patient was referred to our clinic with shortness of breath and palpitation. His electrocardiographic evaluation revealed a severe degree of left ventricular hypertrophy. Subsequent echocardiogram demonstrated severe concentric left ventricular hypertrophy, left ventricular ejection fraction of 55% and interventricular septum thickness of 17 mm. The degree of mitral regurgitation was 3(+) and there was SAM of the anterior mitral leaflet. Due to the presence of significant resting gradient (90 mmHg) and disabling symptoms, medical treatment was not attempted and an elective surgical intervention was planned.

The patient was taken to the operating theatre where transesophageal echocardiogram (TE) confirmed the initial diagnosis of HOCM. The mean pressure gradient across the LVOT was measured at 80 mmHg. Cardiopulmonary bypass (CPB) was instituted by cannulations of the ascending aorta and the right atrium. Myocardial protection was achieved with moderate hypothermia (28 °C) and retrograde blood cardioplegia. The left ventricle was vented with a catheter introduced via the right superior pulmonary vein. Following the aortotomy, a myectomy procedure was then carried out and a muscle mass of 0.7 cm in thickness was removed from the interventricular septum. Since the initial thickness was <2 cm, special attention was given to avoid an iatrogenic ventricular septal defect and the myectomy trough was extended to the base of papillary muscles. After muscle resection, attention was then directed to the mitral valve leaflets. The anterior mitral leaflet was found to be floppy and redundant in nature and no underlying organic cause of mitral insufficiency was identified. A central edge-to-edge Alfieri stitch 1 cm away from the free edges was placed from the anterior leaflet to the posterior leaflet. The weaning from CPB was uneventful and transesophageal echocardiogram revealed a trivial degree of mitral regurgitation and no SAM with resting and provoked mean gradients of 13 and 22 mmHg, respectively. Postoperative transthoracic echocardiogram revealed similar results with intraoperative TE (Fig. 1) and the patient was discharged on postoperative day 7.

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3. Discussion

In patients with HOCM, the principal factors necessary for SAM to occur include the pushing forces of blood flow on the mitral valve, anteriorly positioned mitral valve coaptation plane and the presence of redundant valve leaflets [2,6,7]. In their review, Sherrid and colleagues [2] gave new insights to our understanding about the pathophysiology of dynamic left ventricular outflow tract obstruction. They reported that the occurrence of SAM is related to the re-direction of blood flow in the left ventricular cavity. They also stated that the laterally and posteriorly directed blood flow, because of a septal bulge, catches and pushes the floppy anterior mitral leaflet towards the septum and creates a dynamic outflow tract obstruction.

The persistence of SAM after surgical intervention is usually associated with poor long-term clinical outcomes and increases significantly the reintervention rates in these patients. The Alfieri edge-to-edge stitch technique is an effective way of mitral valve repair and is associated with satisfactory clinical outcomes in various diseases [5,8]. Bhudia et al. [5] used this repair technique in 14 HOCM patients and only two of them required reoperation during the follow-up period. Although they stated that the elimination of SAM does not always occur with this technique, they also added that the need for reoperations is not because of the failure of the edge-to-edge repair. In the light of current experience with Barlow’s disease, we decided to place the stitch 1 cm away from the free edges of the leaflets to abolish SAM and create a more posteriorly located coaptation plane. However, we should also accept that there are not enough data about the technical aspects of its use in this challenging patient population and further prospective clinical studies are necessary to determine its durability and effectiveness in patients with HOCM.

Recently, nonsurgical interventions including DDD pacing and alcohol septal ablation have been tried to reduce LVOT obstruction. Though DDD pacing may reduce resting gradients, the results of this method are usually less satisfactory than those of surgery and this modality should not be considered as a primary treatment for HOCM patients [2,9]. The alcohol ablation is another technique which decreases the septal thickness by alcohol-induced infarction. The therapeutic effects of alcohol ablation are usually related to the direct negative inotropic effects of the septal infarct at the immediate postoperative period and subsequent septal thinning at the late follow-up period. However, this technique may be associated with significant complications including death, complete heart block and LAD dissection or occlusion [2,10]. Additionally, since the follow-up of alcohol-ablated patients is small, we need further prospective clinical trials to compare the results of this modality with those of surgical resection.

In conclusion, the Alfieri edge-to-edge stitch technique provided very promising short-term results in a patient with HOCM. This technique is much less time consuming than other plication techniques and it can be considered as an alternative adjunct to abolish systolic anterior motion associated with HOCM.

References