

## Primary percutaneous coronary intervention of unprotected left main coronary artery: two-year follow-up

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### ARTICLE INFORMATION

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### Competing interests

The authors declare no competing interests

### Acronyms

**CABG:** coronary artery bypass grafting

**LMCA:** left main coronary artery

**PCI:** percutaneous coronary intervention

### ABSTRACT

The case of a 65-year-old patient with left main coronary artery disease, without previous venous or arterial graft, is described; that, in the context of the acute coronary syndrome with ST segment elevation, was operated percutaneously and was implanted a stent with good results.

**Key words:** Coronary angioplasty, Coronary disease, Myocardial ischemia, Myocardial revascularization

### *Intervencionismo coronario percutáneo primario de tronco no protegido: seguimiento a 2 años*

### RESUMEN

Se describe el caso de un paciente de 65 años de edad con enfermedad del tronco principal de la coronaria izquierda, sin injerto venoso o arterial previo; que, en el contexto de un síndrome coronario agudo con elevación del segmento ST, fue intervenido por vía percutánea y se le implantó una prótesis endovascular con buen resultado.

**Palabras clave:** Angioplastia coronaria, Enfermedad coronaria, Isquemia miocárdica, Revascularización miocárdica

### INTRODUCTION

In 1912, James Herrick described the first case of left main coronary artery (LMCA) disease, in a patient who died due to a cardiogenic shock secondary to myocardial infarction<sup>1</sup>. The LMCA lesion is found in 2-7% of patients who undergo coronary angiography, possibly, due to the low probability of surviving the ischemic event generated at that location, or the insufficient time to get to the hospital<sup>2</sup>. Patients with acute myocardial infarction with ST-segment elevation may present affection of the unprotected LMCA. This clinical picture is associated, quite often, to the cardiogenic shock in

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its initial presentation, because a large area of the myocardium is at risk, has high mortality and needs inotropic/vasopressor, ventilatory support and also mechanical with intra-aortic balloon pump<sup>3</sup>.

## CASE REPORT

A 65-year-old man, without personal pathological background of interest, came to the emergency room referring retrosternal pain, oppressive, high intensity, radiating to the left arm. He also described that the beginning was sudden, at rest, 40 minutes of evolution, without relief, and accompanied by profuse sweating, nausea and palpitations. He said he has been smoker of one pack of cigarettes daily in the last 20 years, and he had history of first order high blood pressure.

### Findings of the physical examination

At his arrival, as part of the evaluation in the emergency room, a blood pressure of 110/60 mmHg, heart rate of 110 beats per minute and peripheral oxygen saturation of 98% were registered.

### Electrocardiographic findings

A 12-lead electrocardiogram showed ST-elevation from V<sub>1</sub> to V<sub>4</sub> and aVR greater than 2.5 mm, with ST-segment depression in D<sub>II</sub>, D<sub>III</sub> and aVF.

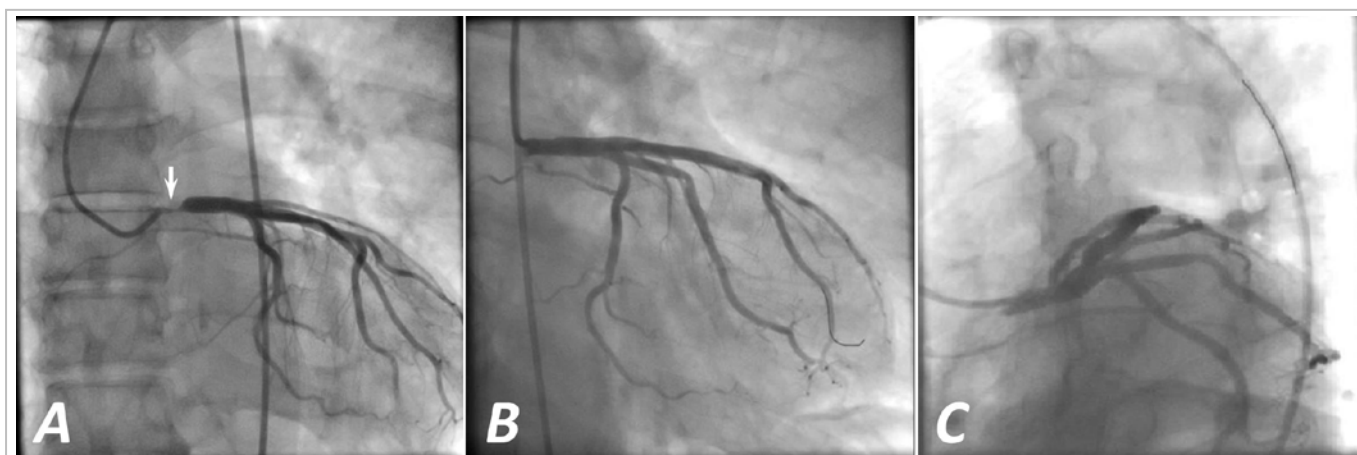
### Management

With the diagnosis of acute coronary syndrome with ST-segment elevation, he was moved to the hemo-

dynamics laboratory, prior to the start of continuous monitoring and the administration of 250 mg of aspirin, 600 mg of clopidogrel and non-fractionated heparin in a dose of 100 U/Kg. In addition, a blood sample was taken for analysis.

