

## Total obstruction of percutaneous vascular accesses in acute coronary syndrome. Case report

*Obstrucción total de los accesos vasculares percutáneos en el síndrome coronario agudo. Reporte de caso*

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### Palabras clave:

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### ABSTRACT

Multisite artery disease (MSAD) is common in patients with atherosclerosis involvement in one vascular bed, including the coronary arteries. The clinical presentation depends on the site and the severity of affected vascular territory as well as the time of disease developed. The therapeutic approach includes addressing the specific symptoms of any affected location and evaluates the risk associated with a specific lesion, in addition to manages the implementation in order to control cardiovascular (CV) risk factors. We present an unusual case of a patient with unstable angina and total obstruction of the vascular accesses (radial and femoral) that precluded the percutaneous coronary revascularization. Subsequently, through non-invasive CV imaging, the possibility of coronary artery bypass grafting (CABG) surgery was ruled out as there were no revascularizable coronary anatomy due to severe and diffuse atherosclerotic disease in coronary arteries.

### RESUMEN

La enfermedad arterial de múltiples sitios es común en pacientes con afección aterosclerótica en un lecho vascular, incluyendo las arterias coronarias. La presentación clínica depende del sitio y gravedad del territorio vascular afectado, así como del tiempo de desarrollo de la enfermedad. El abordaje terapéutico se centra en considerar los síntomas específicos de cualquier localización afectada y evaluar el riesgo asociado con la lesión específica, así como implementar el manejo para el control de los factores de riesgo cardiovascular (CV). Presentamos un caso poco habitual sobre un paciente con angina inestable y obstrucción total de los accesos vasculares (radial y femoral) que imposibilitó la revascularización coronaria percutánea. Posteriormente, a través de estudios de imagen cardiovascular no invasivos, se descartó la posibilidad de una cirugía de revascularización coronaria al no contar con anatomía coronaria revascularizable secundario a la enfermedad aterosclerótica severa y difusa de las arterias coronarias.

### INTRODUCTION

MSAD is defined by the simultaneous presence of clinically relevant atherosclerotic lesions in at least two main vascular territories. This condition is common in patients with atherosclerosis involvement in one vascular bed with association ranging from 10 to 15% in patients with coronary artery disease (CAD) and up to 60 to 70% in patients with arterial disease of the lower extremities.<sup>1</sup> MSAD shares risk factors with other CV diseases. Smoking is the strongest risk factor, followed by previous history of smoking and

type 2 diabetes, conferring this last factor five times greater risk for limb amputation and three times greater for mortality.<sup>2</sup> The increase risk of CV morbimortality is well established in patients with peripheral artery disease (PAD). An ankle-brachial index (ABI) of  $\leq 0.90$  is commonly used in clinical practice to diagnose PAD<sup>3</sup> and is associated with approximately twice the 10-year total mortality, CV mortality, and major coronary event rate compared with the overall rate in each Framingham risk score category.<sup>4</sup> Best medical therapy focuses on controlling CVS risk factors with pharmacological measures as antihypertensives, antiplatelets, and lipid-

lowering drugs as well as non-pharmacological measures including tobacco suspension, healthy diet, weight reduction and exercise.<sup>5</sup>

