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RESEARCH ARTICLE

CAN WE SURVIVE AFTER A LEFT VENTRICULAR FREE WALL RUPTURE WITHOUT SURGERY?: WHEN PATIENT'S WILL MATTERS!

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Abstract

Left Ventricular Free Wall Rupture (LVFWR) is the second most lethal complication of acute myocardial infarction, after cardiogenic shock. It occurswithin a few days of an extensive myocardial infarction. Two distinct patterns are described; the first and most famous is the complete rupture leading to sudden death from cardiac tamponade. The second form, more rare, is rather less dangerous, appearing as an incomplete rupture or pseudo aneurysm formed by recurrent bleeding in the pericardium, which might also lead to fatal outcomes.Imaging tools especially echocardiography and cardiac magnetic resonance, which are performed depending on the clinical and hemodynamic conditions of the patient, confirm the diagnosis. Surgery is the first-line treatment of this condition. Herein we describe a case of a 53-year-old patient who presented to our department two weeks after myocardial infarction with an advanced right heart failure. However, his hemodynamic condition remained stable during hospitalization.Transthoracic echocardiogram showed pericardial effusion and signs of cardiac pre-tamponade. MRI showedthe rupture siteprotected by a thrombus inside an apical pseudo-aneurysm. The patient was immediately subjected to cardiac surgery with the diagnosis of cardiac rupture. Unexpectedly he refused surgery and asked for immediate discharge. Three month later, we noticed a good clinical and echocardiogram outcome. We reviewed the literature of this lethal complication of acute myocardial infarction.This case report highlights the fact that in a world full of invasive therapy, non-invasive management could sometimes matter.

Introduction:-

Nowadays, Left Ventricular FreeWall Rupture (LVFWR) occurs in less than 1% of myocardial infarctions, thanks to the advent of reperfusion therapy (1). It is among the worst mechanical complications of myocardial infarction, which was first reported in 1647 by William Harvey (2).

Commonly, the acute form leads to sudden death from immediate cardiac tamponade. However, there is a less disastrous form designated as "sub-acute" or "contained" rupture, or left ventricular pseudo aneurysm, (3).
We illustrate the latter with a clinical case to showcase its unusual favorable evolution without surgery, through a review of literature.

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Case report:
A 53-year-old man with long history of smoking was referred to our emergency room with a right heart failure clinical presentation that had begun 2 weeks earlier,concomitantly to a chest pain neglected by the patient.

At admission, he was hemodynamically stable with peripheral edema and NYHA functional class III-IV. Vital signs included a BP of 110/60mmHg, HR at 75 beats/min, temperature of 37◦C, and oxygen saturation of 92 % on room air. Heart auscultation revealed a discreet systolic murmur.

ECG showed a low QRS voltage at the peripheral leads, with Q waves of necrosis in the anterior leads and diffuseisoelectric T waves (Figure 1).

2D Echocardiography (Vivid 9, Cardiology B Department, Rabat, Morocco) performed immediately, showed a pericardial effusion of moderate to severe abundance, without diastolic collapse of heart chambers (Figure 2), thebloodflowedfrom the LV to the pericardial space and diastolic re-flow was from the pericardial space to the LV with suspicion of LV apical image. Was also found an ischemic heart disease with mild systolic dysfunction.

Cardiac MRI, performed after stabilization of the patient, revealed a huge apical thrombus filling a pseudo-aneurysm of the LV contained by pericardial adhesions, clogging the wall tear (Figure 3).

Coronary angiography,performed to assess coronary anatomy, showed an occlusion of the proximal part of the LAD and along tight proximal and middle circumflex arterystenosis.

Thus, an intensive medical therapy was administered and an immediate surgical repair was recommended. However, the patient disapproved of the invasive management considering the high per and post-operative mortality, and was discharged against medical advice.

Unexpected improvement was noted three months later when the patient came back for checkup. TTE showed a regression of the effusion.

