



Case Report

Coronary Stent Infections: A Case of Pericardial Abscess and Stent Displacement After Repeated PTCA Procedures Which Required an Emergency Surgery

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Abstract

We report the case of a 50-year-old male patient with hypertension, peripheral artery disease, history of smoking and drug abuse and a hypercoagulability state, who underwent several percutaneous transluminal coronary angioplasty procedures for ST-elevation myocardial infarction first and for stents thrombosis then, complicated with sepsis, epistemic pericarditis, left ventricle aneurism and coronary stent abscess which required an emergency surgical treatment.

Keywords: Coronary Stent Infection; Pericarditis; Left Free Wall Aneurism; Coronary Artery Bypass Graft

Introduction

Although its safeness and feasibility had been proofed, even a less invasive approach for ischemic cardiopathy like PTCA can lead to severe complications. Coronary stent infective complications are rare but could lead to life threatening situations. Our patient's case shows the importance of recognize early signs of infection after a percutaneous procedure, highlights some prevention factors and shows the importance of a timely surgical intervention.

Case Report

In September of 2021 our patient was admitted to ER of our Hospital for uncontrolled hypertension and started antihypertensive medical therapy: during a cardiologic evaluation on October 2021 ECG signs of ischemia appeared and led to a CT coronary scan procedure, which showed a 30% stenosis in distal left main, a 50% stenosis of proximal Left Anterior Descending (LAD), a critical disease of the Circumflex artery (Cx) and a 50% stenosis of the Right Coronary

Artery (RCA): on October a coronary angiography was performed, with the finding of a critical stenosis in left main (evaluated with IVUS), a critical stenosis in proximal (evaluated with FFR) and distal left anterior descending, a moderate stenosis in proximal circumflex artery, a critical stenosis in middle circumflex artery, a moderate stenosis in proximal right coronary artery and a critic stenosis of distal right coronary artery. During the procedure an acute intraluminal thrombosis was observed and hence an urgent PCI was performed with balloon angioplasty and implantation of five Drug Eluted Stents (DES) in proximal and middle Cx, first diagonal branch and distal left main/ostial LAD.

After the procedure the patient developed a bilateral superficial vein thrombosis in the upper limbs and Enoxaparine therapy was started, in addition with dual antiplatelet therapy. After the first procedure, before discharge, the patient was pyretic, but hided it because he wanted to go home.

Six days after the procedure the patient presented chest pain, fever and asthenia. He underwent an emergency evaluation: ECG findings of lateral ischemia were present and coronary angiography was performed. First diagonal branch occlusion, endoluminal thrombosis of left main and circumflex artery ostium were found: balloon dilatations of occluded vessels were accomplished. The day after, the patient experienced a positional chest pain. Persistent ST elevation and echocardiographic finding of pericardic effusion were present, so a diagnosis of episternocardic pericarditis was made. Proper medical therapy was started. On October 19th Methicillin-Sensitive Staphylococcus Aureus (MSSA) grew up in blood cultures and intravenous antibiotics were administered for 14 days. To exclude any septic focus, full-body CT scan, retinoic angiography, OCT and echocardiography were performed without revealing any source of infection. During CT scan an obstruction of proximal left common iliac artery and right common femoral artery was found: vascular surgeons' evaluation recommended an elective PTA procedure. Suspecting a hypercoagulability state, an angiologic evaluation was made and an activated protein C resistance was found. Moreover, the patient resulted heterozygotes for Leiden mutation of V factor. After the discharge, the patient underwent seriate outpatient clinic evaluation in which he referred chronic chest pain due to pericarditis. The echocardiography showed an apical ventricular aneurism and anterior-lateral, middle-apical and anterior septal wall akinesia. On 11th April, the patient experienced an intense chest pain, worse than his chronic usual pericarditic pain, so he went to E.R. and a Heart-CT-scan was performed: left main intra-stent thrombosis, ventricular aneurism, pericardial thickening, organized epicardic hematoma with occluded and probably displaced stents in first diagonal were detected (Fig. 1).

