



ORIGINAL ARTICLE

Surgical repair of post infarct ventricular septal rupture in Peshawar Institute of cardiology: Experience in a newly established tertiary care hospital.

Waqar Masud Malik¹, Muhammad Nisar², Sobia Siddique³, Aamir Iqbal⁴, Syed Shahkar Ahmed Shah⁵, Abdul Nasir⁶

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ABSTRACT... Objective: To share our experience of post infarct closure of ventricular septal rupture in newly established cardiac center. **Study Design:** Retrospective study. **Setting:** Department of Cardiac Surgery, Peshawar Institute of Cardiology, Peshawar. **Period:** Jan 2021 to August 2024. **Methods:** All VSR repair cases done during this period were included which were 10. **Results:** A total of 10 cases of surgical repair of VSR were included in the study. 50 % were males. Mean age was 65 years (IQR 14.7). 40 % were diabetic while 80% were hypertensive. 20% patients had thrombolysis while 60% had PPCI. 50 % patients presented with NYHA IV symptoms. 10% patients were in pre operative AKI. 40% were in cardiogenic shock. 10 % had pre operative IABP passed while 50 % were stabilized with preoperative inotropic support. 90% of VSR were anterior while 10% posterior. Median VSR size was 13.5 mm (IQR 12.2mm). 20 % VSR were multiple. Median time from onset of symptoms to VSR was 4 days (IQR 2.5). Median time from hospital presentation to VSR repair was 15 days (IQR 20.7). Concomitant CABG was performed in 90% cases. Post operative median ICU stay was 4 days (IQR 4.7) while hospital stay was 7 days (IQR 7.2). Residual VSR, pleural effusion, reopening, post Operative AKI, stroke and heart failure each were present in 10% cases. In hospital mortality was 10%. **Conclusion:** Optimal timing of surgery and preoperative status of patients are important determinant to decrease postoperative complications and mortality.

Key words: Cardiogenic Shock, Myocardial Infarction, Ventricular Septal Rupture.

INTRODUCTION

Ventricular septal rupture (VSR) is one of the rare but fatal complications after myocardial infarction.¹ It usually occurs 2-8 days after acute myocardial infarction and most patient dies with hour to days unless treated surgically.² Prior to the advent of thrombolysis, its incidence was reported to be 1-2%.³ After reperfusion therapy, its incidence has declined to approximately 0.25%.¹ VSR can be divided into anterior or posterior with anterior being most common.⁴

Heart failure and cardiogenic shock are two important determinant of outcome after post infarct VSR. The management of patients with multiple ventricular septal defects remains controversial. Primary closure, interventional catheter techniques, and palliative surgery all may have a role, and specific management guidelines

remain undefined.⁵ GUSTO 1 trial shows that 94% patients die within 4 weeks without surgical intervention.

Early repair of VSR is generally recommended mostly due to hemodynamic instability.¹ But mortality is high when early intervention is done, and it decreases afterward as time passes due to fibrosed myocardium and survival bias. Mortality is 60 % with immediate surgical intervention (less than 24 hours), within one week 54.1%, 1-3 weeks 30% and after 3 weeks 10%.⁶ As VSR is a rare condition and not many studies are conducted in this region so this study was performed to know outcomes and complication for patients with post infarct VSR repair in newly established tertiary care cardiac center.

1. MBBS, FCPS, Experiential Registrar Cardiac Surgery, PIC, Peshawar.
2. MBBS, Resident Cardiac Surgeon, Peshawar Institute of Cardiology, Peshawar.
3. MBBS, Resident Cardiac Surgeon, Armed Forces Institute of Cardiology, PEMH, Rawalpindi.
4. MBBS, Resident Cardiac Surgeon, Peshawar Institute of Cardiology, Peshawar.
5. MD, FRCS, Consultant Cardiac Surgeon, Peshawar Institute of Cardiology, Peshawar.
6. MBBS, FRCS, Consultant Cardiac Surgeon, Peshawar Institute of Cardiology, Peshawar.

Correspondence Address:
Dr. Abdul Nasir
Phase-V, Hayatabad, Peshawar, Pakistan
dranasir@gmail.com

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OBJECTIVE

This study aim was to investigate the early outcomes, complication for post-infarction VSR repair at a tertiary referral center over a 3-year period.