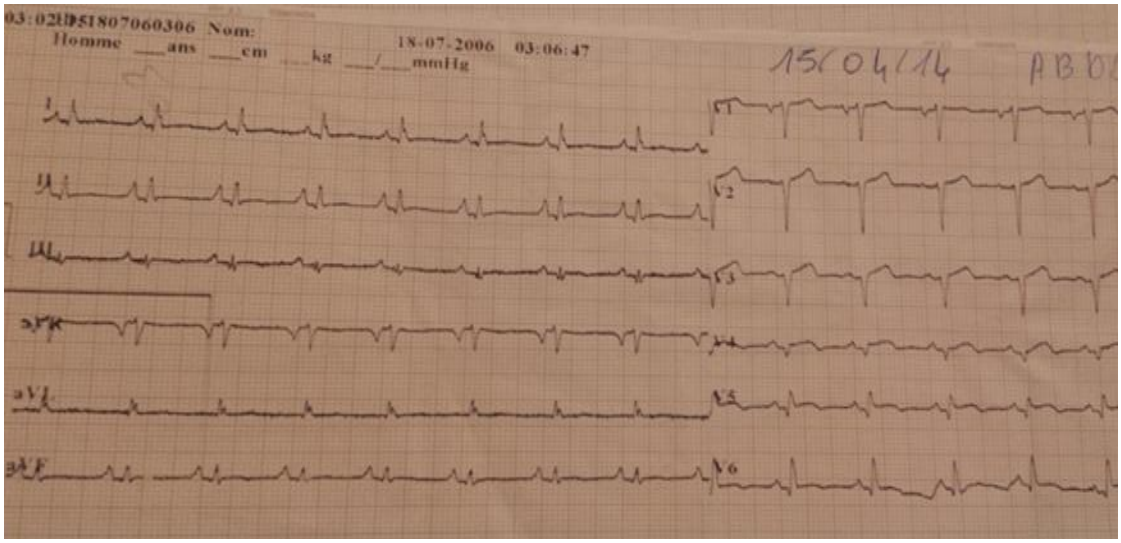

Figure 1:- ECG showinga low QRS voltage at the peripheral leads, with Q waves of necrosis in the anterior leads and diffuse isoelectric T waves.

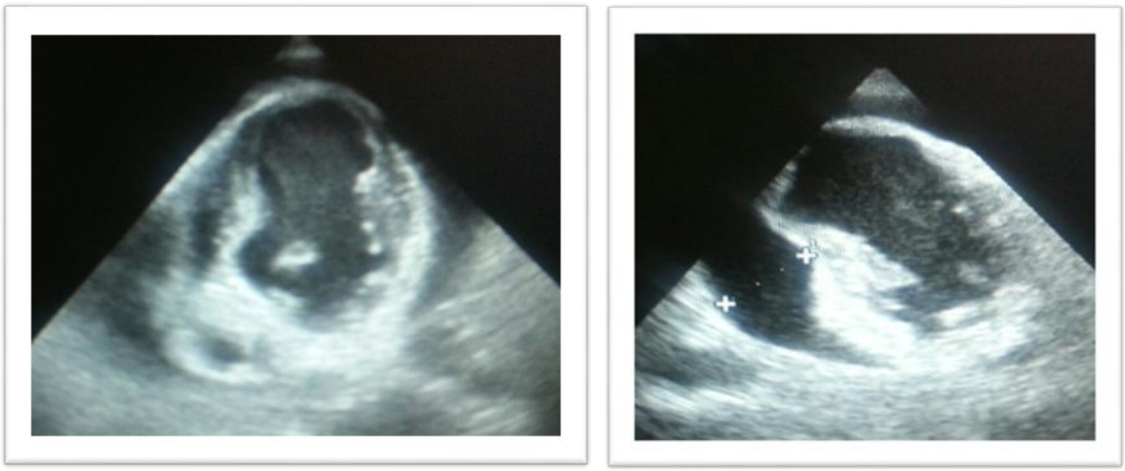

Figure 2: Two-dimensional (2D) Transthoracic Echocardiogram (PSSA), showing severe pericardial effusion