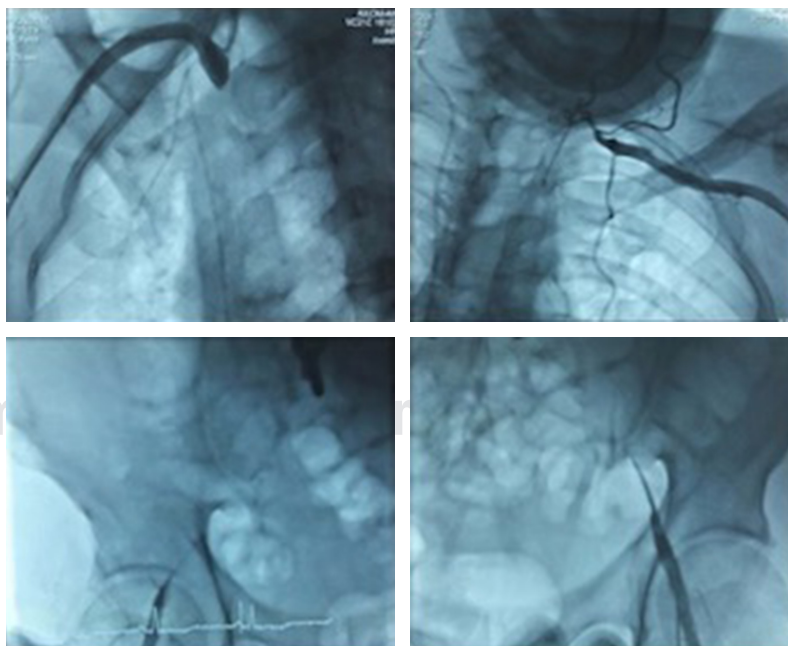
**CASE REPORT**

A 67-year-old male with a history of chronic smoking, type 2 diabetes (T2D), and supracondylar amputation of the right pelvic limb (due to complications of diabetic foot in 2015). He was admitted to the emergency

department due to a progressive pattern of angina pectoris that began three weeks before admission. The initial electrocardiogram (ECG) confirmed anterolateral subepicardial ischemia (Figure 1). Furthermore, the transthoracic echocardiography showed anterior and anteroseptal hypokinesia, with left ventricular ejection fraction of 44%. The cardiac biomarkers were normal, categorizing it as unstable angina with GRACE 102 points. Continuous monitoring and anti ischemic drugs with dual antiplatelet therapy, anticoagulation and high dose statin were started based on the international guidelines of non-ST-elevation acute coronary syndrome (NSTEMI-ACS).<sup>6,7</sup> However, the angina symptoms were recurrent despite the pharmacological treatment. Therefore, he was transferred to the cardiac catheterization room. During the intervention, it was necessary to perform a puncture of both radial and femoral arteries, finding total obstruction at the level of both subclavian and proximal common femoral arteries by angiography (Figure 2), precluding percutaneous coronary revascularization. He was transferred to the coronary care unit to optimize anti-ischemic drugs and stabilize the angina events. Subsequently, non-invasive cardiovascular imaging were performed. The coronary computed tomography angiography



**Figure 1:** 12-lead electrocardiogram: sinus bradycardia with septal necrosis and antero-lateral subepicardial ischemia.



**Figure 2:** Peripheral arteries angiography during PCI attempt: total occlusion of both subclavian arteries, with anterograde filling through vertebral arteries. Total obstruction of iliac arteries.



**Figure 3:** Coronary angiotomography: diffuse disease whit significant stenosis of left anterior descending (LAD) artery and left circumflex artery. LAD artery with maximum diameter of 1.3 mm in its mid segment with poor distal filling.

(CTA) identified diffuse coronary artery disease without distal targets and the anatomy not amenable for CABG (Figure 3). The CTA of the aorta and other large blood vessels anatomically identified the sites of total peripheral arterial obstruction (Figures 4 and 5). Finally, he was a candidate for medical treatment with dual antiplatelet therapy, beta-blocker, nitrate, angiotensin-converting enzyme inhibitor, and high dose statin in addition to cardiac rehabilitation for control of risk factors and changes in lifestyle. In the last cardiological consultation one year after the event, the patient continued smoking eight cigarettes a day and denied cardiological symptoms in his daily activities.

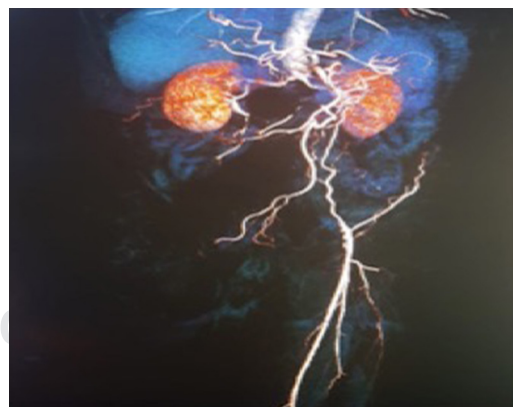
#### DISCUSSION AND LITERATURE REVIEW

In general, the risk of MSAD increases considerably with age, it is estimated a prevalence of 2% at the age group of 40 to 50 years and 32.5% at the age group of 91 to 100 years.<sup>8</sup> Combining the CVS risk factors exposure, being an active smoker increases the risk (odds ratio) of 2.72 times more, 1.88 for type 2 diabetes, 1.55 for systemic arterial hypertension, and 1.19 for hypercholesterolemia.<sup>9</sup> These patients with MSAD who suffer NSTEMI-ACS have an increased risk for CVS mortality during their

