

## Upper gastrointestinal tract symptoms are predictors of postoperative large pericardial effusion in cardiac surgery

Muhammad Sher-i-Murtaza, Mirza Ahmad Raza Baig, Haider Zaman

### Abstract

In this prospective observational study we evaluated the clinical symptoms in patients who presented with early or late significant pericardial effusion after cardiac surgery and underwent its open drainage in our institution. It was a series of 35 patients where the clinical symptoms and lab investigations were recorded. There were 21 male and 14 female (3:2). Majority of patients presented with postoperative large pericardial effusion within 2-3 weeks of cardiac surgery. Eighteen (51.4%) patients presented with predominantly nonspecific upper gastrointestinal tract (GIT) symptoms like nausea, vomiting, loss of appetite and epigastric discomfort, 29 (82.85%) patients with postoperative large pericardial effusion had undergone mechanical valve replacement surgery. Majority of patients were on anticoagulation therapy and had prolonged INR.

This study showed that non-specific upper gastrointestinal tract (GIT) symptoms like nausea, vomiting, loss of appetite are very frequent in patients with post-operative pericardial effusion. If a patient presents with these non-specific GI symptoms along with raised INR and low haemoglobin in postoperative follow up, significant pericardial effusion should be excluded.

**Keywords:** Large pericardial effusion, Upper GIT symptoms.

### Introduction

Postoperative Pericardial effusion is a well-known complication after open heart surgery.<sup>1</sup> If not detected early, it can develop into cardiac tamponade, a potentially life threatening condition, resulting in increased morbidity and mortality even after successful major cardiac surgery. Therefore rapid diagnosis and therapy is essential.<sup>2</sup> Classical signs of tamponade like low blood pressure, rapid pulse rate, pulsus paradoxus, raised JVP and low urine output are often masked or even alleviated in case of slowly increasing effusion after cardiac surgery.<sup>3-5</sup> We conducted this study to evaluate the

clinical manifestations of patients who underwent open drainage for significant postoperative pericardial effusion. This study will be helpful in early recognition and treatment of patients for this postoperative complication to reduce mortality associated with delayed diagnosis and treatment.

### Case Series

This prospective observational study was conducted in department of Cardiac surgery Chaudhary Pervaiz Elahi institute of cardiology (CPEIC), Multan, Pakistan. All patients who presented with early or late significant pericardial effusion after cardiac surgery and underwent open drainage from April 2013 to January 2016 were included. Early pericardial effusion was labelled if the patient developed significant pericardial effusion within 7 days after cardiac surgery and presentation after 7 days of surgery was labelled as late pericardial effusion. Patients who had reopening because of cardiac tamponade within 48 hours of cardiac surgery in the presence of mediastinal drains were excluded. The relevant operative data of 1st surgery was retrieved from electronic data base which was recorded prospectively in our electronic data base (CASCADE DATABASES, Lahore, Pakistan). This study had approval from the ethical committee of the institution.

We recorded clinical symptoms, date of presentation after surgery and laboratory investigations like International Normalized Ratio (INR), X-ray chest and Haemoglobin (Hb). We also recorded mortality after pericardial effusion drainage. In all patients, trans-thoracic echocardiography (TTE) was performed by a cardiologist of sufficient experience and at least of senior

**Table-1:** Numerical variables of patients.

Name of Variable	Minimum	Maximum	Mean±SD
Age (Y)	13.00	65.00	30.31±12.62
INR	1.10	7.50	3.74±1.69
Creatinine (mg/dl)	0.90	2.10	1.24±0.29
Day of presentation (Days)	6.00	120.00	26.42±23.49
BMI (kg/m <sup>2</sup> )	9.61	30.74	19.61±4.40
Hb (g/dl)	7.90	12.00	9.64±0.96

INR=International normalized ratio, BMI= Body mass index, Hb=Haemoglobin.  
SD: Standard Deviation.

.....  
Ch. Pervaiz Elahi Institute of Cardiology, Multan.

