

# Post-infarct sub-acute left ventricular free wall rupture: case report and review of the literature

*Ruptura subaguda da parede livre do ventrículo esquerdo pós-infarto agudo do miocárdio: relato de caso e revisão de literatura*

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## Abstract

Post-infarction left ventricular free wall rupture is life threatening and not uncommon. Surgical experience is largely anecdotal with different techniques being used since the first successful surgical treatment was described. Here we present two patients with subacute left ventricular rupture that were managed using different perioperative strategies. Although the aim of surgical intervention was first and foremost to remove the threat to life by relieving the tamponade and closure of the ventricular defect, longer-term goals were those of conventional coronary artery operations, i.e., to prevent or limit the development of angina postoperatively and to improve the prognosis. These latter goals are controversial, and are discussed. The small number of patients involved prevent us to determine which approach is best but some surgeons, like us, advocate the concomitant procedure, whenever feasible, which achieves revascularization early and avoids the risk of repeat

infarctions in the early postoperative period and the difficulties of early pericardial adhesions at reoperation. Combining the epicardial patch repair and complete myocardial revascularization appears to be the most attractive option for some patients that present with subacute left ventricular free wall rupture.

*Descriptors:* Heart rupture, post-infarction, surgery. Myocardial infarction. Shock, cardiogenic.

## Resumo

A ruptura da parede livre do ventrículo esquerdo é uma complicação potencialmente fatal e de tratamento essencialmente cirúrgico. A correção cirúrgica é o tratamento de escolha, mas o manejo pré-operatório e as técnicas de correção ainda não estão claramente definidos, sendo determinados conforme as condições clínicas do paciente. Há

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carência na literatura de grandes séries envolvendo este tipo de afecção e os relatos são baseados nas experiências individuais, com pequeno número de pacientes. São apresentados dois casos de ruptura subaguda da parede livre do ventrículo esquerdo como complicação da evolução do infarto agudo do miocárdio. Discute-se a abordagem cirúrgica completa, com revascularização miocárdica concomitante e a utilização de circulação extracorpórea. A opção de correção do defeito por meio da sutura epicárdica com retalho de

pericárdio bovino e a revascularização completa do miocárdio, sobretudo sem circulação extracorpórea, parece ser a melhor estratégia para um grupo de pacientes que apresentam ruptura subaguda da parede livre do ventrículo esquerdo pós-infarto agudo do miocárdio.

**Descritores:** Ruptura cardíaca pós-infarto, cirurgia. Infarto do miocárdio. Choque cardiogênico.

## INTRODUCTION

The mechanical complications associated with acute myocardial infarction (AMI), such as rupture of the left ventricle free wall (RLVFW) are serious and potentially lethal [1,2].

RLVFW can be divided into three distinct clinicopathologic categories: acute, subacute and chronic [3]. Acute rupture is characterized by the sudden occurrence of thoracic pain, electromechanical dissociation, shock and death in minutes due to a massive hemorrhage in the pericardium. Chronic rupture with the formation of a pseudoaneurysm, occurs due to the expansion mechanisms of the infarcted area with slow leakage of the blood to the pericardial space [3].

However, subacute rupture, the subject of this article, is characterized by a smaller injury which may initially be tamponade and later suffers lysis. Normally it presents signs of heart tamponade and cardiogenic shock, mimicking other complications of AMI [3].

The diagnostic approach and the best surgical strategy of this complication are still controversial. The current work aims at discussing distinct approaches of two patients with subacute RLVFW after AMI.

## CASE REPORTS

### Case 1

A 68-year-old male patient presented with typical recurrent chest pain in the week prior to being admitted into a local hospital suffering from chest angina for 3 hours. An initial electrocardiogram (ECG) showed a positive deflection of the ST segment of the anterior wall and a thrombolytic (rTPA) was administered with  $\Delta t$  for 4 hours without criteria for reperfusion.