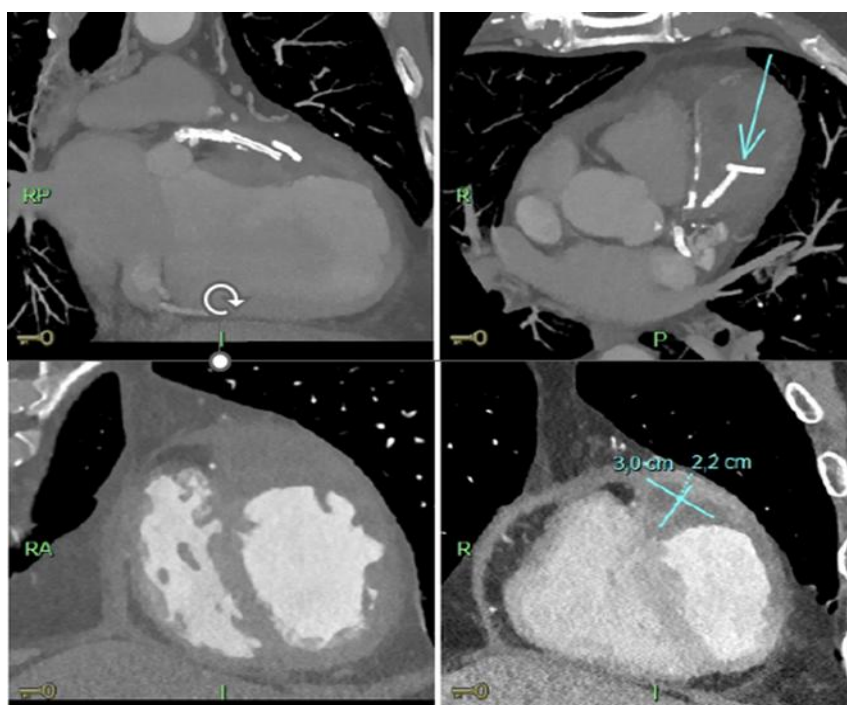


Figure 1: Heart-CT-scan, which shows left main thrombotic occlusion, epicardic hematoma and D1 stents seconded.

The patient was hence transferred to the Cath lab for coronary angiography which showed the finding of left main intrastent thrombosis and occlusion, first diagonal intra-stent occlusion, critical stenosis of middle-distal right coronary artery. Since the poor hemodynamic conditions an Intra-Aortic Balloon Pump (IABP) was placed and the patient was scheduled for emergency surgery. After the full median sternotomy, as expected, firm adhesences were found due to the adhesive pericarditis process. After a careful isolation of the heart structures, cardiopulmonary bypass was established through the ascending aorta for the arterial line and bicaval cannulation for the vein drainage. After debridement of the pericardial adhesions, an abscess on the diagonal territory was identified and opened. Within the abscess the dislocated first diagonal branch stents were identified and removed. After a proper washing of the abscess cavity, the underlying aneurysm of the antero-lateral wall was opened and repaired according to the Dor technique with the interposition of felt stripes. After left internal thoracic artery and great saphenous vein harvesting, two CABG (LITA to LAD, GSV to RCA) were performed, dislocated stents were removed, the ventricular aneurism was excluded with a purse string and repaired through the plication of the wall with a double Teflon strip. Finally, a subtotal pericardiectomy (laterally until phrenic nerves and down for all diaphragmatic surface) was performed (Fig. 2).

