CASE REPORT

Severe coronary vasospasm

Jorge Humberto Guardado, Hugo Vinhas, Cristina Martins, Ernesto Pereira, Hélder Pereira

Unidade de Cardiologia de Intervenção, Serviço de Cardiologia do Hospital Garcia de Orta, EPE Almada, Portugal

Received 14 February 2011; accepted 15 December 2011
Available online 9 August 2012

Abstract A 50-year-old man, with chronic kidney disease and on dialysis, underwent coronary angiography in the context of acute coronary syndrome, which revealed focal lesions (type A) in the proximal left anterior descending and mid circumflex arteries. Ad-hoc angioplasty was performed on both lesions with direct stenting. An immediate drop in arterial blood pressure was observed and the angiogram showed new lesions with reduced flow throughout the coronary tree, progressing to cardiogenic shock and electromechanical dissociation. During cardiopulmonary resuscitation maneuvers, intracoronary verapamil was administered and TIMI 3 flow, sinus rhythm and a rise in blood pressure were obtained. Clinical stability was progressively restored. The patient was discharged medicated with calcium channel blockers and nitrates. During follow-up, he was twice readmitted for unstable angina. Coronary angiography revealed findings that could easily have been interpreted as new obstructive lesions, but these resolved after administration of intracoronary nitrates.

© 2011 Sociedade Portuguesa de Cardiologia. Published by Elsevier España, S.L. All rights reserved.

Keywords Coronary angioplasty; Coronary vasospasm; Cardiogenic shock; Verapamil

PALAVRAS-CHAVE Angioplastia coronária; Vasoespasmo coronário; Choque cardiogênico; Verapamil


* Corresponding author.
E-mail address: jobeguardado@gmail.com (J.H. Guardado).

2174-2049/$ - see front matter © 2011 Sociedade Portuguesa de Cardiologia. Published by Elsevier España, S.L. All rights reserved.
Introduction

Spontaneous coronary vasospasm is associated with changes in autonomic nervous system activity\(^1\) (sympathovagal imbalance) and endothelial dysfunction\(^2,3\) (reduced nitric oxide bioavailability). It is considered to be the pathophysiological mechanism behind variant or Prinzmetal angina and occurs in 1–5% of diagnostic procedures and percutaneous angioplasties.\(^4\) Its location, although no evidence of significant ischemia had been found during evening dialysis sessions, and there was no evidence of transient ST-segment elevation on myocardial perfusion scintigraphy. The patient had completely or partially discontinued the recommended therapy.

During the latest hospitalization, invasive coronary angiography was repeated, which once again revealed coronary findings that could easily have been interpreted as new lesions, but these resolved after aggressive treatment with intracoronary nitrates (Fig. 6).

Discussion

Patients with variant angina present typical chest pain at rest associated with transient ST-segment elevation, mainly at night or in the early morning.\(^6\)

Diagnostic coronary angiography, with administration of intracoronary nitrates and if necessary injection of contrast for non-selective catheterization, excludes the possibility of coronary vasospasm as opposed to obstructive atherosclerotic disease in most cases.\(^7\)

Not all the typical clinical and imaging features of vasospastic coronary artery disease were present in our patient at admission. While he had experienced several anginal episodes at rest, almost all had occurred during evening dialysis sessions, and there was no evidence of significant ischemia on myocardial perfusion.
Severe coronary vasospasm

Figure 1  Diagnostic coronary angiography in right anterior oblique 20°, caudal 20° and right anterior oblique 10°, cranial 40° views, showing angiographic lesions corresponding to critical stenosis in the proximal left anterior descending artery and severe stenosis in the mid circumflex artery.

Figure 2  Percutaneous coronary intervention with direct stenting of the lesions observed on diagnostic angiography: 3 mm × 12 mm DRIVER stent in the proximal left anterior descending artery (left) and 3 mm × 15 mm DRIVER stent in the mid circumflex artery (right).

scintigraphy performed in the month prior to the first hospital admission. These findings could be taken as supporting the hypothesis of vasospastic angina. However, on initial assessment following admission with the patient still presenting residual angina, serial electrocardiograms did not show significant ST-T changes and initial administration of nitrates during diagnostic coronary angiography did not alter the angiographic appearance of the lesions observed. The latter two findings contributed to the operators’ decision to proceed to coronary angioplasty, in the belief that it was a case of fixed coronary obstruction.

Figure 3  Control coronary angiography following stenting of the proximal left anterior descending artery and mid circumflex artery, showing a good angiographic result at the intervention sites, and a new lesion in the proximal circumflex.
Figure 4  (A) Retention of contrast at various points of the coronary tree and abrupt reduction of coronary flow (TIMI 0/1); (B) restoration of coronary flow (TIMI 3) and resolution of severe diffuse vasospasm in the left coronary tree following administration of intracoronary verapamil.

Figure 5  ECG trace showing angina associated with transient ST-segment elevation during continuous monitoring.

Although coronary vasospasm tends to resolve spontaneously, prolonged episodes can lead to myocardial infarction, arrhythmias and sudden cardiac death. In the case presented, coronary intervention played a major role in exacerbating coronary spasm, resulting in cardiogenic shock, and death was only prevented by rapid diagnosis and appropriate treatment.

The administration of intracoronary verapamil was providential, since although it is contraindicated in cardiogenic shock with electromechanical dissociation, it was key to resolving this patient’s severe vasospasm and thus to his survival.

As also seen in our patient, vasospasm can recur in different locations to the treated segment, and even in multiple vessels.

Coronary revascularization (whether percutaneous or surgical) is not indicated in cases of isolated coronary spasm without fixed coronary stenosis. Our patient’s coronary anatomy was reassessed during subsequent admissions, with due caution in the light of what had occurred during the first hospitalization, and with generous doses of intracoronary nitrates in order to establish a differential diagnosis between isolated vasospasm (which was in fact confirmed) and obstructive atherosclerotic disease.

Although not used in this case, intravascular ultrasound or optical coherence tomography can be valuable in characterizing arterial wall atherosclerosis, and thus provide important additional information on the therapeutic approach to adopt.

Cardiac rhythm disturbances are common during vasospastic crises, notably atrioventricular block and severe ventricular arrhythmias.

In most cases of variant angina, appropriate treatment with vasodilators prevents new episodes of vasospasm.

Figure 6  Invasive coronary angiography during the latest hospitalization, showing severe coronary spasm of the mid left anterior descending artery, which resolved after administration of intracoronary nitrates.
Cardioverter-defibrillator implantation should be considered in refractory vasospastic angina complicated by syncope and/or severe ventricular arrhythmias.\textsuperscript{10}

The prognosis of variant angina is good if it is associated with normal coronary arteries and responds well to treatment with calcium channel blockers or nitrates. The incidence of myocardial infarction, malignant arrhythmias and sudden death is low in these patients.\textsuperscript{5}

Persistence of symptoms is normally associated with active smoking\textsuperscript{11} or suboptimal doses of anti-anginal drugs, which was once again seen in our case.

Conclusions

Coronary vasospasm is not a benign entity and can have a fatal outcome. It is therefore imperative to obtain effective coronary vasodilation, for which verapamil may be a good choice, even in the worst hemodynamic scenarios.

Administration of potent coronary vasodilators (intracoronary nitrates or verapamil) should be borne in mind for accurate assessment of the severity of angiographic lesions before proceeding to percutaneous intervention.

Conflicts of interest

The authors have no conflicts of interest to declare.

References