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Coronary malperfusion in acute type A aortic dissection

Hipoperfusión coronaria en la disección aórtica aguda tipo A

Cristina Morante Perea,[a,*] Tomás Cantón Rubio,[a] Luis Manuel Hernando Romero,[a] José Alfonso Buendía Miñano,[b] José Moreu Burgos,[a] and Luis Rodríguez Padial[a]

[a] *Servicio de Cardiología, Hospital Universitario de Toledo, Toledo, Spain*
[b] *Servicio de Cirugía Cardiaca, Hospital Universitario de Toledo, Toledo, Spain*

To the Editor,

Coronary malperfusion in patients with aortic dissection further worsens prognosis due to compromised myocardial blood flow. The incidence rate of coronary disease goes from 9% to 10% according to various registries.[1,2] Also, it can occur simultaneously at the beginning of dissection, during the patient transfer or in the middle of surgery. The management of these patients is still a matter of discussion. The optimal time of myocardial reperfusion is 90 min, a timeframe that cannot be guaranteed with surgical revascularization associated with aortic valve repair surgery.

This is the case of a 65-year-old man. The patient was a smoker with chronic kidney disease who was admitted to our center as a «myocardial infarction code» case due to suspected anterior ST-segment elevation acute coronary syndrome. The coronary angiography revealed the presence of a type A aortic dissection with coronary malperfusion due to left main coronary artery (LMCA) occlusion.

The patient had reported to his tertiary referral center with a 30-min history of oppressive retrosternal chest pain. Upon arrival at the emergency room, he remained symptomatic and hemodynamically unstable (pale, sweaty, low arterial blood pressure levels, 60/40 mmHg). The electrocardiogram showed anterior ST-segment elevation and aVR changes, which is why the «myocardial infarction code» was activated and the patient transferred to our center. The cardiac ultrasound revealed the presence of a severely depressed left ventricular ejection fraction (visual estimate of 10% to 15%) with changes in segmental contractility located in the anterior, septal, and lateral walls without pericardial effusion. A total of 300 mg of acetylsalicylic acid, 180 mg of ticagrelor, and vasoactive drugs were administered to the patient.

The patient was sent to the cath lab right away. Given the situation of established cardiogenic shock (stage D) and the potential need for percutaneous circulatory support systems (intra-aortic balloon pump, Impella, Abiomed, United States), the femoral access route was selected (bilateral common femoral artery puncture with 6-Fr introducers).

Initial complications were found in the selective catheterization of the left coronary artery via right femoral access and direct guide catheter insertion (due to highly suspected LMCA disease). Due to suspected type A aortic dissection, an aortogram was performed using a pigtail catheter that confirmed this suspicion and LMCA disease due to hematoma/intimal flap with subtotal occlusion (videos 1 and 2 of the supplementary data).

The criterion for remaining in the true lumen was the presence of an aortic pressure curve of normal morphological characteristics (non-damped) using a 0.35 in 260 cm Teflon-coated guidewire for catheter exchange.

Simultaneously, the cardiac surgery unit was contacted and it was decided to proceed with an emergency percutaneous revascularization as a bridging therapy until definitive surgical treatment. A 6-Fr JL4 guide catheter (Mach 1, Boston Scientific, United States) was used to facilitate the subselective catheterization of the LMCA and perform maneuvers to increase active support (deep intubations) if necessary (sacrificing greater passive support but with better maneuverability compared to other catheters). Once the stay inside the true lumen was confirmed, a 0.014 in angioplasty guidewire was advanced towards the distal third of the left anterior descending coronary artery. A hydrophilic, intermediate weight guidewire was used (SION black, Asahi, Japan).

Afterwards, a 3.5 mm x 16 mm drug-eluting stent was implanted with 50% protrusion of the device into the ascending aorta to simulate the «chimney stent» technique used in cases of damaged coronary ostia during transcatheter aortic valve implantations. The stent was deployed at low (nominal) pressure to minimize the risk of dissection of the LMCA uncovered by the stent and, at least initially, free from significant atherosclerotic disease.

This stabilized the patient's hemodynamic status significantly. The echocardiography confirmed the improvement of left ventricular systolic function.

