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Heart failure: A difficult case of diagnostic definition

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ABSTRACT

We describe the case of a 58 year old man, who had recently undergone a coronary angioplasty with implantation of DES on the proximal circumflex branch and MO1 proximal for a NSTEMI, who had come to the emergency department complaining of severe pain in the back radiating in the precordial region. A few days later he developed a framework of acute heart failure with severe left ventricular dysfunction, accompanied by fever and blood cultures positive for *Staphylococcus aureus*. Instrumental examinations showed a massive coronary pseudoaneurysm originating from the circumflex branch ostium, which led to compressive action against anterior descending artery.

1. Introduction

The infection of the stent after a coronary angioplasty procedure fortunately represents a very rare occurrence. We present a case of a massive septic pseudoaneurysm of the circumflex branch involving drug-eluting stents previously implanted, that by the compression of the anterior descending branch of the left coronary artery it caused a severe myocardial ischemia and secondary left ventricular dysfunction.

2. Clinical case

Under our observation came a 58-year-old man presenting dyslipidemia, a smoker with a family history of cardiovascular disease, suffering from esophagitis and Barrett with a history of a previous duodenal ulcer. About two weeks earlier, the patient had been admitted with a picture of NSTEMI inferior-lateral response to the critical coronary stenosis in the proximal CX load and proximal MO1, both treated with angioplasty and implantation of multiple DES. During hospitalization the patient was also subjected to the implant of bicameral PM for the onset of advanced BAV.

About two weeks after the revascularization procedure, the patient began to complain of severe back pain radiating to the precordial region, which lasted over an hour; therefore he went to our Emergency Department where he arrived still symptomatic, with stable vital signs, afebrile and in good hemodynamic compensation.

The ECG showed a PM rhythm with ventricular pacing for which repolarization was not assessable; the blood tests carried out at the entrance of the myocardial damage markers were negative and remained so even in the three subsequent controls with inflammatory markers consistently negative. There were no significant findings both in the thorax RX as well as in the Angio-CT aortic scan performed to rule out the acute phase. Color-Doppler echocardiography was performed at the entrance of the left ventricle and showed that the left ventricle appeared normal in size, slightly hypertrophic with its left ventricular function preserved, and there were no obvious major asymmetries during contraction.

After three days of hospitalization, the patient developed a framework of acute heart failure accompanied by high fever and bilateral pleural effusions; blood tests detected a significant increase in all the markers of myocardial injury (TNT 5.7 ng/ml, CK-MB mass 470 ng/ml) and inflammatory markers (CRP 26.5 mg/dl, pro-calcitonin 0, 5 ng/ml) with positive blood culture for *Staphylococcus aureus*.

The color-Doppler echocardiography control detected the left ventricular to be dilated, with reduced global systolic function (FE 30%) for global hypokinesis.

We therefore performed a comprehensive scintigraphy with autologous cells labeled in order to identify the septic focus with evidence of a modest increase in the uptake of autologous leukocytes only in the right jawbone at fixation without other significant findings.

Following treatment with diuretics by continuous infusion, intravenous dopamine, specific antibiotic therapy and intravenous (Meropenem and Vancomycin), we obtained an improvement in the infection with the re-establishment of fair conditions of hemodynamic compensation.

Unfortunately, in the following days the patient developed a framework of acute renal failure resolved with restoration of normal values within a few days.

The patient was then subjected to coronary angiography which detected a massive coronary pseudo-aneurysm of about 5 cm in diameter originating from the narrow collar of the circumflex ostial branch which presented severe stenosis and which determined compressive action to the anterior descending artery that was not visible (Fig. 1 and Fig. 2).

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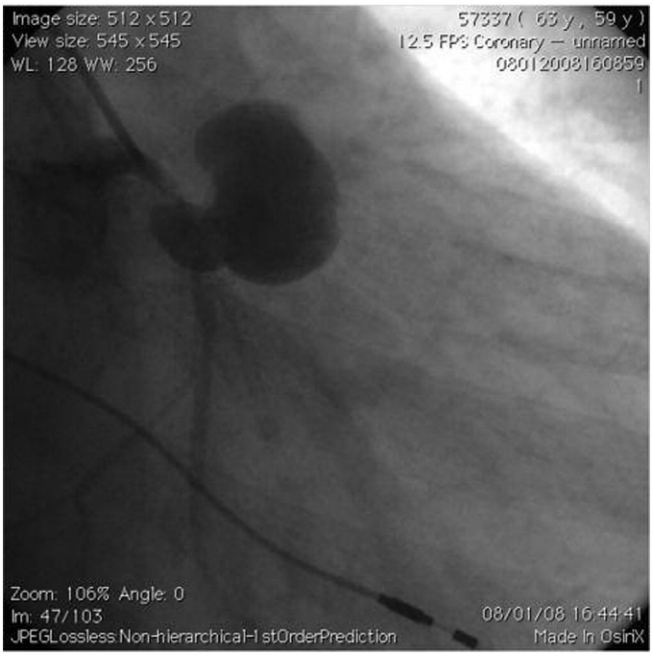

Fig. 1.

