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Original article

Primary transcatheter closure of post-myocardial infarction ventricular septal rupture using amplatzer atrial septal occlusion device: A study from tertiary care in South India

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ABSTRACT

Objective: The study investigated effectiveness of transcatheter closure of post-myocardial infarction ventricular septal rupture (VSR) using atrial septal device (ASD) occluder in a cohort of patients admitted at our institute.

Method: This was a retrospective, observational and single center study which included patients who were treated with transcatheter closure for post-myocardial infarction VSR at our tertiary care center between May 2000 and August 2014 depending upon inclusion and exclusion criteria. Primary outcome was all-cause mortality at 30-days follow-up. The MELD-XI (Model for End Stage Liver Disease) score was used as a predictor for poor outcome in these patients.

Results: A total of 21 patients (mean age 66.4 ± 5.9 years) were included in the study. Study cohort predominantly included male patients (n = 15; 71.4%) and patients with single vessel disease (n = 15; 71.4%). Revascularization of the culprit lesion, before VSR closure, was attempted in 6 patients. Except one patient (treated with Cera® occluder), all patients were treated with Amplatzer® ASD occluders. Average diameter of VSR was 20.8 ± 6.9 mm. Diameter of the device used in the study ranged from 10 mm to 30 mm. Residual defect was detected in 13 patients (62%). All-cause mortality at 30-day follow-up was observed in 9 (42.9%) patients. Time to VSR closure, diameter of VSR, and serum creatinine levels were significantly related to the 30-day mortality. MELD-XI score was found to be strongly associated with increased risk of mortality.

Conclusion: Primary transcatheter VSR closure using ASD occluders is a feasible approach which can provide reasonable survival outcomes along with equitable mortality rates.

1. Introduction

Ventricular septal rupture (VSR) is a rare but lethal mechanical complication of acute myocardial infarction (AMI). Although introduction of reperfusion therapy reduced the incidence of this deadly complication (from 1 to 3% to 0.2–0.5%), the prognosis is still poor.[1] When conservative treatment is applied, mortality approaches to 90–95% within two months of diagnosis without intervention.[2,3] Extremely poor outcomes can be explained by advanced age of the patient, existence of multiple co-morbidities, severity of coronary artery disease and hemodynamic instability.[4–7]

Surgery is the mainstay for the treatment of post-MI VSR. Evidences documented that surgery in the early stage is favorable for survival. Evidence based guidelines suggest immediate repair and closure of VSR to shorten duration of left-to-right shunting and duration of systemic hypoperfusion which ultimately lessen the chances of multiple organ failure, coma, and death.[8,9] However, in order to allow scarring of tissues surrounding the rupture and to achieve better anchoring of sutures, the surgeons usually delay the surgical repair for 3–4 weeks.[10] This delay further reduces the chances of survival in these patients. Recent series revealed high mortality rate, ranges from 20 to 87% in acute stages.[4–7] Hence, transcatheter closure of VSR has been introduced as a less invasive procedure providing a definitive single treatment for VSR, a bridge to subsequent surgical correction or in selected cases a procedure for residual defects closure after surgical repair.[2] As a result of lower incidence of the complication, there is dearth of clinical

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experience on transcatheter closure of post-myocardial infarction VSR, particularly in Indian hospital setting. Hence, we designed this retrospective study to investigate effectiveness of transcatheter closure of post-MI VSR using atrial septal defect (ASD) occluder in a cohort of patients admitted at our institute over a period of 14 years.

2. Methodology

2.1. Study design and patient population

This was a retrospective, observational and single center study. The study included all the patients who were treated with transcatheter closure for post-MI VSR at our tertiary care center between May 2000 and August 2014 depending upon inclusion and exclusion criteria of the study. Inclusion criteria of the study were 1) Patients who were admitted or diagnosed with VSR as a result of preceding AMI; 2) patients who were treated with transcatheter closure of post-MI VSR during study period. However, the patients with congenital heart disease or patients who developed VSR as a result of trauma were excluded from the study.

