

Fatal Ventricular Septal Rupture: A Case Report

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Abstract

Case Report

Ventricular septal rupture is a fatal mechanical complication of acute myocardial infarction for which there are neither means of predicting or monitoring, nor an effective therapy. The incidence of this catastrophic event was made rare by the large use of different reperfusion techniques; however, the burden of this complication remains high. Here we report a case of ventricular septal rupture following myocardial infarction in a 51-year-old patient through which we focus on the clinical and epidemiological features of this rare complication, and we discuss the different treatment options.

Keywords: Ventricular septal rupture, acute myocardial infarction, complication, case report.

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INTRODUCTION

Ventricular septal rupture (VSR) is an unusual lethal mechanical complication of acute myocardial infarction (AMI). With the advent of revascularization methods its frequency has decreased, however, the mortality remains high [1].

Early diagnosis of VSR, optimal medical treatment, and surgical intervention are required to optimize recovery and survival [2].

We report a case of a 51 years old male who presented a ventricular septal rupture revealed by cardiogenic shock signs and ventricular tachycardia, 72h following the MI.

CASE REPORT

A 51 years old male with a history of diabetes and hypertension was initially admitted to the intensive care unit for chest pain evolving for 3 days. On admission, the clinical examination found a neurological and hemodynamic stable patient with a blood pressure of 140/80 mm Hg and a heart rate of 99 beats per minute, without signs of shock or heart failure. Auscultation did not show any abnormalities.

The electrocardiogram (EKG) showed an elevation of the ST segment in the anterior territory with a complete right bundle branch block (RBBB). Initially, the patient was managed medically for anterior post-myocardial infarction (MI).

Six hours after the patient was admitted, he altered his neurological and hemodynamic status, presenting signs of cardiogenic shock, a newly appeared murmur, and ventricular tachycardia at 172 bpm, requiring external electrical shock, cardiopulmonary resuscitation, intubation, and inotropic support.

Transthoracic echocardiography (TTE) revealed akinesia of the anterior, anteroseptal, infero septal wall and a reduced left ventricular ejection fraction (LVEF) of 25%, with interventricular communication of 9mm in the inferoseptal wall (Figure 1), with a left-right shunt (Figure 2).

Unfortunately, the hemodynamics of the patient deteriorated rapidly after admission to the critical care unit, and the cardiogenic shock became refractory to inotropic agents resulting in the patient's death.



Figure 1: TTE showing the ventricular septal communication

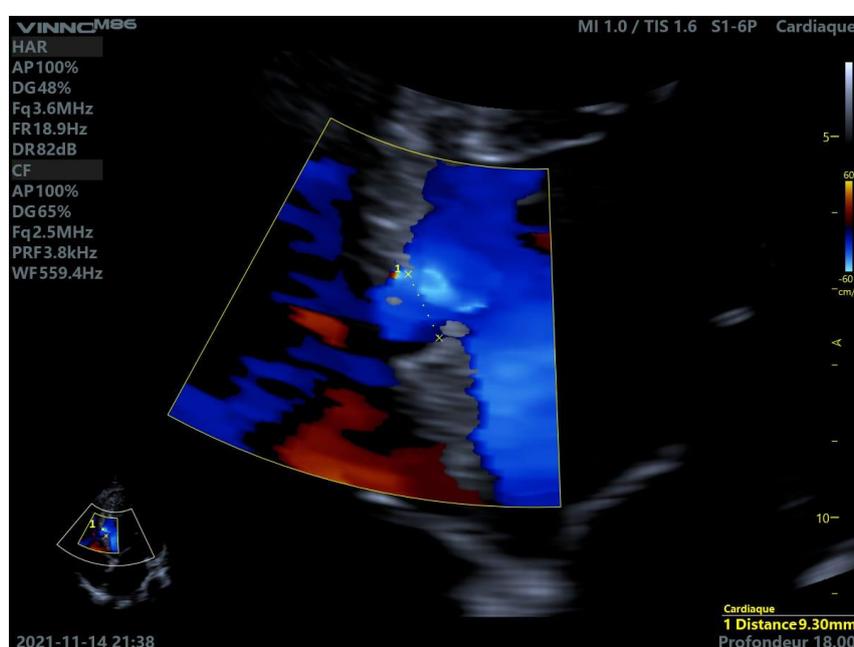


Figure 2: TTE showing ventricular septal rupture of 9mm with a left-right shunt

DISCUSSION

Before the reperfusion era, VSR was thought to complicate approximately 1 to 2% of acute myocardial infarctions (AMI), however, recent series, show it to be increasingly rare, complicating between 0.17 and 0.31% of patients presenting with AMI [3].

