Case Report

An Example of Angiographic Projection "Fine Tuning" in Primary PCI for Acute Anterior Myocardial Infarction

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Abstract

A 52-year-old gentleman was admitted with acute anterior myocardial infarction. He was submitted to emergency coronary angiography intending to perform primary percutaneous coronary intervention (PCI). The left anterior descending (LAD) coronary artery was missing. The standard initial angiographic projections failed to reveal the stump of the very proximally occluded LAD, which was consistently hidden by the proximal part of the left circumflex artery. Only the right anterior oblique cranial view, after slightly modifying the initial angle, finally delineated the LAD stump. Primary PCI was successfully performed and the patient had an uncomplicated in-hospital course.

Case Report

A 52-year-old male patient, smoker, dyslipidemic, was admitted via the emergency department because of retrosternal chest pain of 2-hour duration. His ECG showed acute anterior myocardial infarction; he was in Killip class I status. He was pre-treated with oral aspirin 325 mg and clopidogrel 600 mg and IV heparin 5000 IU and was immediately transferred to the catheterization laboratory for emergency coronary angiography. The right radial approach was selected and the left anterior descending (LAD) coronary artery was found missing with no (TIMI 0) coronary flow. The initial angiographic projections did not reveal the LAD stump, giving the impression that the LAD was occluded at the ostium as shown in *Figure 1* (anteroposterior-AP caudal 20º view- Panel 1A; AP cranial 35º view- Panel 1B; left anterior oblique-LAO 30º cranial 20º view- Panel 1C; LAO 45º caudal 25º view- Panel 1D). The right anterior oblique-RAO cranial view as shown in *Figure 2* (RAO 36º cranial 32º view- Panel 2A) finally unveiled the LAD stump, but the ostial LAD segment appeared foreshortened. A slight correction of the angle (RAO 27º cranial 29º view- *Figure 2* -Panel 2B) provided a better image of the angle of the LAD origin and stump. There was no other significant coronary lesion found in the left circumflex artery (LCx) or the dominant right coronary artery (not shown).

A Judkins left 3.5 6-Fr guiding catheter was selected to engage the left main. Using the predetermined optimal projection (RAO 27º cranial 29º view), the LAD occlusion was easily crossed with a BMW 0.014'' guidewire (Abbott Vascular, USA), and a TIMI II flow was immediately restored into the LAD. A focal 95% stenosis (without angiographically visible thrombus) at the proximal LAD proved to be the culprit lesion (*Fig. 2*-Panel 2 C). A bolus injection of eptifibatide (180 μg/kg) was administered and a continuous drug infusion (2 μg/kg/min) was started. The critical LAD proximal lesion was predilated with a 2x10 mm balloon and stented with a Xience V 3x15 mm stent (Abbott Vascular, USA) with an optimal angiographic result and restoration of TIMI III flow into the LAD (*Fig. 2*-Panel 2 D). By the end of the intervention the patient reported significant symptom relief and complete ST segment resolution was noted on the ECG 1 hour post-procedure. The patient was discharged 6 days later after an uncomplicated in-hospital course.

Discussion

Primary PCI is currently considered the best treatment option in acute myocardial infarction (AMI) when performed in a timely manner by experienced operators.[1] The first step of any emergency coronary angiography in AMI is to clearly delineate the culprit lesion in two orthogonal views in order to accurately assess its anatomic details, plan and perform the primary PCI and finally assess the result objectively. Accurate views of the ostial segment of the artery involved and the course of segments proximal to the target lesion are needed to decide about the interventional devices to be used.[2] In our case the initial standard views gave the impression that the LAD was occluded at the ostium. The LAD stump was finally discovered in a single view, the RAO cranial. Furthermore, slight angle correction was needed in order to delineate the lesion optimally, assess anatomy with accuracy and determine where the guidewire should be accurately directed to cross the occlusion.

