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TRANS CATHETER CLOSURE OF POST INFARCT VENTRICULAR SEPTAL DEFECT BY ASD DEVICE

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Contribution
All the authors contributed significantly to the Case Report.

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ABSTRACT

Post infarction ventricular septal defect carries high mortality and the management of these patients is challenging both for cardiologist and cardiovascular surgeon, because of the patient hemodynamic instability and tissue friability which make the intervention difficult. We report one of our patient who had anterior M I followed by apical ventricular septal defect with cardiogenic shock .The patient was subjected to PCI and the defect was closed successfully with ASD closure device. The patient was discharge successfully from hospital.

Key Words: Ventricular Septal Defect, Myocardial Infarction, ASD Closure Device

INTRODUCTION

Ventricular septal defect (VSD) is a rare but lethal complication of myocardial infarction (MI). The event occurs 2-8 days after an infarction and often precipitates cardiogenic shock.[1] In the era of fibrinolytic reperfusion, the incidence of infarct – related VSD is described to be in range of 0.2-0.34%.[2] 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]

When VSD occurs, delaying its closure in hemodynamically unstable patients will result in a state of progressive multisystem failure. Surgical closure of post infarction VSD is the treatment of choice for this serious complication since 90% of patients without defect closure will die within 2 months.[4]

Despite modern techniques still surgery has got poor prognosis apart for apical rupture which has the best with surgery. Current guidelines recommend immediate surgical VSD closure irrespective of the patient's haemodynamic status to avoid further haemodynamic deterioration.[5,6] Most of the surgeon recommend a delay of 3 to 4 weaks for post infarct VSD closure. However delaying its closure in hemodynamically unstable patients will result in a state of progressive multisystem failure.

Percutaneous closure of ventricular septal defect (VSD) has now become a

widely accepted alternative to surgical repair[7] and is a less invasive option that might allow for immediate complete VSD closure or initial haemodynamic stabilization. Several devices have already been used for this purpose: the Cardio Seal septal occluder and the new Amplatzer mVSD duct occluder.[8] Percutaneous closure of a post infarct 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.[9,10] We report a case of ASD device closure of VSD and PCI to LAD in a 60 year old diabetic patients with Anterior STEMI.

CASE REPORT

A 60 years old diabetic man had anterior myocardial infarction complicated by ventricular septal defect. He was late for thrombolytic therapy and was in cardiogenic shock and acute pulmonary oedema. On auscultation there was pan systolic murmur grade 4/6 on left lower sternal border , bilateral fine crackles up to the midzones .He was started on inotropes and intravenuous frusemide to control his symptom of failure and insulin for glycemic control. Echocardiography was performed which showed about 14mm of apical ventricular septal defect, apical hypokinesia and EF of 35% (Figure 1). After initial stabilization the patient was then subjected to cardiac catheterization for intervention and VSD occlusion with local anesthesia and trans thoracic echo guidance. Cardiac catheterization through right femoral vein and artery performed. He was heparinised with 4000 units of heparin. Left ventricular angiogram in LAO 30/Cranial 25 view with a 5 Fr pigtail catheter (cordis) showed a large muscular VSD measuring about 14mm (Figure 2). VSD crossed from the left side with a cut pig tail catheter by an exchange length 0.035" terumo wire. The wire was snared with a 10mm snare(AGA)(AGA Medical Corporation, Plymouth, MN, USA) in the right pulmonary artery and exteriorized via right femoral vein. A 10F delivery

Figure 1: Color Doppler large jet at apex (VSD)