hospitalization, as well as medium and long term compared to those with isolated CAD. Similarly, the risk of CV mortality increases if more arterial territories are affected.<sup>10-12</sup> The therapeutic approach should be decided on a case-by-case basis with a multidisciplinary team and giving preference to the symptomatic vascular site. It has not been shown that routinely detection of the disease in additional asymptomatic vascular sites improves its prognosis or changes the therapeutic behavior.<sup>1</sup> The only randomized clinical trial «AMERICA» designed to evaluate the impact on the prognosis of the systematic screening for MSAD in patients with high-risk CAD (three vessel



**Figure 4:** Reconstruction 3D angiotomography: chronic thrombosis of both subclavian arteries.



**Figure 5:** Reconstruction 3D angiotomography: aortoiliac occlusive disease with chronic thrombosis of both iliac arteries and antegrade filling by collateral circulation.

CAD and/or with ACS at age greater than 75 years), does not show any significant benefit in primary composite endpoint including death, any ischemic event leading to rehospitalization or any evidence of organ failure.<sup>13</sup> Within the spectrum of NSTEMI-ACS, unstable angina is defined as myocardial ischemia at rest or minimal effort in the absence of myocardial necrosis<sup>6</sup> and compared with myocardial infarction, has a lower risk of mortality.<sup>14</sup> NSTEMI-ACS international guidelines establish the time for conducting diagnostic percutaneous coronary angiography in patients with recurrent angina despite pharmacological treatment and recommends an immediate invasive strategy in less than two hours.<sup>6,7</sup> The radial artery access in percutaneous coronary intervention (PCI) is preferred over femoral artery in patients with PAD. The reason behind this is that femoral access in PAD patients is an independent risk factor for developing major vascular complications, in other words, complications requiring surgical vascular intervention for resolution.<sup>15</sup> The current surgical practice is based largely on an anatomical definition of complete revascularization and aims to derive all epicardial vessels with diameter equal to or greater than 1.5 mm with luminal reduction greater than 50% in at least one angiographic view. The complexity of coronary anatomy and clinical comorbidity was associated with incomplete revascularizations that had a significant increase in mortality.<sup>16</sup> Data on patients with ACS not susceptible to revascularization due to severe and diffuse CAD or without distal beddings are scarce. Available observational studies included mainly patients with stable CAD and refractory angina. Although the prognosis vary due to characteristics of the patient factors such as age, previous CABG or PCI, left ventricular dysfunction, and congestive heart failure, in the largest cohort in the literature consisting of patients with CAD referred specifically for refractory angina who were not amenable to coronary revascularization had significantly higher mortality rate (14.8% vs 6.6%,  $p = 0.004$ ) compared to completely revascularized patients at the three-year follow-up.<sup>17</sup> If coronary anatomy is not suitable for revascularization, the goal is to intensify

medical therapy for angina relief and improve quality of life.<sup>18</sup> In addition, individuals who change their behavior (quit smoking and modify diet and exercise) after ACS are at substantially lower risk of repeat cardiovascular events. Persistent smoking and non-adherence to diet and exercise had a 3.8-fold increased risk of myocardial infarction, stroke and death compared with never smokers who modified diet and exercise.<sup>19</sup>

## CONCLUSIONS

MSAD has a high prevalence worldwide. This condition is strongly associated with morbidity and mortality due to coronary and cerebrovascular disease. Given the devastating consequences of these pathologies, it is of utmost importance to continue spreading information about cardiovascular diseases. The main goal is to educate the population with primary prevention tools, as well being able to recognize early manifestations of arterial diseases and thus reduce the number of patients diagnosed in advanced stages.

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**Protection of people and animals:** The authors declare that no experiments have been carried out for this research in humans or animals.

**Data confidentiality:** The authors state that they have followed the protocols of their work center on the publication of patient data.

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