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SURGICAL MANAGEMENT AND OUTCOME OF POST MI VENTRICULAR SEPTAL RUPTURE: OUR 10-YEARS EXPERIENCE

Cardiovascular

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ABSTRACT

Aims: The aim of this study is to review our experience with late surgical repair of post-MI VSD in a single center over 10 years. **Materials and Methods:** This is a retrograde observational study. All patients who underwent post MI VSD closure from May 2014 to April 2023 were included in the study. **Results:** Total 8 patients underwent post MI VSD repair. The mean age of the patients was 67.62 years with Male: Female ratio 5:3. The VSDs were anterior in 5 (62%) patients with 2 patients having two VSDs. More than 50% of patients were in cardiogenic shock during the initial presentation. All the patients were initially managed conservatively and once stabilized were taken for elective surgery. IABP was used in one patient. Average duration between MI and surgical repair was 23 days. Mean CPB and ACC time was 226 and 98.5 minutes, respectively. On Pump CABG was done in 3 patients. There was no in-hospital mortality and average hospital stay was 29 days. 3 patients were readmitted for post operative effusions. **Conclusion:** Medical stabilization and repair of post MI VSD after 3 weeks had excellent outcomes in terms of in hospital mortality **Clinical Significance:** This study helps us understand the clinical course of this rare entity viz post MI VSD and how the delayed repair can result in good outcomes with less morbidity and mortality.

KEYWORDS

INTRODUCTION

Post myocardial infarction ventricular septal rupture was first described by Latham in 1846[1], in the prethrombolytic era, VSR was reported in around 1–2% of cases of acute ST elevation myocardial infarction (STEMI)[2]. However, recent literature reported an incidence of 0.17% to 0.21%[3,4]. When treated nonoperatively, it has a mortality rate of 65% within 2 weeks of perforation and 86% within 2 months[5,6]. Therefore, surgical repair has become the treatment of choice.

Hereby we perform a single center study to review the outcomes of late surgical repair of post-MI VSD over a period of 10 years.

MATERIALS AND METHODS

Study Design

This is a retrospective observational study of 8 consecutive patients with echocardiography confirmed diagnosis of VSR after MI presenting to a single institution who underwent post MI VSD closure from May 2014 to April 2023.

Data Collection and Statistical Analysis

The patients' demographics, peri-operative data, post-operative course and outcomes were retrospectively obtained from chart review and collected in the electronic database. Data were analysed using SPSS 23.0

Surgical Techniques

After placement of interventional monitoring lines under general anaesthesia median sternotomy done for all patients. Pericardiotomy done and patient heparinized. Aortobicaval cannulation done and CPB instituted. ACC was applied. Cardioplegia was administered and cardioplegic arrest achieved in diastole. SVC and IVC snugged. Left ventriculotomy done directly over the aneurysm area approximately 1 to 2 cm parallel to the left anterior artery (LAD) or posterior descending artery (PDA). VSD visualized. VSD closed using ePTFE patch with interrupted pledgeted 2-0 ethibond sutures. Left ventriculotomy closed with 3-0 prolene in two layers (first interrupted mattress, second continuous mattress) reinforced on teflon felt Rewarming started. ACC removed after standard de-airing manoeuvres. Heart returned to normal sinus rhythm spontaneously. Patient weaned off cardiopulmonary bypass with moderate inotropic support. No systolic thrill noted on RV. Protamine administered. Chest closed after maintaining haemostasis and placement of mediastinal tubes.

RESULTS

Patient Demographics

From May 2014 to Apr 2023, 8 patients with a diagnosis of post-MI VSD were referred to our CTVS department. Out of 8 patients, 5 were male and 3 were female with mean age was 67.6 ± 8.89 years. 3 patients had hypertension, 4 had DM and 2 patients had history of previous episodes of MI (Table 1, Table 4)

Table 1: Patients' Demographic Data

Cases	8
Age(years)	67.6 ± 8.89
Sex (male:female)	5:3
H/o HTN/DM	3/4
H/o Previous episode of MI	2
Cardiogenic shock at the time of presentation	3
1/2/3 vessel disease	6/1/1
Pre-op. Mechanical ventilation (n)	0
Pre-op IABP	0
Pre-op deranged KFT	5
Serum creatinine levels	2.1±0.8

3 patients presented with cardiogenic shock and were managed

conservatively and were then referred to CTVS department for elective surgery. All the patients underwent coronary angiography. Six patients showed significant single vessel disease, 1 double vessel disease, and 1 patient had triple vessel disease. None of the patients required preoperative mechanical ventilation or IABP. Deranged renal function was noted in 5 patients preoperatively with mean serum creatinine levels 2.1±0.8. (Table 1)

Mean duration between MI and surgery was 23±6.047 days. 5 patients underwent only VSD repair, and 3 patients underwent concomitant CABG + VSD closure. Intra-op balloon was placed in 1 patient in view of hemodynamic instability. (Table 2, Table 5)

Table 2: Perioperative Findings

Cases	8
Anterior /Inferior VSD	6/2
VSD size	1.5±0.62 cm
No.of VSDs	Single :6, Double :2
Intra-op IABP	1
CABG+VSD closure	2
Duration between MI and Surgery	23±6.047 days
Duration of hospital stay	29±2.97 days
Readmission	3 (pleural effusion)
In-hospital mortality	0