An emergency computed tomography scan of the aorta revealed the presence of a Standford type A aortic dissection without damage to supra-aortic trunks or the rest of the aorta. Surgery was planned based on the patient's hemodynamic instability, high risk of bleeding, and baseline anatomy (dilated aortic root and ascending aorta). The goal was to use a surgical technique that would require the shortest possible time on extracorporeal circulation. Based on the previous considerations, the Bentall-Bono technique was used. Both the aortic root and the ascending aorta were replaced for a no. 25 Carboseal valved conduit (Palex Medical, Spain) followed by coronary ostia re-implantation. Intraoperatively, the roof of the left main coronary artery was ruptured and the stent malapposed to the arterial walls, which led to the removal and further reinforcement of both the roof of the LMCA and left coronary ostium with 6/0 sutures, and a pericardial patch, respectively. The total time on extracorporeal circulation was 12 min.

*** Corresponding author.**
E-mail address: Cristinamorante94@gmail.com (C. Morante Perea).
𝕏 @MorantePerea

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The patient did fine after the surgery, was successfully extubated, and eventually discharged from the hospital. Prior to being discharge, an echocardiogram confirmed the presence of preserved systolic function (left ventricular ejection fraction of 55%) with mild hypokinesis of the anterior septum and proper positioning and functioning of the valved conduit.

In conclusion, this patient was initially treated of an anterior ST-segment elevation acute coronary syndrome (KK-IV). During coronary angiography, however, he was diagnosed with a type A aortic dissection that led to coronary malperfusion due to the protrusion of the dissection flap into the left main coronary artery. An urgent decision was made for drug-eluting stent implantation into the LMCA, which improved perfusion to the left coronary tree and provided enough hemodynamic stabilization to proceed with cardiac surgery.

In a series by Uchida et al.[1] of 25 patients with type A aortic dissection and signs and symptoms of coronary malperfusion, 11 underwent preoperative coronary angiography while 9 went to surgery right away. In those treated with coronary angiography, if coronary flow was compromised following dissection, a drug-eluting stent was implanted. If ventricular function improved, emergency surgery was performed. Otherwise, veno-arterial extracorporeal membrane oxygenation cannulation was used after surgery. Patients who underwent coronary angiography had a better prognosis.

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AUTHORS' CONTRIBUTIONS

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CONFLICTS OF INTEREST

None reported.

SUPPLEMENTARY DATA

Supplementary data associated with this article can be found in the online version available at https://doi.org/10.24875/RECIC.M23000392.

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Co-registration assisted 3-vessel orbital atherectomy in de novo calcified multivessel coronary artery disease

Aterectomía orbital a 3 vasos guiada por corregistro en enfermedad coronaria multivaso calcificada

Asad Shabbir, David Chipayo, Adrián Jerónimo, Alejandro Travieso, Nieves Gonzalo, and Javier Escaned*

Unidad de Cardiología Intervencionista, Hospital Clínico San Carlos IDISSC, Universidad Complutense de Madrid, Madrid, Spain

To the Editor,

Treatment of heavily calcified coronary artery disease (CAD) remains a technical challenge since a significant number of patients require some type or form of advanced plaque modification procedure in the cath lab. Therefore, interventional cardiologists should be aware of the complete array of plaque modification techniques available to prepare vessels to facilitate optimal stent deployment and expansion.[1] In the presence of proximal calcified disease in tortuous vessels, orbital atherectomy can be used as an alternative to rotational atherectomy thanks to its greater stability with reverse ablation, improved ease of use, and convenience as a result of a single-size burr that can be used to treat a wide range of vessel profiles. In addition, it appears to have a similar safety profile compared to rotational atherectomy.[2] We herein describe a case of 3-vessel proximal heavily calcified CAD where we demonstrate the feasibility of using orbital atherectomy to prepare all 3 epicardial vessels using a one-size burr guided by co-registered intravascular ultrasound (IVUS) and physiology prior to complete percutaneous revascularization in a single-staged procedure.

This is the case of a 73-year-old man with hypertension, type II diabetes mellitus, severe chronic obstructive pulmonary disease (forced expiratory volume in 1 second [FEV_1] of 29%), and atrial

* **Corresponding author.**
E-mail address: escaned@secardiologia.es (J. Escaned).
@AsadKShabbir @JEscaned

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