**Correspondence:** Muhammad Sher-i-Murtaza. Email: sherm.cpeic@gmail.com

**Table-2:** Categorical variables of patients.

Name of Variable	Number of Patients	Percentage
Total number of Patients	35	100
Males	21	60.0
Females	14	40.0
<b>Type of Operation</b>		
CABG	2.0	5.7
MVR	11.0	31.4
AVR	4.0	11.4
DVR	11.0	31.4
TVR	1.0	2.9
AVR+VSD	2.0	5.7
LAAA	1.0	2.9
Bentall operation	1.0	2.9
ASD	1.0	2.9
VSR	1.0	2.9
<b>Presenting Symptoms</b>		
Nausea, Vomiting, Anorexia	17	51.4
Dyspnoea	8	22.9
Rhythm problem	6	17.1
Dizziness	3	8.6
<b>INR Range</b>		
Less than 2.5	6	17.1
2.5-3.5	10	28.6
More than 3.5	19	54.3
<b>Duration of Presentation</b>		
1-7 days	1	2.9
8-14 days	9	25.7
15-21days	13	37.1
22-30days	4	11.4
after 1month	8	22.9
Mortality	5	14.3

CABG= Coronary artery bypass grafting, MVR= Mitral valve replacement, AVR= Aortic valve replacement, DVR= Double valve replacement, TVR= Tricuspid valve replacement, VSD= Ventricular septal defect, LAAA= Left atrial appendage aneurysm, ASD= Atrial septal defect, VSR= Ventricular septal repair.

registrar rank. Large Pericardial effusion was labelled when effusion was > 2 cm on M-mode of TTE. In our institution anterior pericardium is left open after cardiac surgery in all patients who undergo either coronary, valve or congenital heart surgery. Posterior pericardotomy is not done in any case. In majority of patients pericardial fluid was drained in Operation Room under General Anaesthesia using a sub-xiphoid incision made at lower end of original median sternotomy wound. Two patients underwent emergency drainage at bedside in ICU because of sudden cardiac arrest. Full median Sternotomy was done in these cases.

The preoperative, operative and postoperative characteristics were summarized using mean  $\pm$  standard deviation for the numeric variables and frequency for categorical variables (Table-1 & 2).

## Results

Thirty five (35) patients underwent open drainage for large postoperative pericardial effusion including 21 male and 14 females (3:2). Majority of patients presented with postoperative large pericardial effusion within 2-3 weeks after cardiac surgery. They had predominantly nonspecific upper gastrointestinal symptoms like nausea, vomiting, loss of appetite and epigastric discomfort (51.4%). Other presenting symptoms were dyspnoea, and recurrent rhythm problems (fast atrial fibrillation and Supra ventricular tachycardia) and neurological symptoms like dizziness and blackouts. The postoperative large pericardial effusion was most common in patients who underwent mechanical valve replacement [n=29 (82.85%)]. Majority of patients were on anticoagulation therapy and had prolonged INR. Mean INR levels were  $3.74 \pm 1.69$ . Mean haemoglobin levels at the time of presentation were  $9.64 \pm 0.96$  g/dl and mean creatinine levels were  $1.24 \pm 0.29$  mg/dl. Mean duration of presentation was  $26.42 \pm 23.49$  days. Pleural cavity was opened in 24 (68.6%) patients during surgery who presented with post-operative pericardial effusion. Five patients (14.3%) expired after open drainage of pericardial effusion. Mortality was higher in patients who presented with dyspnoea. Four patients had dyspnoea and one had upper GI symptoms. One patient had sudden cardiac arrest was opened in ICU through median sternotomy but could not be revived. Two patients remained in low cardiac output syndrome (LCOS) even after drainage. One patient expired because of right ventricular injury during pericardial fluid drainage, and another one died because of acute decompression syndrome after pericardial fluid drainage.

## Discussion

Rheumatic heart disease is still very common in developing countries like Pakistan. The disease involves valves of heart and results in valve dysfunction either stenosis or regurgitation.<sup>6</sup> Patients with severe valvular disease undergo heart surgery. Majority of patients receive mechanical valve replacement and need lifelong anticoagulation therapy. Pericardial effusion after cardiac surgery is common in patients receiving oral anticoagulants.<sup>7</sup> Despite many recent improvements in intraoperative management and postoperative care, postoperative pericardial effusion remains an important cause of morbidity and even mortality after cardiac surgery.<sup>8</sup> Malouf et al concluded that incidence of large effusions is significantly higher in patients who received anticoagulation.<sup>7</sup> In our study, 29 (82.85%) patients were taking anticoagulant therapy after mechanical valve replacement. Our results showed that significant

pericardial effusion is common in patients with raised or supra-therapeutic INR. These results are comparable with results of a case study done by Shah and colleagues, which showed that raised INR in postoperative follow up period is an early warning for late cardiac tamponade.<sup>9</sup>