The patient was transferred to another hospital with pain and signs of inadequate peripheral perfusion. An echocardiogram on admission revealed a pericardial effusion. He was referred to the hemodynamics clinic and submitted to a coronary angiography with intra-aortic balloon (IAB)

and multivessel obstructions were identified with injuries of 90% of the proximal anterior descending artery (AD) and TIMI II flow.

The patient evolved with ventricular tachycardia (VT) without pulse and was submitted to electric cardioversion, orotracheal intubation, pericardiocentesis and immediately taken to the surgical center.

During the surgery, a RLVFW was identified. A cardiopulmonary bypass was established to perform the epicardial suturing of a bovine pericardial patch as well as total coronary artery bypass grafting.

The patient evolved with a brain stroke due to cardiac emboli (thrombus in the left ventricle) and was submitted to anticoagulation therapy. On the 10<sup>th</sup> postoperative day a re-intervention was necessary for a pericardial effusion.

The patient was released from hospital on the 32<sup>nd</sup> postoperative day, lucid and without motor-neurological sequels. Twelve months after surgery the patient is in Functional Class II (NYHA).

### Case 2

An 86-year-old female patient on chronic anti-platelet aggregation therapy (clopidogrel) due to a previous brain stroke was admitted to the hospital emergency department with vomiting and rapidly evolved to circulation shock and respiratory failure. An electrocardiogram (ECG) demonstrated subacute AMI in an antero-lateral location. The serum heart enzymes were elevated and an echocardiogram was suggestive of myocardial rupture with heart tamponade.

The patient was referred to the heart surgery emergency department. After installing an IAB, an exploratory sternotomy was performed which showed a large quantity of blood in the pericardium. A subacute RLVFW had occurred in its apical section. Surgical correction of the rupture was made using a bovine pericardial patch sutured to the healthy epicardium without the use of CPB.

The patient was successfully extubated on the 5<sup>th</sup> postoperative day when vasoactive amines were no longer necessary.

For administrative reasons, the patient was transferred

to another institution where she evolved with septicemia and died due to multiple organ failure.

#### REVIEW OF LITERATURE

RLVFW after AMI is associated with lack of success of reperfusion strategies; studies suggest that early reperfusion is capable of reducing the incidence of this complication [4-6]. One to four percent of patients admitted after AMI die from this complication [3,7].

Other factors are described as predictors of rupture: the presence of a positive deflection of the ST segment and Q-wave on the initial electrocardiogram located in the anterior wall, peak of the CKMB above 150 IU/L, over 70-year-old women and absence of prior anginal syndrome; a fact related to the absence of collateral circulation [3,5,6].

A transthoracic echocardiogram is essential in the evaluation of patients with acute heart insufficiency after AMI and suspicion of mechanical complications [7].

The patients should be clinically optimized and prepared for surgical treatment [2], with a main objective of maintaining life [7]. However, it is known that 80% of patients who undergo autopsies present with multiple artery disease with at least one main coronary artery with severe obstructive disease, the strategy of concomitant coronary artery bypass grafting is also accepted with the objective of improving the long-term quality of life.

#### DISCUSSION

Often there is an interval to clarify the diagnosis and to clinically stabilize the patient. Although controversial, if the patient is sufficiently stable and CABG is contemplated, a coronary angiography should be considered.

Our surgical experience is, thus, based on sporadic reports and different surgical strategies have been utilized. Classical techniques, such as infarctectomy and on-pump ventricular reconstruction have been substituted with correction of the RLVFW with an epicardial pericardium patch and the utilization of biological glue without using CPB; a strategy that gives better results [7-9].

However, if CPB is necessary mainly for the correction of the RLVFW (hemodynamic instability, difficulty to access the area of rupture), the concomitant CABG (guided by catheter or 'blind') minimally increases the morbimortality of the procedure, especially if the left ventricular chamber is not approached (infarctectomy, ventricular reconstruction), and thus improving the long-term evolution of selected patients.

#### CONCLUSION

The combination of epicardial repair using a bovine

pericardial patch and total CABG, especially off-pump, seems to be the most indicated option for a group of patients who present with subacute RLVFW after AMI.

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