Six patients had anterior VSD, and two patients had inferior VSD. Average size of VSD was 1.5±0.62 cm. Six patients had single VSD whereas two patients had 2 VSDs each. The mean duration of hospital stay was 29±2.97 days with in-hospital mortality 0. Three patients were readmitted in view of pleural effusion and managed by chest tube insertion and were subsequently discharged. (Table 2)

Table 3: Pre Cardiopulmonary Bypass(CPB) And Post CPB Comparison Between CVP, PA Pressure And NYHA

	PreCPB	Post-op	P value
CVP	28±2	13.5±1.2	<0.01
PA pressure	64±4.8/ 31.5±6.7	28.75± 1.8/11.75±1.28	<0.01
NYHA	IV (8) preop	III (3), II(5) postop	<0.001

Mean pre CPB CVP was 28±2 which improved significantly post CPB to 13.5±1.2 (p value <0.01). Also, there was significant improvement in PA pressures post-surgery from 64±4.8/31.5±6.7 to 28.75±1.8/11.75±1.28 with p value <0.01. All the eight patients presented with dyspnea on exertion with NYHA IV. In the immediate post op period three patients had NYHA III dyspnea on exertion while five patients improved to NYHA II. (Table 3)

Table 4: Patients' Demographic Details

S.NO	AGE	SEX	CAG	TIME FROM STEMI TO VSD (in days)	DURATION B/W MI & SURGERY (in days)	DURATION OF HOSPITAL STAY (in days)	READMISSION
1	76Y	M	SVD	2	26	32	No
2	65Y	M	SVD	3	18	31	Yes
3	68Y	F	SVD	2	29	25	No
4	75Y	F	DVD	8	23	27	No
5	70Y	F	SVD	5	33	33	Yes
6	48Y	M	SVD	3	16	30	No
7	66Y	M	SVD	7	22	28	No
8	73Y	M	TVD	4	17	26	Yes

Table 5: Perioperative Findings

S.No.	OPERATION	CPB TIME	ACC TIME	SIZE OF VSD (CM)	PRE CPB CVP	POST CPB CVP	PRE CPB PA	POST CPB PA
1	CABG+VSD CLOSURE	250	109	2	31	15	70/40	30/12
2	VSD CLOSURE	232	78	1,1	25	12	62/34	28/10
3	VSD CLOSURE	190	80	2	28	14	68/36	28/12
4	CABG+VSD CLOSURE	280	118	1.5	30	15	60/30	32/14
5	VSD CLOSURE	230	104	1,1.5	29	13	58/28	30/12
6	VSD CLOSURE	159	98	0.5	28	14	64/26	28/12
7	VSD CLOSURE	178	86	2	26	12	60/12	26/10
8	CABG+VSD CLOSURE	289	115	2.5	27	13	70/38	28/12

DISCUSSION

VSD is a rare mechanical complication after acute myocardial infarction. Cooley et al. first reported their series of post-MI VSD repair in 1957[7]. Its incidence is decreasing further because of increasing early percutaneous interventions which halts the further ischemic process and thus decreases the occurrence of post MI Ventricular septal rupture.

Conservative management has grave prognosis. Even after surgical repair mortality remains high. The reported mortality in the United States, if repair is done within 1 week, is 54.1%, which constitutes one of the highest mortality rates in today's time[8].

The current ACC/AHA guideline recommends that – "all patients should undergo emergency operation unless there is a clear contraindication" Whether early surgery will bring greater benefits to post-MI VSD patients is still controversial.

In our case, twenty-four patients came to emergency department and were diagnosed as Post MI VSD. These patients were initially managed under department of cardiology. Five patients were discharged against medical advice. Eleven patients who were hemodynamically unstable even after initial resuscitation underwent emergency device closure. Remaining eight patients who were hemodynamically stable after initial resuscitation were referred to CTVS department for elective post MI VSD closure.

In our study, average duration between MI and surgical repair was 23±6.047 days. During this period the patients were kept under close monitory for any signs of deterioration. Advantages of delayed closure were-hemodynamic stabilization, the fibrotic boundary with the surrounding healthy myocardium will provide good tissue to withstand the strength of VSD repair and decreased chances of postop residual VSDs

In our study average size of VSD was 1.5±0.62 cm which was less than other studies like study done by Jian et al in 2023 where mean size of the VSD was 22.6 ± 5.7 mm. This may be reason of better perioperative survival of these patients in our study[9].

In our study mean hospital stay was 29±2.97 days with readmission in 3 patients for pleural effusions. There was no in hospital mortality

The role of CABG during VSR repair remains controversial. Several studies have not found a relationship between CABG and perioperative mortality. In our study there was no significant difference in patients with or without CABG in terms of hospital stay, complications and in hospital mortality

The limitations of this study are its retrospective design and limited sample size. Larger sample size and more detailed analyses are required to support our results.

CONCLUSION

VSR is a rare mechanical complication of STEMI with high mortality. Usually occurs in elderly (>60 yrs). Most patients have single vessel disease with anterior VSDs. In patients with small VSDs and comparatively stable hemodynamics can be taken for a delayed elective repair after 3 weeks with good outcomes. Concomitant CABG does not improve immediate post op outcomes in these patients

especially in single vessel disease

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