VSR carries a significant mortality rate, it accounts for 5% of all deaths in acute myocardial infarction with approximately 46% of the patients with VSR dying within the first week and 62% to 82% within 2 months in the absence of surgical treatment [4].

VSR is the result of transmural infarction of the ventricular septum and can occur at any anatomic location. VSR occurs with similar frequency in anterior

and inferior/lateral infarctions. Anterior infarctions frequently result in apical defects and inferior or lateral infarctions are more likely to cause basal defects at the junction of the septum and the posterior wall [3].

Some predisposing factors were linked to a high prevalence of cardiac rupture in the AMI: first episode of myocardial infarction, advanced age, female gender, and high admission blood pressure [1].

VSR usually occurs 3 to 5 days following AMI and rarely after 2 weeks. More than half of the patients present with cardiogenic shock. Other manifestations include recurrent chest pain, pulmonary edema, right ventricular failure, altered mental status, new loud and harsh holosystolic murmur, persistent ST-segment

elevation on the electrocardiogram, and sudden onset of electromechanical dissociation [2, 4].

Echocardiography with Doppler study is a highly sensitive and specific technique that confirms the diagnosis in almost all cases. Transesophageal echocardiography remains the gold standard that can accurately locate and measure interventricular communication to guide surgical strategy [5].

Medical therapy should stabilize hemodynamics and act as a bridge to surgery. It consists of respiratory support, mechanical support with the use of an intra-aortic balloon pump, and afterload reduction with the help of vasodilators and diuretics. Inotropic support is often needed to maintain a correct hemodynamic state [2].

Surgical repair of the ventricular septal rupture associated with coronary artery bypass grafting is the treatment of choice. However, restoring flow in the infarct-related artery with aspiration thrombectomy and/or balloon angioplasty should be considered pending the surgery [3].

The timing of the surgical repair has an important impact on survival. Patients who underwent surgery within 7 days of presentation had a 54.1% mortality rate compared with 18.4% if the repair was delayed until after 7 days. The mortality rate approaches 60% in the patients who underwent surgery in the first 24 hours [3].

Transcatheter closure of the VSR is an alternative to surgery in an anatomically suitable rupture in patients whose comorbidities preclude surgical repair [3].

CONCLUSION

Ventricular septal rupture is a fatal complication of myocardial infarction. The prompt detection and management of this complication are key to increasing survival. Surgical repair is the treatment of choice, and the delayed approach seems to be more beneficial regarding survival.

BIBLIOGRAPHY

1. Gao, X. M., White, D. A., Dart, A. M., & Du, X. J. (2012). Post-infarct cardiac rupture: recent insights on pathogenesis and therapeutic interventions. *Pharmacology & therapeutics*, 134(2), 156-179.
2. Birnbaum, Y., Fishbein, M. C., Blanche, C., & Siegel, R. J. (2002). Ventricular septal rupture after acute myocardial infarction. *New England Journal of Medicine*, 347(18), 1426-1432. <https://doi.org/101056/NEJMra020228>.
3. Jones, B. M., Kapadia, S. R., Smedira, N. G., Robich, M., Tuzcu, E. M., Menon, V., & Krishnaswamy, A. (2014). Ventricular septal rupture complicating acute myocardial infarction: a contemporary review. *European heart journal*, 35(31), 2060-2068.
4. Bajaj, A., Sethi, A., Rathor, P., Suppogu, N., & Sethi, A. (2015). Acute complications of myocardial infarction in the current era: diagnosis and management. *Journal of investigative medicine*, 63(7), 844-855.
5. Dujardin, J. J., & Fabre, O. (2008). Complications de l'infarctus du myocarde. Évolution et pronostic. *EMC – Cardiologie*, 3(1), 1-13.