Medical records, electronic charts, procedure reports and discharge summaries were reviewed for demographics and clinical characteristics of the patients including age, gender, type of myocardial infarction, culprit vessel(s), presence of co-morbidities, pre-procedural clinical characteristics, device related information and post-procedural outcomes. Though treatment was decided on an individual basis (in agreement with cardiac surgeon and interventional cardiologists), primary transcatheter closure was opted for unstable patients with significant risk factors (age, right

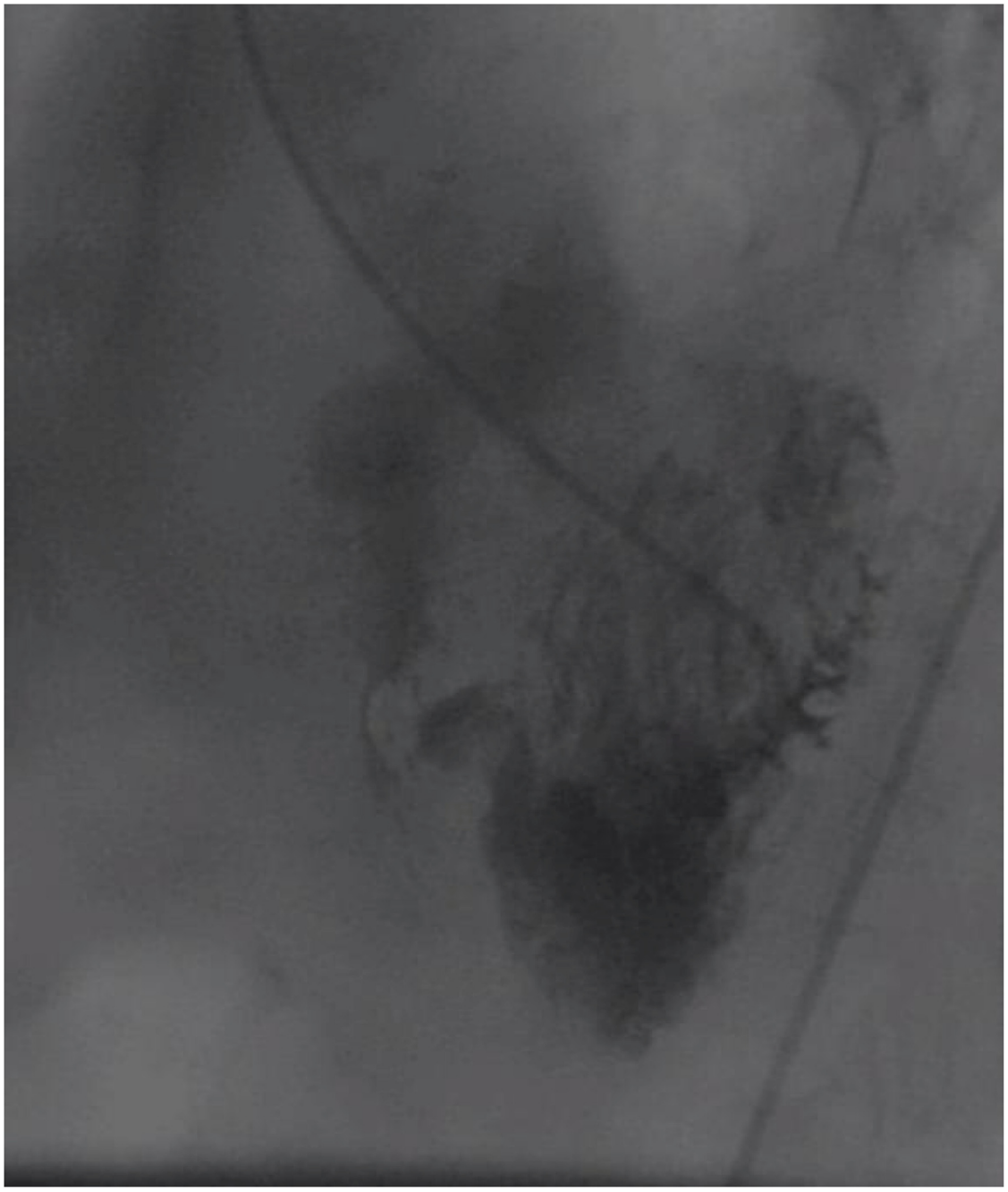

Fig. 1. LV angiogram of a post MI patient showing a defect across the inter-ventricular septum.

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