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Spontaneous conus branch occlusion mimicking anterior ST-segment elevation myocardial infarction

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A 64-year-old male patient was admitted due to out-of-hospital cardiac arrest. No bystander cardiopulmonary resuscitation (CPR) was provided with at least 10-15 minutes of downtime prior arrival of paramedics. The initial rhythm was ventricular fibrillation. Return of spontaneous circulation was achieved after 20 minutes of CPR. His post-arrest electrocardiogram (ECG) demonstrated ST-segment elevation in leads V1-V2 (Figure 1A). The patient was transferred to the hospital and underwent coronary angiography which revealed an acutely occluded conus branch of a non-dominant right coronary artery (RCA) (Figure 1B; Supplementary material, Video S1). The conus branch had slow filling to the point of occlusion with a meniscus. Furthermore, the patient had a non-culprit lesion in the mid portion of the RCA and several non-culprit lesions in the left coronary artery (Supplementary material, Figure S1).

After engagement of the RCA with a 6F IM Mach1 guide catheter an occlusion in the infarct-related artery was crossed with a Prowater coronary guide wire (Figure 1C). Despite balloon angioplasty with a 1.5/15 mm Sprinter Legend balloon dilatation catheter (Figure 1D), flow was unable to be restored in the conus branch (Figure 1E). Given the risk-benefit ratio, no more attempts were made to open the infarct-related artery. As a result of prolonged downtime, the patient exhibited a poor neurological outcome and deceased a three days later due to diffuse ischemic brain injury.

A conus branch supplies right ventricular outflow tract which is a potential origin of ventricular arrhythmias. Therefore, despite the small caliber of the vessel, a conus branch occlusion may result in fatal arrhythmic events [1]. While several reports of an iatrogenic conus branch occlusion have been published [1-3], a spontaneous occlusion of the above mentioned branch causing ST-segment elevation myocardial infarction (STEMI) is exceptionally rare [4,5]. To the best of our knowledge, this is the third report of STEMI due to a non-iatrogenic conus branch occlusion.
In some cases of STEMI, the culprit lesion or artery may not be clear. A careful analysis of the angiogram is essential to ensure all myocardial territories are accounted for and no branches are missing. Occlusion of a branch at its ostium may be difficult to appreciate. Right ventricular branches, septal branches, and the conus artery are not usual targets for coronary intervention, and thus have the potential to be unappreciated, yet all can cause STEMI. In addition, the conus branch may arise separately from the right aortic sinus and may not be seen with selective right coronary angiography. Optical coherence tomography may be utilised in suspected culprit lesions to assess for the presence of intraluminal thrombus and plaque rupture or erosion. Cardiac magnetic resonance imaging can be of use to localise infarction [5], noting time to reperfusion is important in STEMI. In our case, careful assessment of the angiogram found the conus branch occlusion with an acute appearance.

The case highlights that an acute conus branch occlusion can mimic anterior STEMI due to LAD lesion and should be considered when ST-segment elevation in anterior leads is encountered.
References:


**Figure 1.** A – ECG demonstrating ST-segment elevation in leads V1-V2 (arrows); B – Right coronary angiography showing an acutely occluded conus branch (arrow); C – Balloon angioplasty of the conus branch (arrow); D – Non-restored blood flow through the infarct-related coronary artery (arrow).