Proposal for bail-out procedures - Cardiac general

Early Amplatzer occluder closure of a postinfarct ventricular septal defect as a bridge to surgical procedure

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Abstract

The management of postinfarction ventricular septal defects represents a challenge to both cardiologists and surgeons due to the high morbidity and mortality rate. We report the case of a 79-year-old patient who developed an apical rupture of the ventricular septum, nine days after an anterior myocardial infarction. As the patient was in cardiogenic shock and developed acute pulmonary edema we chose to perform a percutaneous closure of the septal defect using an Amplatzer occluder (AO). Despite the incomplete closure, the placement of the device greatly improved the patient's clinical condition allowing the delay of the surgical procedure, which could be performed ten days later with an excellent result.

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1. Introduction

Percutaneous closure of ventricular septal defects (VSD) has become a widely accepted alternative to surgical repair [1]. Several devices have already been used for this purpose: the Sideris prosthesis, the Rashkind device, the Cardio Seal septal occluder and the new Amplatzer mVSD duct occluder [1]. The percutaneous procedure poses, however, several significant challenges in the postinfarction period as closure devices are difficult to place on fragile, dissected or aneurysmatic septum [2, 3]. Therefore, a higher rate of complications has been reported when Amplatzer occluders (AO) are used for closure of VSD, one of the complications being a residual shunt due to the incomplete closure of the defect [3]. We report a case of an incomplete closure of a postinfarction VSD by an AO, which significantly improved the clinical course of our patient, subsequently allowing us to perform a semi-elective surgical procedure.

2. Case report

A 79-year-old woman was referred for a postinfarction VSD occurring nine days after an acute anterior myocardial infarction. On echocardiography the septal defect was approached by a left ventricular transinfarct incision. The Amplatzer was found in place but was secondarily reinforced with an over-and-over running suture (Fig. 1a). After closing the ventriculotomy the patient was weaned from cardiopulmonary bypass on catecholamines and IABP.

The postoperative course was uneventful: the IABP was removed 24 h later and the patient was discharged at day twelve. At one year follow up the patient was doing well, with no clinical signs of heart failure.
3. Discussion

We describe the case of an uncompleted AO closure of a postinfarct VSD followed by classic surgical correction. This combined approach permitted to delay surgical repair and perform it later, on a more stable patient.

Postinfarction rupture of the ventricular septum has a poor prognosis: nearly 50% of patients with postinfarction septal rupture die within one week without intervention, 80% within four weeks and only 7% live longer than one year [5]. The overall incidence of this severe complication is, however, decreasing as a result of aggressive pharmacological treatment and interventional therapy in patients with evolving myocardial infarction [3, 5]. In the report of Szkutnik, the mean period before procedure was eight weeks after the infarction [3]. However, when VSD occurs, delaying its closure in hemodynamically unstable patients will result in a state of progressive multisystem failure. Despite all the advances of modern cardiac procedures, surgery alone has a poor prognosis although apical location has the best prognosis; the 30-day mortality in the GUSTO-1 trial for patients treated surgically was 47% vs. 94% for those treated medically. The difficulty of the operation and the severity of the prognosis are due to two main factors: (1) the challenge of repairing a septal tissue with friable and necrotic borders; and (2) the aggravation of the cardiogenic shock when operating on an acutely infarcted myocardium. New strategies, alone or associated with conventional surgery [4], may improve these outcomes: percutaneous closure of the VSD or wider use of extracorporeal life support.

Percutaneous closure of a postinfarct VSD remains one of the most challenging procedures in interventional cardiology because of the poor clinical condition of these patients and of the high failure rate of the procedure [2, 3]. There are only sporadic reports in the literature on percutaneous closure of postinfarction VSD, the results being comparable to the surgical procedure with an overall mortality of 50% but with a higher incidence (20%) of residual shunt [3]. In the short series reported by Szkutnik et al. they conclude that percutaneous closure should be performed only after the 6th postinfarction week when the scar tissue is becoming more solid [3]. One of the risks is a residual shunting due to partial in situ thrombosis of the occluder and to enlargement of defect as a result of resorption of the necrotic tissue [2, 3] which can be followed by systemic embolization of the device [6].

In our case we estimated that our 79-year-old patient’s clinical condition was too critical to perform an early surgical closure of the VSD. We accepted the risk of residual shunting and decided that even a partial closure of the defect would be of a great benefit by reducing the left to right shunt. Indeed, her clinical condition improved after the percutaneous procedure, allowing the weaning of IABP and dopamine; subsequent successful surgical repair was possible under better hemodynamics and more favorable local conditions.

We believe that combining surgery with percutaneous closure may improve the grim prognosis of postinfarct VSD. More clinical studies are required to see whether the concept can be extended as a bridge to surgical closure in selected severely sick patients.

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References