In retrospective studies, the incidence of clinically important pericardial effusions has been reported around 1% to 2%.<sup>10,11</sup> Symptoms of pericardial effusion are nonspecific, and few patients have classic presentation of tamponade.<sup>11</sup> In a study by Elena et al.<sup>12</sup> 42% of patients with postop pericardial effusion manifested haemodynamic compromise with hypotension, low cardiac output, and oliguria. While other signs of tamponade were reported infrequently and echocardiographic confirmation of tamponade was found in 61%. These Authors concluded that the threshold to perform echocardiographic study should be low after cardiac surgery if atypical symptoms are present. In our study population, 51.4% patients presented with non-specific GI symptoms e.g. nausea, vomiting, loss of appetite and epigastric discomfort.

In our institution, early post-operative follow up of cardiac surgery patients is done by Cardiac Surgeons in the outpatient department. Because of lack of facilities and patients burden, it is not possible to send all patients for diagnostic Echo in early post-operative period. Hence it is important to have updated information about clinical manifestations of postoperative complications like large pericardial effusion for early diagnosis. In our routine practice, we advise x-ray chest on 1st follow up visit in OPD and compare it with x-ray chest at the time of discharge. If there is increased cardiac silhouette we admit the patient in ICU for TTE to rule out pericardial effusion.

## Conclusion

This study showed that non-specific upper gastrointestinal tract (GIT) symptoms like nausea, vomiting, loss of appetite are very frequent in patients with post-operative pericardial effusion. If a patient presents with these non-specific GI symptoms along with raised INR and low Haemoglobin in postoperative follow

up, one must investigate to rule out significant pericardial effusion.

**Disclaimer:** None.

**Conflict of Interest:** None.

**Funding Sources:** None.

## References

1. Pepi M, Muratori M, Barbier P, Doria E, Arena V, Berti M, et al. Pericardial effusion after cardiac surgery: incidence, site, size, and haemodynamic consequences. *Br Heart J* 1994; 72: 327-31.
2. Bodson L, Bouferrache K, Vieillard-Baron A. Cardiac tamponade. *Curr Opin Crit Care* 2011; 17: 416-24.
3. Russo AM, O'Connor WH, Waxman HL. Atypical presentations and echocardiographic findings in patients with cardiac tamponade occurring early and late after cardiac surgery. *Chest* 1993; 104: 71-8.
4. Grecu L. Cardiac tamponade. *Int Anesthesiol Clin* 2012; 50: 59-77.
5. Chuttani K, Tischler MD, Pandian NG, Lee RT, Mohanty PK. Diagnosis of cardiac tamponade after cardiac surgery: relative value of clinical, echocardiographic, and hemodynamic signs. *Am Heart J* 1994; 127: 913-8.
6. Mendis S, Puska P, Norrving B. Global atlas on cardiovascular disease prevention and control: World Health Organization; 2011.
7. Malouf J, Alam S, Gharzeddine W, Stefadouros M. The role of anticoagulation in the development of pericardial effusion and late tamponade after cardiac surgery. *Eur Heart J* 1994; 15: 583-4.
8. Kulik A, Rubens FD, Wells PS, Kearon C, Mesana TG, van Berkomp J, et al. Early postoperative anticoagulation after mechanical valve replacement: a systematic review. *Ann Thorac Surg* 2006; 81: 770-81.
9. Shah A, van den Brink A, de Mol B. Raised international normalized ratio: An early warning for a late cardiac tamponade? *Ann Thorac Surg* 2006; 82: 1090-1.
10. Tsang TS, Barnes ME, Hayes SN, Freeman WK, Dearani JA, Butler SLO, et al. Clinical and echocardiographic characteristics of significant pericardial effusions following cardiothoracic surgery and outcomes of echo-guided pericardiocentesis for management: Mayo Clinic experience, 1979-1998. *Chest* 1999; 116: 322-31.
11. Ikaheimo MJ, Huikuri HV, Airaksinen KJ, Korhonen UR, Linnaluoto MK, Tarkka MR, et al. Pericardial effusion after cardiac surgery: incidence, relation to the type of surgery, antithrombotic therapy, and early coronary bypass graft patency. *Am Heart J* 1988; 116: 97-102.
12. Ashikhmina EA, Schaff HV, Sinak LJ, Li Z, Dearani JA, Suri RM, et al. Pericardial effusion after cardiac surgery: risk factors, patient profiles, and contemporary management. *Ann Thorac Surg* 2010; 89: 112-8.