METHODS

We did a retrospective analysis of all the patients who underwent surgical repair of post infarction ventricular septal rupture from January 2021-August 2024, (n=10), in Department of Cardiac surgery, Peshawar Institute of Cardiology, Peshawar. Device closure cases was excluded from study. On obtaining approval from the Institutional Review Board (Reference No IRC/24/73) preoperative, perioperative and postoperative data until discharge or in hospital mortality was obtained from hospital Information management system (HIMS) and electronic medical record (EMR). Patients were also followed for 6 months through HMIS. Data collected included demographic variables (age, gender), preoperative presenting symptoms, clinical status, time between onset of symptoms and presentation, urgency of operation, preoperative co morbidities as well as complications, use of intra-aortic balloon pump, intraoperative data such as operation time, size of the defect, ionotrope usage, intraoperative complications, post operative data of critical care stay, hospital stay, perioperative complication and mortality rate were all included and assessed.

Data was analyzed using SPSS version 23. Quantitative variables like age, BMI, EF, VSR Size, Time between presentation and surgery etc were reported in terms of median and interquartile range (IQR) after checking normality by Shapiro-wilk test. Categorical variables like gender, diabetes, hypertension, complication etc were described in terms of frequencies and percentages. The data was presented in the forms of tables.

RESULTS

During the study period, a total of 10 patients underwent surgical repair of ventricular septal rupture, of which 50% were males and 50% were females. The median age of patient was 65 years (range 44 years -70 years, interquartile range of

14.7 years), 90% had anterior wall MI in which mainly LAD was involved, 10 % had inferior wall MI. Pre operative characteristics are given in Table-I.

40% of patients were diabetic while 80 % patients were hypertensive. 20% patients had thrombolysis, 40 % had primary PCI while 40% had neither PCI nor thrombolysis. 40% of patients presented with cardiogenic shock in which 10% had pre operative intra aortic balloon Pump inserted. 50% of patients had inotropic support before surgery. 80 of cases were urgent. Most common type of VSR was anterior (90%) and most had single defect (80%).

Table-II shows distribution of preoperative, operative and post-operative quantitative variables

Median BMI was 23.6 kg/m² (Range 22-27 k/m², IQR 2.3k/m²). Ejection fraction was 39% (Range 33-50%). Size of VSR was 13.5mm (Range 8-30mm). The median duration between symptoms onset to VSR diagnosis was 4 days (Range 2-7 days). Median preoperative ICU or other intensive care stay was 3 days (Range 1-6 days). Median duration from hospital admission to surgery was 15 days (Range 2-38 days).

All patients underwent coronary angiography before undergoing VSR repair. 60% of patients had SVCAD, 10% had DVCAD and while 30% has TVCAD.90% of patients had concomitant CABG with VSR repair while 10% had only VSR repair. Grafts are shown in Table-III

Median cross clamp time was 159 minutes (Range 108-240) minutes while median bypass time was 188 minutes (Range 133-311min). Postoperative ventilation time was 7.5 hours (Range 4-190 hours). Postoperative ICU stay was 3 days (Range 2-22days) while postoperative hospital stay was 7 days (Range 4-24 days). 40% patients had some sort of complications in which re opening for bleeding, AKI, pleural effusion, stoke, residual VSR and heart failure were all 10% each. 60% of patients were having smooth postoperative recovery (Table-IV).

In hospital mortality was 10%. Cause of in Hospital mortality was bleeding leading to cardiac temponade. Patients were followed for 6 months.

70% of patients were living a healthy life while 1 patient was lost to follow up.

Variables		
Gender	Male=5(50%)	Females=5(50%)
Diabetes Mellitus	Diabetic =4(40%)	Non diabetic =6(60%)
Hypertension	Hypertensive=8(80%)	Normotensive =2(20%)
AKI	Yes =1(10%)	No= 9 (90%)
Reperfusion	Thrombolysis= 2(20%)	PPCI=4(40%)
Symptoms	NYHA IV=5(50%)	NYHA III=4(40%)
Cardiogenic shock	Yes=4(40%)	No=6(60%)
Pre op IABP	Yes=1(10%)	No=9(90%)
Pre-operative ionotropic support	Yes =5(50%)	No=5(50%)
Status of surgery	Urgent =8(80%)	Elective= 2(20%)
VSR type	Apical Anterior= 9(90%)	Basal Inferior =1(10%)
Number of VSR	Single= 8(80%)	Multiple= 2(20%)