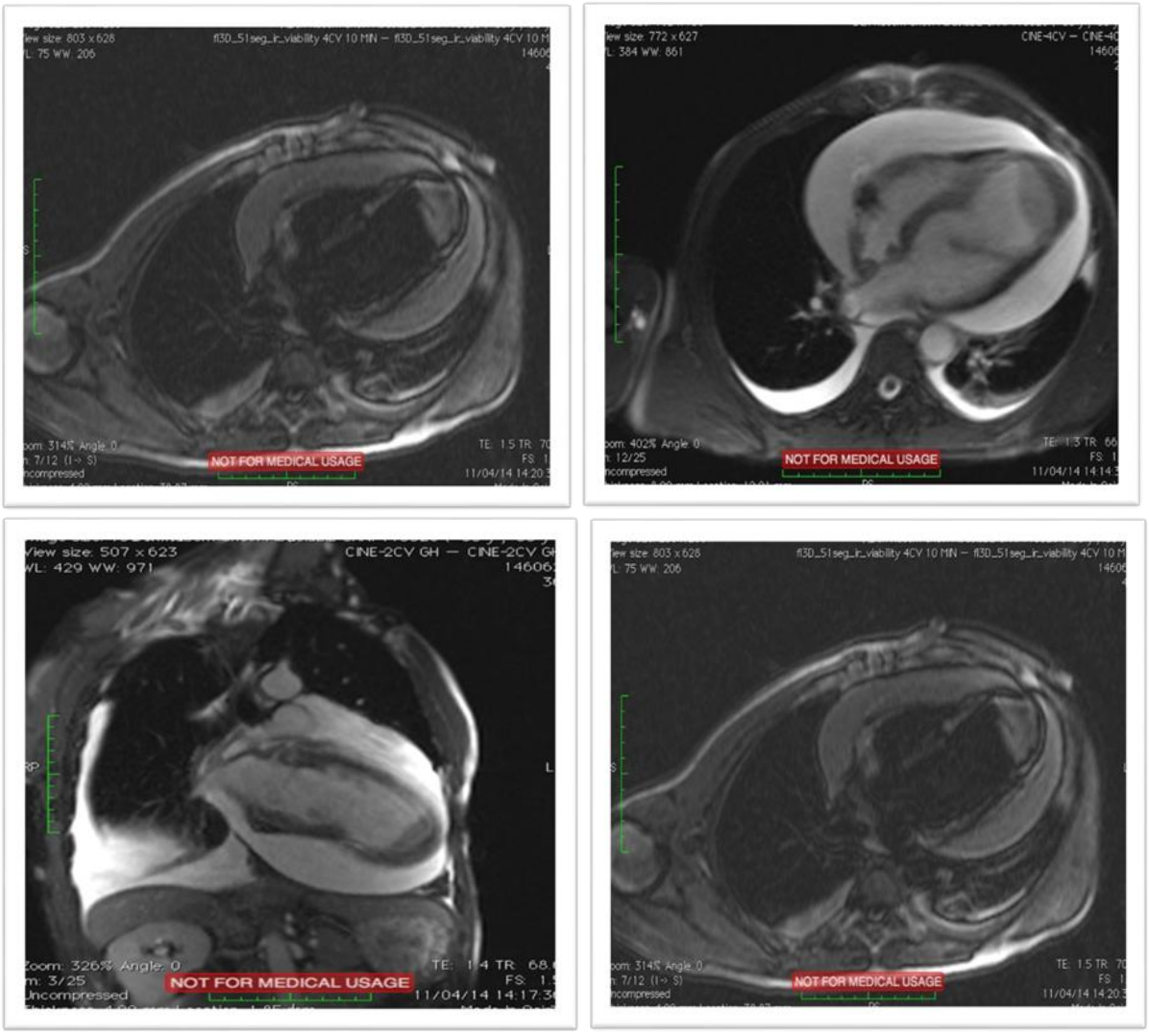

Figure 3:- Four-chamber view on Cine Cardiac MRI(SSFP) showing a left ventricular pseudoaneurysm (red arrows) clogged by thrombus, and pericardial effusion.

Discussion:-

Sub-acute free wall rupture is a gradual or incomplete rupture of the infarcted area with slow or recurrent bleeding into the pericardial sac, contained by epicardial adhesions, causing progressive or recurrent cardiac tamponade.(4)(5)

This rupture of myocardium is contained by epicardial adhesions. It is a more rare complication compared to the complete rupture or true postinfarction aneurysms. Its true incidence is unknown since death can occur before hospital admission and autopsy reports are poor and variable. However, it is estimated that the incidence of LVFWR has significantly decreased in the era of reperfusion therapy, before which it could easily reach 6%, nowadays it is less than 2% (6) (7)

Actually,thestarting point of a free wall rupture is an endocardial tear. AJapanese team evaluated50 sudden out-of-hospital death cases (post-mortem) and concluded that endocardial tears concentrate on two sites: at or near the base of the papillary muscles, and in the area where the septum meets the cardiac free wall. (8) They result from the stretching of the adynamic, infarcted myocardium – becoming thin and soft due to proteolytic enzymes of necrosis - by left ventricular contraction as well as systolic pull of the mitral valve apparatus. (8) Some authorsalso blamed "reperfusion injury" due to thrombolytic therapy and genetic predisposition leading to an inter-individual susceptibility (2).

Commonly, clinical presentation might be a congestive heart failure, recurrent or persistent chest pain, ventricular arrhythmias and even embolization. Some patients remain asymptomatic and subacute ruptures are discovered several years later. (3) (10)

Diagnosis can be confirmed by several imaging techniques especially TTE and CMR. Routine echocardiography may detect a pseudo-aneurysm in an asymptomatic patient who is recovering from an acute myocardial infarction as well as a tamponade patient. Ultrasound has the advantage of being a rapid, innocuous, and readily available technique at the patient's bedside.

CMR established the diagnosis in our case; in fact, it allowed distinction ofpseudo aneurysm from a true aneurysm.

Surgical treatment is always recommended as the risk of outright rupture occurs in nearly half the patients, associated with a good intensive medical therapy as well. Pericardiocentesisisalso an option to be used to stabilize the patient before definitive therapy. (3)(9)(10)

What happened in the case of our patient?

The contained rupture was attributed to pericardial adhesions, which might have been present at the time of infarction or may have developed de novo during rupture as the tract is usually small and narrow. An intra-pericardial collection of clotted blood was formed, which might have elicited an inflammatory and fibrous reaction.

Thus, our patient survived by virtue of adherent thrombi or pericardial adhesion.Takuda also reported that the histological age of the thrombi found in situ was independent of those of the myocardial infarction (8).

Conclusion:-

Left Ventricular Free Wall Rupture is a fatal complication of acute myocardial infarction. Pseudo-aneurysm occurs when this rupture is incomplete as it is contained by adherent pericardium. Diagnosis is difficult and challenging with the absence of a specific clinical presentation. Hence, TTE remains a judicious first step that should be followed by other imaging techniques with higher sensitivity, such as CMR.

Surgery can save these patients. Untreated pseudoaneurysms have an approximately 30% to 45% risk of rupture. (10)

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