CASE REPORT

A MECHANICAL COMPLICATION OF ACUTE MYOCARDIAL INFARCTION - VENTRICULAR SEPTAL DEFECT

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SUMMARY

Introduction The ventricular septal defect (VSD) incidence today is less than 1%. It presents with a rapid clinical deterioration and acute heart failure. A loud systolic murmur appears over the precordium. Doppler echocardiography is the golden standard for diagnosis.

Case Report A female patient was admitted to the hospital with the diagnosis of an acute myocardial infarction with the involvement of the inferior wall and right ventricle. At admission, a loud systolic murmur above the precordium was noted and an emergency echocardiography was performed. A suspected interruption of the interventricular septum continuity was registered at the inferoseptal level. An emergency coronography was immediately performed to uncover a subocclusion of the medial segment of the right coronary artery. Ventriculography was performed in the same act and passage of contrast was registered from the left ventricle to the right at the septal level. A cardiac surgeon was consulted, but the patient died while being prepared for surgery.

Conclusion Keeping in mind the high mortality rate, a prompt diagnosis and aggressive treatment with a timely surgical intervention are necessary to enable a favorable outcome. Poor prognosis parameters are advanced age and a myocardial infarction involving the inferior wall, which were both present in our patient.

Key words: mechanical complication, acute myocardial infarction, ventricular septal defect.

INTRODUCTION

Mechanical complications of acute myocardial infarction are rare in this day and age, but are still accompanied by a dramatic clinical picture and high mortality rate. In the era of primary percutaneous coronary intervention, the incidence of ventricular septal defect (VSD) as a mechanical complication of acute myocardial infarction is less than 1% (0.17-0.31%) [1]. The ventricular septum rupture usually occurs during the first week after a transmural myocardial infarction involving the septum. [2]. The greatest incidence is during the first day and between the 3rd and 5th day after first symptoms occurred [3,4]. It usually presents with a rapid clinical deterioration in the form of an acute heart failure or cardiogenic shock accompanied by a loud systolic murmur above the

precordium. Doppler echocardiography is the golden standard in the diagnostic algorithm, with a high level of sensitivity and specificity. However, in determining the size of the defect and hemodynamic importance of the shunt, ventriculography and right heart catheterization provides much more precise information [5].

We are presenting the case of a patient who developed a ventricular septal defect as a mechanical complication of an acute myocardial infarction.

CASE REPORT

A 79 year-old woman was admitted to the Cardiology Clinic for clinical and electrocardiographic signs of an acute myocardial infarction involving the inferior wall and right ventricle (a late presenter)

complicated with the development of cardiac shock. It is noted that chest pain and shortness of breath began a few days before admission. Upon admission the patient is conscious, barely communicative, tachy and dyspnoic, hypotensive (60/40mmHg), tachycardic (120/min) and a loud systolic murmur is heard above

the precordium. The ECG depicts a QS formation with negative T waves in inferior leads, as well as the Erhardt sign (**Figure 1.**). The patient was sedated, intubated and placed on invasive mechanical ventilation and vasopressor support.

Figure 1. The ECG depicts a QS formation with negative T waves in inferior leads

Since auscultation of the precordium revealed a loud systolic murmur, an emergency echocardiography was performed, revealing inferobasal and inferoseptal akinesis. From the subxyphoid projection, a dyskinetic basal inferoseptum distended into an aneurysm is

registered. A shunt is registered from several projections, pointing out the possibility of interventricular septum discontinuity beneath the tricuspid valve (**Figure 2.**).

Figure 2. Echocardiography registers a shunt in several projections, pointing out the possibility of interventricular septum discontinuity beneath the tricuspid valve.

Pericardial effusion is not noted. An emergency coronarography was performed and it uncovered a subocclusion of the medial segment of the right

coronary artery with TIMI I/II blood flow, while the left coronary system showed insignificant signs of stenosis (**Figur 3. and 4.**).

Figure 3. The coronarography shows medial segment of the right coronary artery subocclusion with TIMI I/II blood flow.

Figure 4. Coronarography shows insignificant signs of stenosis of the left coronary system.

In order to determine the exact diagnostic and therapeutic algorithm, ventriculography was performed in the same act. After manual application of contrast

directly into the left ventricle, a passage of contrast into the right ventricle at the level of the septum is registered (**Figure 5**).

Figure 5. After manual application of contrast directly into the left ventricle, a passage of contrast into the right ventricle at the level of the septum is registered.