Table-I. Preoperative variables of patients (n=10)

	N	Minimum	Maximum	Median	IQR
Age	10	44	70	65	14.7
BMI(kg/m ²)	10	22	27	23.6	2.3
EF (%)	10	33	50	39	11.0
VSR size (mm)	10	8	30	13.5	12.2
Time from symptoms to VSR (days)	10	2	7	4	2.5
Pre op ICU or HDU stay	10	1	6	3	2.5
Time from presentation to surgery (days)	10	2	38	15	20.7
Cross clamp time (min)	10	108	240	159	56.0
CBP time (min)	10	133	311	188	82.7
Ventilation time (hours)	10	4	190	7.5	8.0
Post Op ICU stay (days)	10	2	22	3	4.7
Post Op hospital stay (days)	10	4	24	7	7.2

Table-II. Distribution of preoperative, operative and post-operative quantitative variables

Grafts	Frequency	Percent
Vain graft to LAD	5	50
Vein graft to diagonal	2	20
Vein graft to OM and LAD	1	10
Vain graft to OM, LAD and Diagonal	1	10

Table-III. Grafts during VSR repair

	Frequency	Percent
Temponade, reopening, stroke and mortality	1	10
Residual VSR and heart failure	1	10
AKI	1	10
Pleural effusion requiring tube thoracostomy	1	10
No complication	6	60

Table-IV. Major Post op complication

DISCUSSION

VSR is rare but severe complication of myocardial infarction that usually presents in 55-70 years age which is similar to our study.^{7,8} Historically female sex is been associated with VSR occurrence but we had equal number of males and females in our study. Most common co morbidity in our study was hypertension followed by diabetes mellitus similar to other study.¹ Incidence of VSR has decrease in past two decades due to thrombolysis and PPCI. Most of the patients in our study had either primary PCI (40%) or thrombolysis (20%). This can be explained by the fact that thrombolytic therapy may increase bleeding in infracted area and increase the chances of VCR occurrence in first 24 hours.⁹ However contrary to our study, PCI decreases VSR risk.¹

One of the major finding in our study was lower frequency of intra aortic balloon pump (10%) despite higher number of patients presented with hemodynamic instability.⁸ Most of the patients were stabilized with inotropic support.

Although surgical treatment is definitive treatment of VSR repair, but there are different opinions about timing of surgery.¹⁰ Generally it is believed that the later the surgery, the less is perioperative mortality. It is due to the fact that as time passes, there is scar formation around VSR which is useful for repair. In the initial stages after VSR formation, the tissue are thin and friable and the incidence of residual shunt and mortality is high. But in many patients hemodynamic instability doesn't allow the surgery to be delayed.¹¹ Median time of VSR repair in our study was 15 days which explains the low incidence of residual shunt (10%) compared to around 20%.^{8,14} In hospital mortality in different studies show around 20-40 %.^{12,13,14} However as discussed earlier, mortality depends on timing of surgery. It is 15% for elective cases, 30% for urgent and 40 % for emergency or salvage cases.¹³ Our mortality (10%) is significantly less. This can be explained by the fact that we performed delayed surgeries and gave time to the patients for pre operative stabilization. Older age, female sex, chronic kidney disease, intra aortic balloon pump, preoperative cardiogenic shock, urgent or emergency surgery and earlier surgery are some of the factors increasing early mortality.^{1,15} In our study the single mortality was due to bleeding and temponade effect. We performed concomitant coronary revascularization in 90% of our patients. Controversy persists over concomitant bypass revascularization as some studies show improved late survival and others don't show any benefit.^{14,16}

CONCLUSIONS

Timing of surgery is important. Delaying the surgery for stabilization and giving tissue time to heal is important to decrease post operative complication and mortality. Some patient will not give time for stabilization and will need emergency surgery. Such patient should be identified and operated despite high mortality of emergency surgery.

RECOMMENDATIONS

We recommend multicentre and long term follow up studies to identify complications, outcomes and timing of surgery for f patient undergoing surgical repair of post myocardial infarction.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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




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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Waqar Masud Malik	Writing of the manuscript.	
2	Muhammad Nisar	Writing of manuscript and data collection.	
3	Sobia Siddique	Data analysis.	
4	Aamir Iqbal	Data collection.	
5	Syed Shahkar Ahmed Shah	Data analysis.	
6	Abdul Nasir	Idea, Data collection, Manuscript writing.	