The ostial-proximal segment of the LAD is often hidden by the overlapping proximal segment of the LCx. This is why when performing primary PCI, optimal imaging of a proximally occluded LAD can be time-consuming in a situation where "time is muscle". When the LAD is occluded proximally the stump is usually easily depicted in the caudal views (RAO, AP or LAO caudal). In our case this was not possible, probably because the LAD occlusion was too proximal. The LAO cranial projection was also not helpful, as the proximal LAD segment is known to be usually overlapped by the proximal LCx in this view. The AP cranial view is the projection preferred by most operators when performing PCI to the LAD, because

the vessel's mid- and distal segments are delinated optimaly. This projection is often also used to assess the ostial-proximal LAD segment, even if this is sometimes only achieved by maximizing the cranial angulation (~40º) and/or asking the patient to take a deep breath in order to elevate the overlapping proximal LCx higher on the image. If the AP cranial view fails, the RAO cranial projection is an alternative option, since it often proves useful in delineating the ostial – proximal segment of LAD. To optimize imaging some angle modification may be needed, as in our case.

REFERENCES

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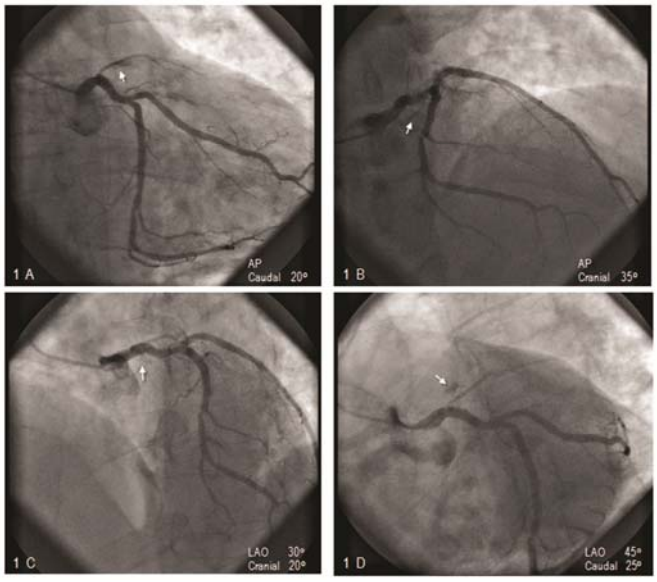

Figure 1. In the initial angiographic projections the LAD stump was not clearly delineated (indicated by the arrow). LAD = left anterior descending (coronary artery).

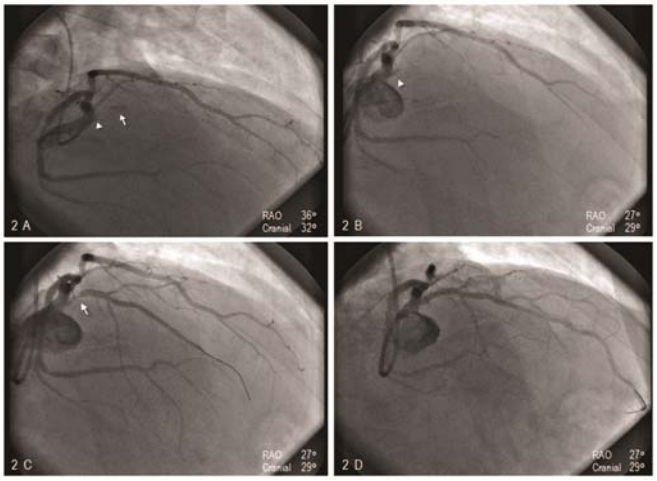

Figure 2. The RAO cranial view with some degree of angle correction provided a better view of the LAD stump. A succesfull balloon angioplasty and stenting was finaly performed (as shown in Panels 2C and 2D). LAD = left anterior descending (coronary artery); RAO = right anterior oblique (view)

ECG Quiz

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This pacemaker ECG (Figure) belongs to a patient who received the device (Symphony DR 2550, Sorin Group) due to sick sinus syndrome combined with atrioventricular (AV) conduction disturbances. Is the pacemaker malfunctioning given the fact that it encorporates a specific algorithm to minimize ventricular pacing?