In order to obtain a better morphological definition of the lesion and to clarify its relationship with the surrounding structures we performed a cardiac MRI which has allowed us to more accurately assess the size of the lesion (45 × 36 mm) and to differentiate within it a vast area of the same corpus of material cast thrombotic/septic (Fig. 3–4).

Thanks to the instrumental tests performed and the clinical picture we then posited the diagnosis of septic pseudoaneurysm of the circumflex branch which led to a compression of the descending anterior branch of the left coronary artery causing a severe myocardial ischemia resulting in a deterioration of the global systolic function of the left ventricle and thence a picture of the overt left ventricular failure.

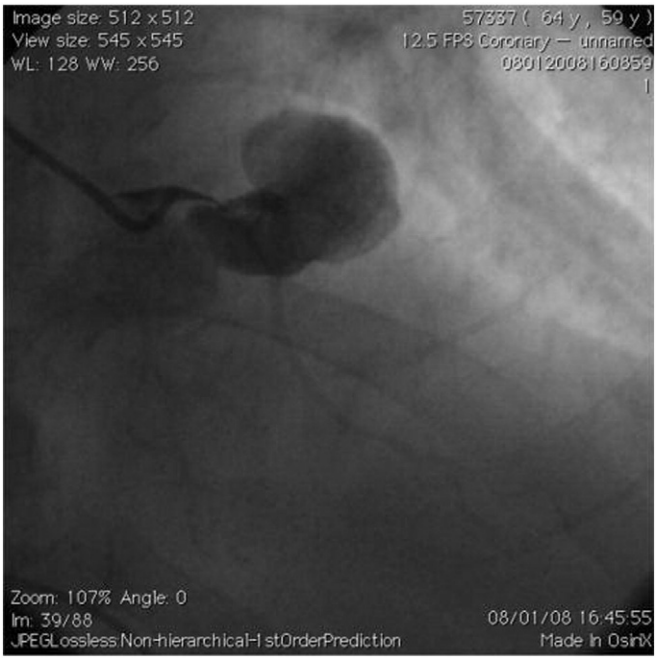

Fig. 2.

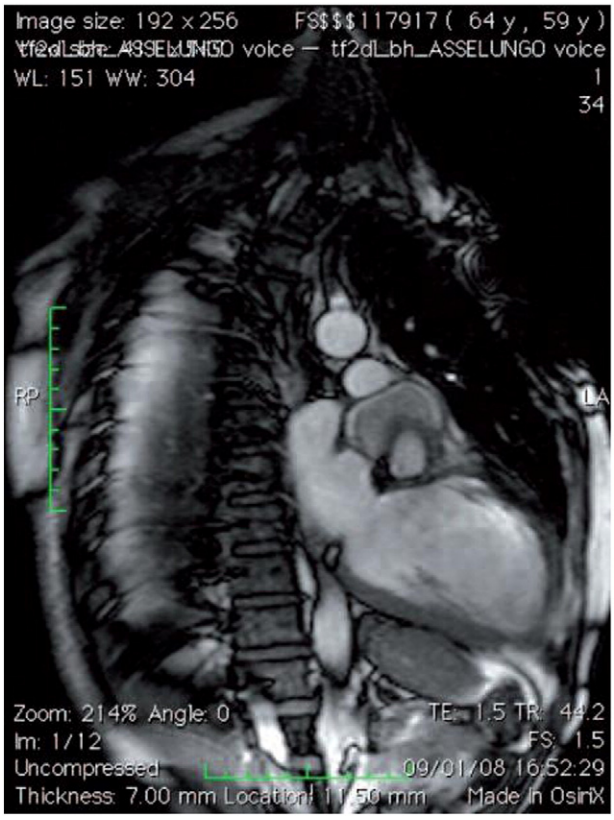

Fig. 3.