Since hemodynamic stability was not achieved with vasopressor therapy, an intra aortic balloon pump was implanted in the cath lab. A cardiothoracic surgeon was immediately consulted. However, the patient went into cardiac arrest with pulseless electrical activity while being prepared for surgery and subsequently died.

DISCUSSION

Today, even in the era of reperfusion therapy, the mortality rate is still extremely high in patients with ventricular septal defect. For patients treated surgically, the mortality rate is 47% and in patients treated conservatively it is 94% [6]. However, there is no clear consensus about the ideal time to perform surgical reparation. Early reparation of the septal defect carries a high risk of mortality and re-rupture. On the other hand, delayed reparation enables better sanation of the septal tissue interlaced with scar tissue, but carries a risk of defect enlargement while the patient is waiting for surgery. According to current guidelines, patients who don't respond favourably to aggressive medical therapy for heart failure should undergo surgical reparation as soon as possible, while those who do respond are candidates for delayed surgical reparation [7]. However, certain studies point out benefits of delayed surgery. Serpits and other authors describe the 100% rate of survival in patients surgically treated 3-4 weeks after initial stabilization and 100% mortality rate in patients operated on 10 days after initial symptoms [8]. Percutaneous closure of a ventricular septal defect could be taken into consideration for patients with high risk of surgery in order to achieve initial stabilization until the time of surgery or for patients whose septum anatomy favours this form of treatment (complicated defects of the inferobasal region).

The higher incidence of post infarction ventricular septal defect development is noticed in patients of the female sex, of advanced age, with ST segment elevation, high levels of cardiospecific enzymes, tachycardia, hypotension, higher Killip class and late reperfusion [9,10]. Our patient had most of these factors. The most common infarction sites for ventricular septal defect development are the anterior descending artery and right coronary artery [10]. A myocardial infarction involving the anterior wall is usually associated with an apical septal defect, which is relatively easy to repair. On the other hand, a myocardial infarction involving the inferior wall is associated with complicated defects of the

inferoposterior septum, like in our case. It is important to point out that, once a ventricular septal defect develops, bad prognosis parameters include advanced age and inferior wall myocardial infarction. Our patient had both of those conditions.

Keeping in mind the high mortality rate, early detection of clinical signs pointing at mechanical complications and emergency echocardiography are crucial in determining the right diagnosis and therapy algorithm. In unclear cases, ventriculography of the left ventricle and right heart catheterization help in determining the size of the defect and hemodynamic importance of the shunt.

CONCLUSION

Keeping in mind the high mortality rate, a prompt diagnosis and aggressive treatment with a timely surgical intervention are necessary to enable a favorable outcome. Poor prognosis parameters are advanced age and a myocardial infarction involving the inferior wall, which were both present in our patient.

Conflict of interest: None declared.

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– prikaz bolesnika –

MEHANIČKA KOMPLIKACIJA AKUTNOG INFARKTA MIOKARDA- VENTRIKULARNI SEPTALNI DEFEKT

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SAŽETAK

Uvod Danas je incidenca ventrikularnog septalnog defekta manja od 1%. Prezentuje se rapidnim pogoršanjem kliničke slike, u vidu akutne srčane slabosti, dok se nad prekordijumom čuje grub sistolni šum. Doppler ehokardiografija je zlatni standard u dijagnostičkom algoritmu.

Prikaz slučaja Bolesnica je primljena zbog akutnog infarkta miokarda donjeg zida i desne komore. Obzirom da se po prijemu čuje grub sistolni šum, urađen je hitan ehokardiografski pregled kojim se registruje mlaz koji imponuje da na nivou inferoseptuma postoji prekid kontinuiteta interventrikularnog septum. Urađena je urgentna koronarografija kojom se nađe subokluzija medijalnog segmnetu ACD i ventrikulografija kojom se registruje prolazak kontrasta iz leve u desnu komoru na nivou septum. Konsultovan je dežurni kardiohirurg, ali u toku pripreme za operativni zahvat dolazi do smrtnog ishoda.

Zaključak Obzirom na visoku stopu mortaliteta, promptna dijagnostika, agresivan tretman uz pravovremenu hiruršku intervenciju su neophodni za povoljan ishod. Međutim, parametri loše prognoze su uznapedovalo životno doba i infarkt miokarda donjeg zida, koji su bili prisutni kod naše bolesnice.

Ključne reči: mehanička komplikacija, akutni infarkt miokarda, ventrikularni septalni defekt.