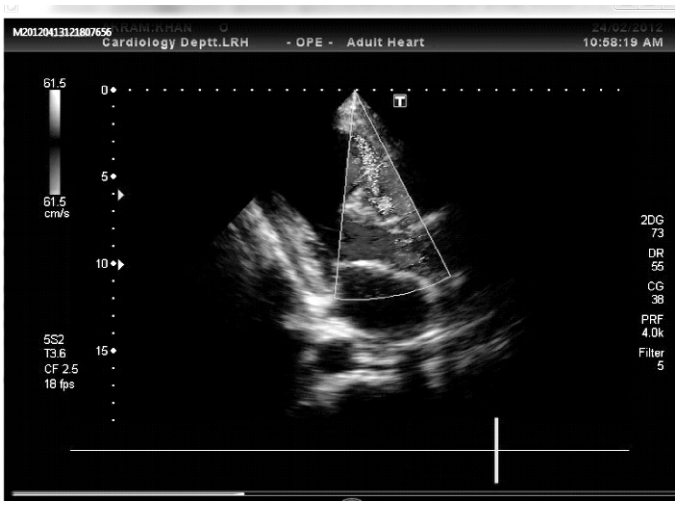


Figure 2: Left Ventriculoangiogram

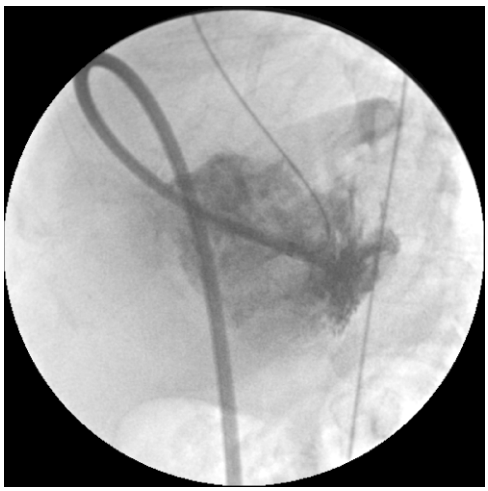


Figure 3: ASD Device Implantation

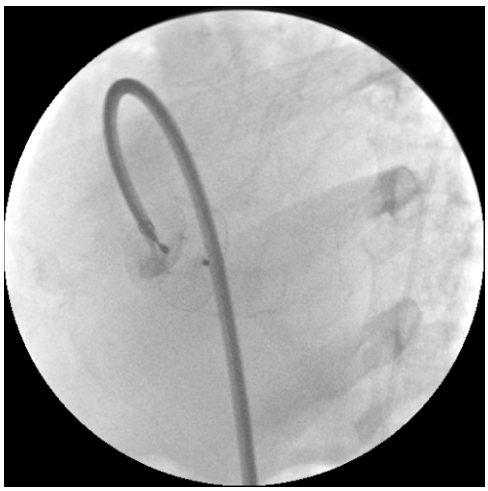


Figure 4: LV gram showing stable disc after implantation

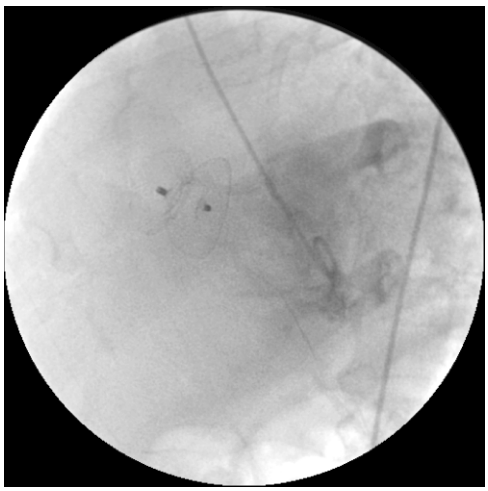
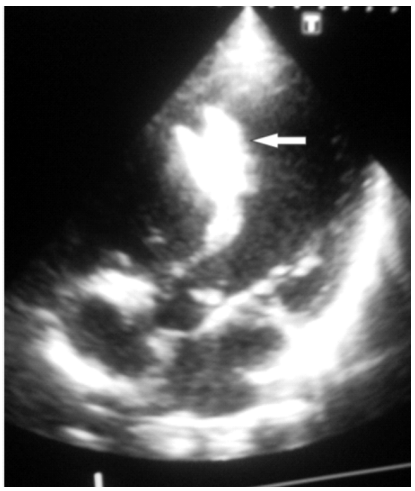


Figure 5: 2 D ECHO APICAL 5 Chamber View Arrow Showing ASD Device



sheath AGA (AGA Medical Corporation, Plymouth, MN, USA) Toroque view was crossed into LV over this wire. An 18mm ASD Occluder device AGA (AGA Medical Corporation, Plymouth, MN, USA) successfully delivered under Flouro /TTE guidance (Figure 3). LV and RV angiograms showed stable LV and RV discs respectively (Figure 4). There was minimal residual shunt. There were no procedural complications and uneventful post procedure hospital stay. He was discharged home on dual antiplatelets, diuretics , statins and insulin. At 6 weeks follow up he was asymptomatic with good effort tolerance. His echo cardiogram showed minimal residual shunt with stable device position (Figure 5).

DISCUSSION

We describe our case of ventricular septal defect that was successfully closed by ASD closure device Post infarction defect of the ventricular septum has a poor prognosis: nearly 50% of patients with post infarction septal defect die within one week without intervention, 80% within four weeks and only 7% live longer than one year[7] with the advent of fibrinolytic therapy and percutanuous intervention the overall incidence of this sever complication has decreased.[3] In the report of Szkutnik, the mean period before procedure was eight weeks after the infarction. 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,[11] may improve these outcomes: percutaneous closure of the VSD or wider use of extracorporeal life support. Percutanuous VSD treatment allows immediate closure after the diagnosis is made which might lead to stabilization or prevention of further deterioration. The results of percutaneous post infarct VSD closure are 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 Szuktnik 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 resorbtion of the necrotic tissue.[3,9] which can be followed by systemic embolization of the device.[12] The overall published number of interventional postinfarction VSD procedures is ,100 patients and the majority of such patients underwent VSD closure in the chronic/subacute phase, or were restricted to patients with residual shunting after surgical patch closure.[13]

Our 65 years old patient was too critically ill to go for surgical closure, so we decided to do percutaneous closure with ASD device and to do coronary angiography. His coronary angiography showed single vessel disease in left anterior descending artery which was stented with a bare metal stent and post infarct VSD closed with an ASD device. Patient clinical condition improved after percutaneous procedure and his NYHA class improved from IV to I in 3 days time. Post procedure Echocardiography performed showing minimal residual shunt, but patient did not show any symptom. At 6 weeks follow up the patient was quite stable and has resumed his activity and his repeat echocardiography showed same minimal residual shunt.

In conclusion primary percutanuous closure of post infarct ventricular septal rupture is a promising technique that might offer an alternative or an adjunctive treatment to surgery.

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