In order to decide on the more correct treatment between CABG surgery and the replacement option, and also in consideration of the high surgical risk present (EuroSCORE of 36.42%), we subjected the patient to a study of viability via cardiac MRI which was not present and for which we sent the patient to a transplant center in order to perform a targeted evaluation for admission in the transplant list.

3. Discussion

Pseudoaneurysms result from the displacement of the external elastic membrane with loss of integrity of the vascular wall.

Typically a pseudoaneurysm is characterized by large, thin-walled, narrow neck, saccular appearance and is in communication with the real arterial lumen through a continuous solution of the vascular wall.

Pseudoaneurysms are extremely rare after coronary percutaneous procedures with an incidence of 0.3–0.6% and drug-eluting stents are associated with a higher incidence of these complications.

Among the main causes of the formation of pseudoaneurysms after percutaneous angioplasty procedures is the use of large balloons, high inflation pressure and the presence of coronary dissections.

Pseudoaneurysms tend to become large and have a high growth speed with the risk of rupture, thus current literature is not unanimous in recommending invasive treatment; some patients have been successfully treated with CABG surgery, while others are equally successfully treated with the use of covered stents or by embolization with appropriate devices.

Concerning septic coronary pseudoaneurysms, literature cites only 23 cases. The initial physiopathological event is represented by the infection of the stent; in most cases (65.2%), *S. aureus* is implicated, as in our case; less frequently the infection is caused by Methicillin-resistant *Staphylococci* (17.4% of cases) and *Pseudomonas aeruginosa* (13% of cases).

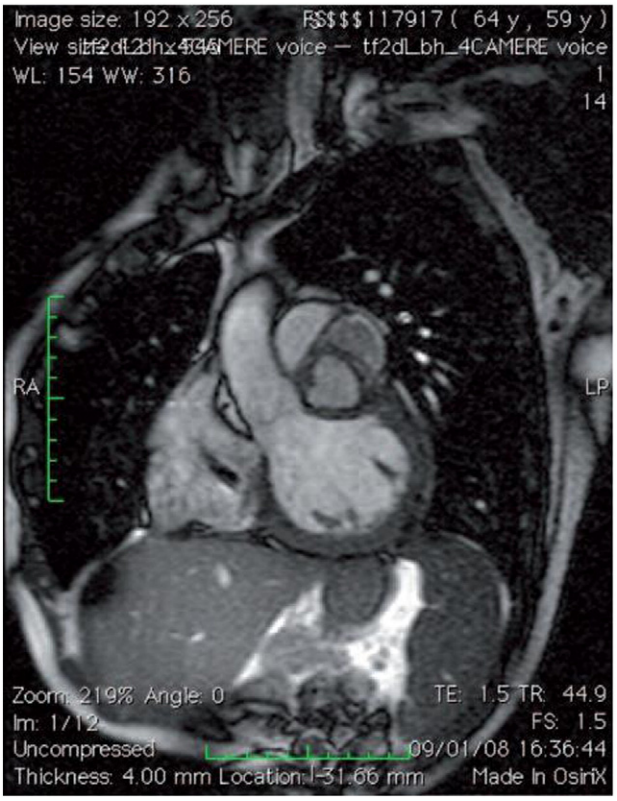

Fig. 4.

In all patients fever and positive blood cultures are present, while the angina symptoms are present in only 50% of the cases.

The development of important bacteremia during percutaneous angioplasty procedures is certainly favored by the use of multiple accesses from the same artery site, the permanence of the introducer in situ for several days, the formation of hematomas in the arterial puncture and the presence of non-optimal sterile measures.

The use of drug-eluting stents may predispose to the onset of infectious states because of their immunomodulatory and antiproliferative effects which lead to the in situ reduction of defense mechanisms, for the infiltration of inflammatory cells and in particular of eosinophils and lymphocytes near the stent and the delayed endothelialization of the stent.

The diagnosis of septic pseudoaneurysm is extremely challenging and today makes use of numerous instrumental methods including transthoracic and transesophageal echocardiography, coronary CT angiography, cardiac MRI and coronary angiography using IVUS.

The therapy is not univocal in the first instance and makes use of antibiotic therapy; in 60% of cases in the literature patients were then subjected to CABG surgery with the removal of the infected stent with a very high mortality rate (43.5% of cases).

The coronary stent infection is a serious complication, fortunately very rare and still associated with significant morbidity and mortality; it should be suspected in patients who have recently undergone PCI and develop a septic clinical frame.

An integrated use of imaging techniques that are available today is associated with the clinical picture and the blood tests can help in defining a diagnosis.