HOSPITAL CHRONICLES 2010, SUPPLEMENT: 109–111

ATHENS CARDIOLOGY UPDATE 2010

Challenging Percutaneous Coronary Intervention in Complicated Inferior Wall Myocardial Infarction

George Sitafidis, MD, Charalambos Parisis, MD,
Dimitrios Economou, MD, Filippos Tryposkiadis, MD, FESC, FACC

Cardiology Department, University Hospital of Larissa, Larissa, Greece

KEY WORDS: *inferior infarction, complete atrioventricular block, sinus node branch, force focused angioplasty, buddy wire technique*

ABSTRACT

A 61-year-old gentleman suffered an acute complicated inferior myocardial infarction. Coronary angiography revealed severe type C lesion in a dominant right coronary artery and the patient had an angioplasty done in the culprit vessel and a number of procedure related technical difficulties were encountered.

INTRODUCTION

Major advancements and technological improvements in the performance of percutaneous coronary intervention (PCI) have been achieved over the past 40 years. This progress has allowed interventionalists to undertake more demanding and challenging cases of PCI thus obviating the need for cardiac surgery and its attendant risk. In certain cases of complex single coronary artery disease, whereby the surgical risk is not deemed worth-taking and medical therapy is the only remaining option, PCI, albeit difficult, offers a better option.

CASE PRESENTATION

A 61-year-old gentleman was admitted via the emergency room complaining of epigastric pain and dizziness which had started 3 hours earlier. An acute inferior wall myocardial infarction was diagnosed, which was complicated by right ventricular involvement and complete atrioventricular block (Fig. 1).

Primary percutaneous coronary intervention (PCI) was immediately offered which the patient initially refused. A temporary pacemaker was inserted and thrombolytic therapy was administered. Approximately 20 minutes after the initiation of thrombolysis, the patient had atrial fibrillation with a mean ventricular rate of 70 bpm. Half an hour later he developed sustained recurrent ventricular fibrillation which was finally converted successfully to sinus rhythm after five 360-joule DC shocks. At this stage the patient was hypotensive not responding to intravenous fluid administration, confused with severe hypoxia and hypercapnia and was finally intubated and placed on a respirator.

Echocardiography revealed mild left ventricular systolic dysfunction with severe

Correspondence to:
George Sitafidis, MD
Senior Registrar
Cardiology Department
University Hospital of Larissa
41222 Mezourlo, Larissa, Greece
E-mail: gsitafid@otenet.gr

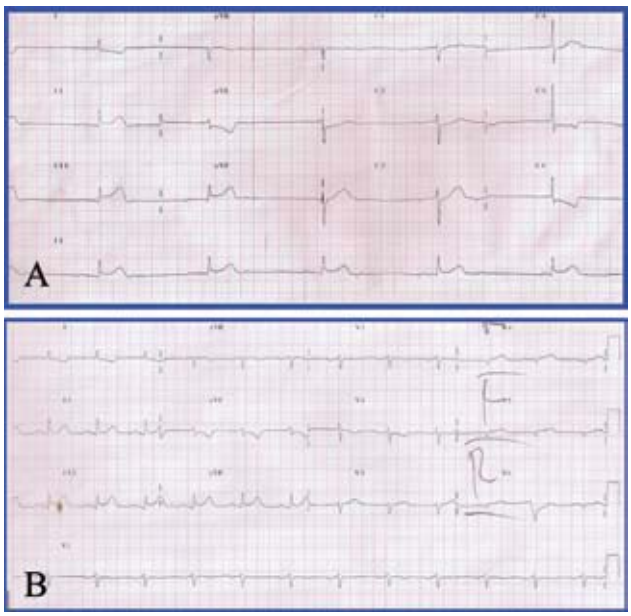

FIGURE 1. Panel A: admission ECG showing ST-elevation in leads II, III & aVF and complete atrioventricular block. Panel B: right precordial leads revealed ST-elevation indicative of involvement of the right ventricle.

inferior and posterior wall hypokinesis with a global left ventricular ejection fraction of 45% (eye ball estimate). Neither pericardial effusion nor mechanical complication was found. The free wall of the right ventricle was moderately hypokinetic with mild tricuspid regurgitation.

For the next 12 hours the patient remained on inotropic support and mechanical ventilation. He was finally extubated and the inotropes were tapered off. Subsequently, the patient remained in sinus rhythm, normotensive and clinically stable. Laboratory tests included a peak creatine kinase (CK) of 9.364 U/L and CK-MB of 183 U/L; there was initial leukocytosis and elevated transaminases, all of which gradually normalized.

A long discussion was held with the patient and his family regarding his complicated course of myocardial infarction and after a written informed consent, he was subjected to cardiac catheterization six days after admission.

CORONARY ANGIOGRAPHY

Coronary angiography was performed from the right femoral artery with use of 6Fr Judkins left (JL-4), Judkins right (JR-4) and pigtail catheters. The angiogram revealed a patent left main coronary artery, mild vessel wall irregularities without significant stenoses in the left anterior descending (LAD) coronary artery, and mild calcification with near ostial 50-60% stenosis of the left circumflex coronary artery. The right coronary artery (RCA) was a dominant, moderately calcified vessel with proximal eccentric 60% stenosis. In the mid segement, there was a type C long ulcerated subtotal stenotic bifurcational lesion involving a large ectatic right ventricular (RV) branch (Medina classification 1-1-0)[1] (Fig.2). The posterior descending artery and the posterolateral branch were found free of significant disease. The sinus nodal branch arose immediately adjacent to the RV branch (rare anatomical variation) distal to the second lesion.