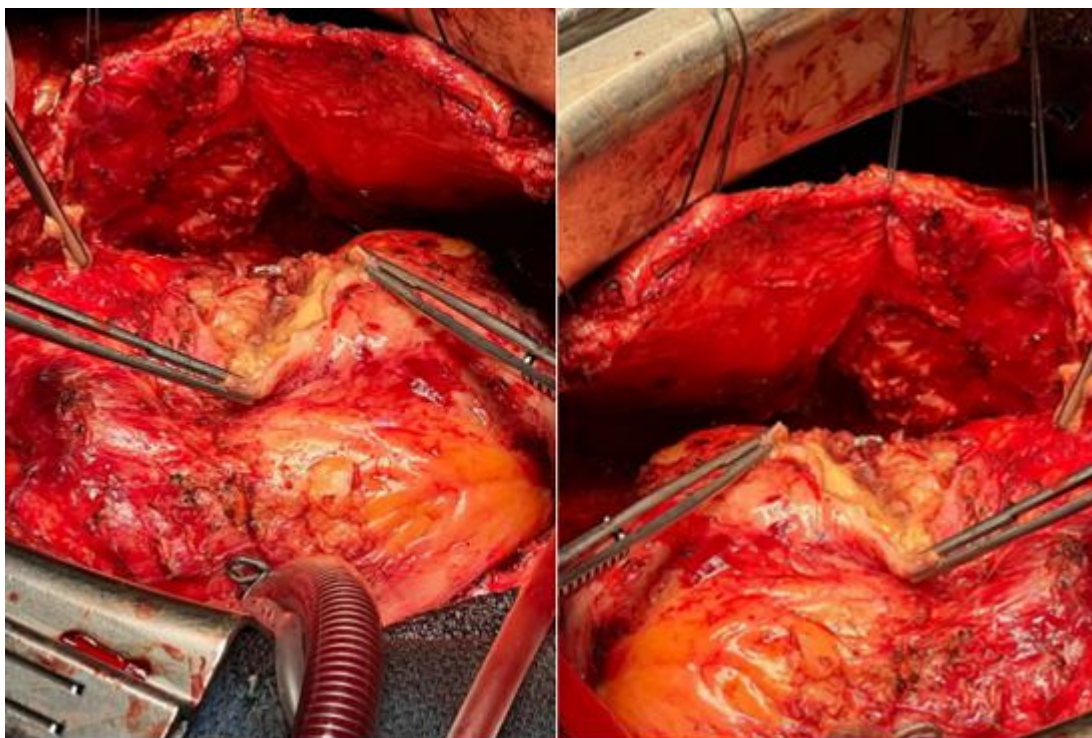


Figure 2: Intraoperative pictures.

MSSA was detected in abscessual material from operating room. After surgery, antibiotic therapy with intravenous Oxacillin was administered. During the post-operative period, the patient underwent seriate blood cultures, without any microbial growth and then full-body CT scan looking for any source of infection. No septic focus was found. The patient continued antibiotic therapy with Oxacillin. Before discharge the patient was in good clinical conditions, with decreasing inflammation signs. Antibiotic therapy with Minociclin was prescribed and seriate outpatient clinic evaluation were settled. The echocardiogram highlighted antero-apical dyskinesia and a 39% ejection fraction.

Discussion

Studies have shown that incidence of stent thrombosis increase in patient with genetic hypercoagulability like ours [1]. The first stent infection was reported in 1993 [2]. From that moment to 2019, 77 cases of stent infections were reported, with 29 cases involving coronary stents. Drug Eluting Stents (DES) are associated with a higher infection rate than Bare Metal Stent (BMS), *Staphylococcus aureus* is the most common involved bacteria, followed by *Pseudomonas Aeruginosa* [3,4]. Of the 24 cases of coronary artery stent infection reported from 2003 to 2018, 16 cases involved DES and only 8 involved BMS [5]: This is due to the fact that neointima formation is a protective factor against infections and DES, with their antiproliferative properties delay the neointimal growth (up to 6 months) leading to a greater risk of infections³, according to the presence of a surface in which organism from distant sources could seed with a bacteremia [6]. Many findings suggests that coronary stent infection is due to equipment contamination during angiographic procedure or to another concurrent source of infection when the DES is implanted [7].

The role of cardiac magnetic resonance has been discussed and evaluated in many studies: resonance imaging is thought to be dangerous in case of metallic cardiovascular devices because it may cause malfunction o dislodgement of the devices [8]. For this reason, manufacturers and physicians use to delay the exam until endothelialization (which can avoid these complications) has occurred [9]. Nevertheless, a study on this problem 8 has shown that the risk of cardiac complication due to stent thrombosis with early MRI (before endothelialization) is very low: so, even if there are still concerns about it, in our patient's case a cardiac MRI could be useful to anticipate the diagnosis and should be considered for similar clinical scenarios.

Therefore, stent infections could be caused by perioperative contamination or by latent seeding from distant sources of infection through bacteremia. This can be due to inadequate peri-procedural asepsis measures, to inadequate management of central

venous catheter during hospitalization, which could lead to Catheter-Related Blood Stream Infections (CRBSIs) or to other sources of bacteremia which are not known before the intervention [10].

When a coronary stent infection happens, patients experience fever (93%), chills (41%), chest pain (51.7%) [5]. Despite its rareness, the surgeon and the cardiologist always have to be aware of a DES-related infective complication when these symptoms appear.

Conclusion

Infective complications of PTCA with DES are rare but dangerous events. In most cases they develop thanks to the presence of a surface in which organisms from distant sources could seed after a bacteremia. As is seen in other similar cases, an hypercoagulability state is a condition which augments the risk of both stent thrombosis and infection. In the future, Leiden V factor or other hypercoagulability disorders, thanks to further advancements, could influence decision making among interventional or surgical approach in ischemic cardiopathy. This is the physiopathological model we postulate for our patient's case: a bacteriemic spread from an external source of infection which found an ideal substrate to seed. The above-mentioned risk factors have to be kept in mind and prevention should be made considering these. The diagnosis is challenging because of lacking of radiological signs sufficiently sensitive and specific for stent infections; clinical suspicion should arise when considering symptoms and history. Prevention should be focused in avoiding many same sides groin puncture, in ensuring proper aseptic care, in avoiding reuse of inadequately sterilized percutaneous devices and in managing a strict glycemic control in diabetic population.

Conflict of Interest

The authors have no conflict of interest to declare.

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