A coronary angiography was performed through the right femoral arterial, where, after a selective catheterization of the left coronary *ostium*, an obstruction of the LMCA in a 90% at the proximal third was observed, due to a type A lesion with thrombus image (**Figure, Panel A**). Afterwards, the predilatation of the lesion with balloon 4.0 × 14 mm at 14 atmospheres and subsequently, a paclitaxel-eluting stent Active 4.0 × 14 mm was deployed, where a TIMI 3 flow was obtained (**Figure, Paneles B y C**). During the procedure, the patient presented hypotension and bradycardia which required the administration of drugs intravenously, that were withdrawn once the hemodynamic stability was achieved; after which, the patient was moved to the Coronary Intensive Care Unit (CICU), where the reversal of electrical changes was observed, with no evidence of ischemia or necrosis.

At the CICU, he was performed a transthoracic echocardiogram that showed a preserved ejection fraction with grade I diastolic dysfunction. The patient was discharged from the hospital seven days after the procedure, under treatment of dual antiplatelet therapy (aspirin and clopidogrel), statins and beta-blockers, as well as lifestyle modifications, and outpatient follow-up to the first, third, sixth and twelfth month.



**Figure.** Left coronary artery angiography. **A.** Severe stenosis of the left main coronary artery (arrow). Anteroposterior view. **B.** Angiographic result after stent implantation. Right anterior oblique. **C.** Idem. Left anterior oblique with caudal angulation.

## Evolution

At the third month of evolution, he was performed a transthoracic echocardiogram that showed a preserved ejection fraction without segmental contractility disorders or left ventricular diastolic dysfunction; in addition, he was performed a stress test where the maximum heart rate was reached with no evidence of clinical or electrocardiographic signs of myocardial ischemia. After two years of evolution, the patient continued without ischemic symptoms, and the stress test was repeated, where the same result was obtained: he reached the maximum heart rate in the absence of symptoms or ischemic signs, or suggestive changes of ischemia in the electrocardiogram. The echocardiographic evaluation showed only a delayed relaxation pattern in the mitral flow diagram, with no other data of interest.

## COMMENTS

Over the past 25 years, the approach paradigm for the multivessel coronary artery disease has been redefined, especially the lesions of unprotected LMCA, which is still a controversial issue. Due to the results of the CASS study<sup>4</sup>, the coronary artery bypass graft (CABG) is considered the standard treatment for the LMCA disease.

Two important pathophysiological characteristics that negatively condition the success of the percutaneous coronary intervention (PCI) are pointed out: a) up to 80% of the LMCA disease affects the bifurcation, which has more risk of restenosis, b) up to 80% of patients with LMCA disease also have multivessel coronary artery disease, in which the CABG offers survival advantages, regardless the presence of the disease in the LMCA<sup>5</sup>. However, in recent years, the evidence in favor of the PCI of the LMCA has increased. A recent study<sup>6</sup>, where the population of the SYNTAX and PRECOMBAT studies was analyzed, which presented serious lesions of the LMCA, and where a total of 1305 patients were enrolled with a five-year follow-up, contributed with the conclusions that in patients with LMCA lesion, CABG and PCI have similar rates of death, heart attack and stroke. Besides, in the group with isolated LMCA lesion or trunk plus one vessel, the PCI was associated with lower mortality from any cause or the cardiac one<sup>6</sup>.

The context of these lesions in the acute coronary syndromes with ST-segment elevation poses an additional challenge for the interventional cardiolo-

gist. It is well known that approaching emergency lesions of the LMCA significantly increases mortality<sup>7</sup>, between 40 to 50%, by considering that heart failure and cardiogenic shock are very common forms of presentation, combined with the fact, that generally these patients present several lesions of the coronary tree because the isolated disease of the LMCA is a rare situation and when it is found, it affects the *ostium* of the artery<sup>8</sup>. In a Chinese study<sup>9</sup>, significant differences in mortality or serious complications between surgical and interventional strategies were found. On the other hand, a follow-up study of patients undergoing PCI of the LMCA at a center that does not have cardiac surgery, concluded that approaching LMCA lesions by primary PCI was safe and effective<sup>10</sup>. The SYNTAX study<sup>11</sup> itself reported similar mortality and reinfarction rates in both subgroups of patients with LMCA disease: treated with stent or with CABG.

The selection of patients is clearly an important decision in choosing the optimal revascularization method for them. In patients with LMCA lesions undergoing PCI, the strongest predictor of serious adverse events is the presence of lesions involving LMCA's bifurcation, which represent real challenges. On the other hand, lesions that do not involve bifurcation are very favorable to be treated with PCI. The additional use of the SYNTAX score is a tool to help choosing an optimal method of myocardial revascularization in patients with complex coronary artery disease<sup>12</sup>. The PCI in the acute coronary syndrome with ST-segment elevation in LMCA lesions, in patients with unfavorable anatomy, could be part of a hybrid treatment strategy as a bridge to CABG. On the contrary, in patients with favorable anatomy it seems to be a viable and safe option.

## CONCLUSIONS

Recent studies have shown the effectiveness of PCI in the LMCA disease, especially in patients with stable coronary artery disease. However, in the context of acute coronary syndromes with ST-segment elevation, given the clinical circumstances and taking into account the anatomical characteristics of the lesions and the rest of the coronary tree, the PCI is a useful strategy as a bridge for a definitive treatment. Moreover, in patients with favorable anatomy –as the case presented– seems to be an optimal option in the approach of those lesions.

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