PCI PROCEDURE

A 6Fr JR-4 guiding catheter with side holes was employed to perform the PCI procedure. Cougar XT and Zinger support guidewires were used (buddy wire technique).[2,3] Sequential

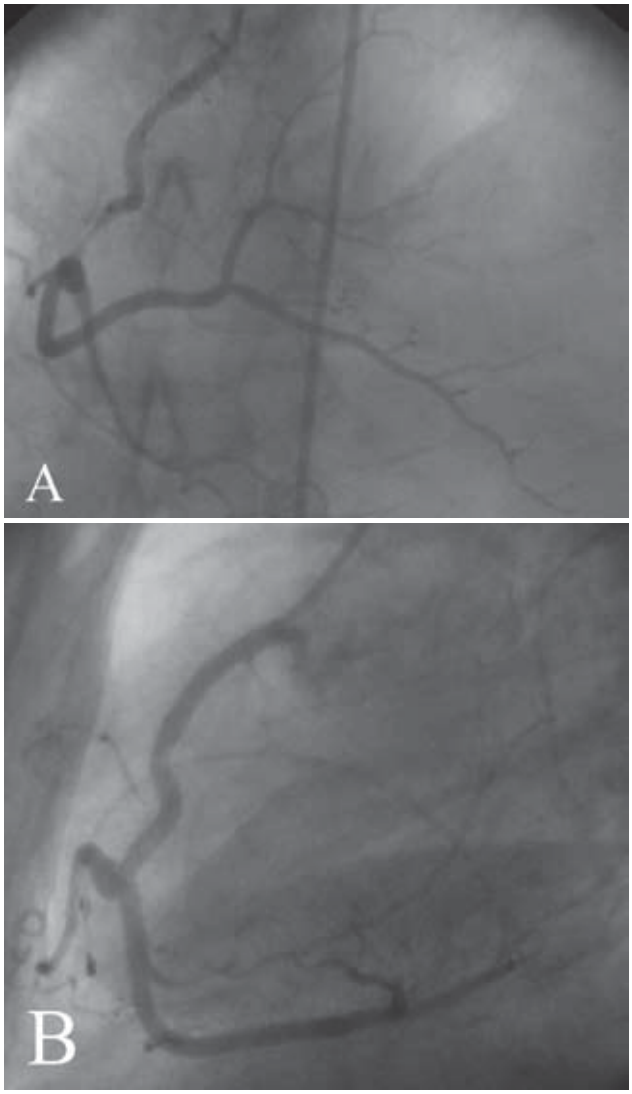

FIGURE 2. Panel A: an antero-posterior (AP) cranial fluoroscopic view demonstrating long subtotal stenosis in segment 2 of the right coronary artery (RCA). Panel B: final angiographic result.

balloon predilatations were performed with use of Sprinter legend (2.0x15 mm) (inflated at 10 bar for 15 sec), B. Braun Sequent (2.5x15 mm) (inflated at 12 bar for 20 sec) and NC Durastar (2.5x15 mm) (inflated at 18 bar for 20 sec) coronary balloons (force focused angioplasty).[4,5]

Subsequently, the following coronary stents were implanted: an Endeavor Resolute 3.5 x 9 mm stent, deployed at 12 bar for 20 sec, was implanted at the distal segment; an Endeavor Resolute 3.5x9 mm stent deployed at 16 bar for 20 sec was placed at the mid segment with minimal overlapping with the distal stent; an Endeavor Resolute 3.5x12 mm stent deployed at 18 bar for 20 sec was implanted at the proximal segment, again with minimal overlapping with the previous stent. Post-dilation was accomplished with use of a NC Durastar 3.5x12 mm balloon inflated at 20 bar. With use of this tedious technique, an excellent final angiographic result without residual stenoses was obtained (Fig. 2) and no complications were observed.

DISCUSSION

Percutaneous coronary intervention (PCI) of complex coronary artery lesions[1] may be potentially associated with an increased risk of procedural complications. Technological advancements and a variety of PCI tools have rendered the percutaneous approach to coronary revascularization feasible and safer in cases whereby surgery would have been the only option in the past. This was indeed illustrated in the present case, where the complicated and stormy course of the patient dictated a more aggressive approach. All the technical difficulties encountered during the revascularization procedure were successfully managed with various tools and techniques which were employed,[2-5] all leading to a successful outcome.

REFERENCES

1. Legrand V, Thomas M, Zelisko M, et al. Percutaneous coronary intervention of bifurcation lesions: state of the art. Insights from the second meeting of the European Bifurcation Club. *Eurointervention* 2007; 3: 44-49
2. Cheema A, Hong T. Buddy wire technique for stent placement at non-aorto ostial coronary lesions. *Int J Cardiol* 2007;118:e75-80
3. Hussain F, Kashour T, Rajaram M. Ostial RCA intervention: guiding catheter challenges and use of a buddy wire to perform focused force angioplasty on a severely calcific ostil right coronary lesion. *J Invasive Cardiol* 2006;18: E298-301.
4. Solar R, Ischinger Th. Focused force angioplasty: theory and application. *Cardiovasc Rad Med* 2003; 4: 47-50
5. Stillabower ME. Longitudinal force focused coronary angioplasty: a technique for resistant lesions. *Cathetet Diagn* 1994; 32: 196-198.