



DEVICE CLOSURE IN VENTRICULAR SEPTAL RUPTURE CASES AFTER ANTERIOR WALL MYOCARDIAL INFARCTION – A STUDY

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ABSTRACT Ventricular septal rupture is a dreaded complication of myocardial infarction. Changes in haemodynamics associated with increased load on the already infarcted myocardium compromises the function of the heart. Ventricular patch repair can be done but device closure in the setting of delayed patch closure can be tried. Improvement in haemodynamics was observed following closure of the defect but all the patients later succumbed to the complications of VSR in myocardial infarction. Management of VSR in myocardial infarction remains a challenge

KEYWORDS : ventricular septal rupture, myocardial infarction

INTRODUCTION

Ventricular septal rupture in case of myocardial infarction has decreased in frequency in post thrombolytic era than pre thrombolytic era though the mortality remains still high.^[1,2] Mortality rate is as high as 90-95% if managed conservatively.^[3,4] Mortality is even higher if it is posteriorly located, associated with right ventricular dysfunction, older age, longer delay between rupture and surgery or cardiogenic shock develops post myocardial infarction^[5,6]. According to GRACE study the rate of post myocardial infarction VSR is lower in PCI (0.7%) than in those treated with thrombolytic therapy (1.1%)^[7]

According to ACC/AHA guidelines patients with VSR should undergo coronary angiography (figure 1) followed by VSR patch repair and CABG^[8] (class I, Level of evidence B). Optimum haemodynamics are to be maintained with use of IABP and inotropes. Preserved LVEF had

MATERIAL AND METHODS:

	Case 1	Case 2	Case 3	Case 4	Case 5
Presentation	12hrs	24hrs	18hrs	3hrs	6 hrs
Myocardial Infarction	AWMI	AWMI	AWMI	AWMI	AWMI
Complication	VSR	VSR	VSR	VSR	VSR
ECG	ST elevation in V2-V6 I aVL	ST elevation V1-V4	ST elevation V1-V6	ST elevation V2-V6 IaVL	T wave inversion in V2-V6
ECHO	VSR 2 mm L to R shunt	VSR 3 mm L to R shunt	VSR 3 mm L to R shunt	VSR 2 mm L to R shunt	VSR 3 mm L to R shunt
treatment	ASD device to closure	ASD device to closure+ primary PCI	ASD device to closure	ASD device to closure	ASD device to closure + primary PCI
Outcome	Died on day 2	Died on day 3	Died on day 2	Died on day 2	Died on day 3

5 cases presented to our institute with ventricular septal rupture post myocardial infarction between June 2019 and February 2020. All of them had anterior wall myocardial infarction with ventricular septal rupture presenting within 24 hours. On examination they had a loud pansystolic murmur in left parasternal area. They all complained of recurrent chest discomfort with breathlessness. ECG showed ST elevation in anterior precordial leads. On chest X ray they developed florid pulmonary edema. On 2D echocardiography ventricular septal defect was seen in apex with left to right shunt. Three of them underwent thrombolysis and two were taken for primary PCI. Four females and one male with age between 55 years and 70 years underwent percutaneous device closure with ASD Device cocoon (Vascular Innovations Co., Ltd., Thailand). Patients haemodynamics improved on closure but the condition deteriorated post operatively. Majority of the patients did not survive beyond day 3 post op. Three of them had developed AKI and all developed refractory cardiogenic shock. One was taken for intracardiac repair but could not survive beyond post op day 3.

TECHNIQUE:

Under local anaesthesia right femoral artery and right femoral vein

better post op outcomes and requirement of renal replacement in patients undergoing VSR patch repair^[9]

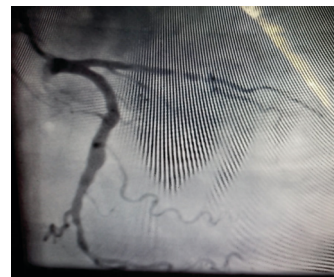


Figure 1: Angiography of VSR patient

access is taken. Terumo guidewire 0.035" guidewire is inserted and passed from aorta to LV and through ventricular defect pulled out with a snare which is inserted through vein to form a AV loop. Delivery sheath is inserted through the venous side and ASD device is placed across the ventricular defect under echocardiographic guidance. After successful deployment device checked in echo and fluoroscopically (figure 2)

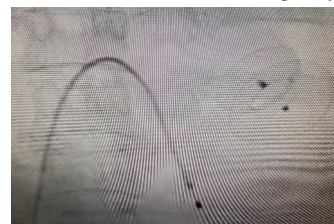


Figure 2 Post deployment of ASD device in VSR

RESULTS

Patients haemodynamics improved on table but later they succumbed

to refractory cardiogenic shock and acute kidney injury within 3 days.

DISCUSSION:

VSR is a rare complication of Acute MI but carries poor prognosis in the long run. Patch closure is generally delayed by surgeons to get firmer scars, good collateral circulation and giving time to body systems to adapt to altered circulation^[11]. IABP is used to bridge gap between VSR and surgical repair for decreasing reperfusion injury to stunned myocardium by decreasing the afterload on left ventricle and improving coronary circulation. Interventricular septum consists of membranous part and muscular part^[10]. Any part can rupture. Ventricular septal rupture is suspected when there is sudden appearance of pansystolic murmur in left parasternal area and echocardiographic evidence of flow across septum. AWMI can lead to apical VSR and IWMI can lead to basal VSR. The latter is usually associated with papillary muscle dysfunction leading to mitral insufficiency. Coagulation necrosis occurs and shear stress across normal and necrotic myocardium leads to VSR. This usually takes 3 to 5 days but can occur within 24 hours due to dissection of intramural haematoma or haemorrhage in diseased myocardium. Poor prognosis is usually due to sudden volume overload in ventricles damaged by large myocardial infarction

CONCLUSIONS

Ventricular septal rupture in case of acute myocardial infarction remains a challenge for both surgeons and cardiologists. Haemodynamic changes and post op complications management requires a team effort of cardiac surgeons, cardiologists and intensivists

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