

IMAGES IN INTERVENTION

Acute Stent Thrombosis: Technical Complication or Inadequate Antithrombotic Therapy?

An Optical Coherence Tomography Study

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A 68-year-old woman was admitted to the hospital with non-ST-segment elevation myocardial infarction. Coronary angiography showed a 95% mid stenosis in the left anterior descending artery (Fig. 1A). The lesion was treated with a 2.50 × 18-mm Xience drug-eluting stent (Abbott Vascular, Santa Clara, California) during bivalirudin infusion (Fig. 1B). At the end of the procedure, the patient received a 600-mg loading dose of clopidogrel and bivalirudin was discontinued. Seventy minutes later, the patient experienced chest pain with anterior ST-segment elevations. Repeat angiography demonstrated acute stent thrombosis (AST) (Fig. 2A). While the patient was on heparin and eptifibatide, low-pressure angioplasty was performed. Optical coherence tomography (OCT) imaging revealed

an intravascular mass consistent with platelet-rich thrombus within the stent (Figs. 2B).

Technical factors or inadequate antithrombotic therapies are responsible for AST (1,2). In this case, mechanical complications such as dissection, under-expansion, or significant malapposition were ruled out. Review of the timing of antithrombotic therapy revealed possible gaps in therapy. Bivalirudin was discontinued simultaneous to the administration of clopidogrel. Clinical effects of bivalirudin continue for 1 h after its discontinuation, whereas the anticipated onset of clopidogrel (600 mg) effect is 2 h after its administration (3). Consequently, antithrombotic therapy in our patient was insufficient for approximately 1 h, during which the AST occurred (Fig. 3).

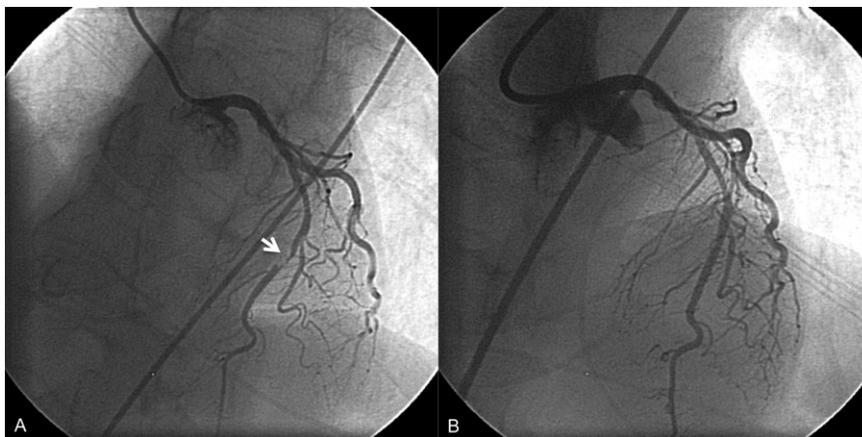


Figure 1. Angiographic Frames of the Left Coronary System in the Right Anterior Oblique Cranial Projection

(A) A filling defect (white arrow) in the mid left anterior descending artery is present. (B) After stent deployment, a good angiographic result was observed. Cath = catheterization.

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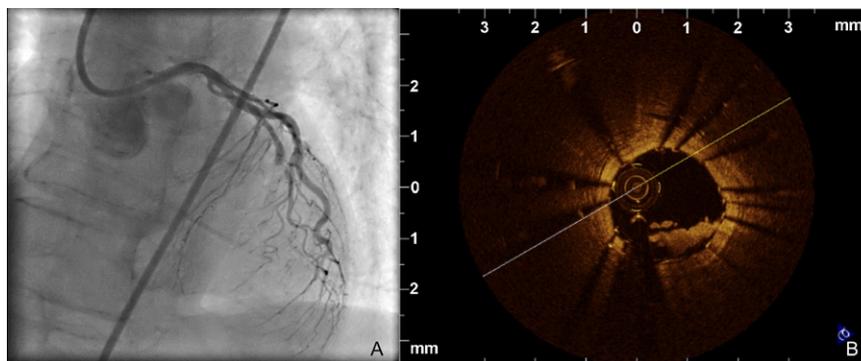


Figure 2. Evaluation of AST

(A) Repeat coronary angiography 1 h after the initial procedure demonstrated acute stent thrombosis (AST). (B) After restoration of blood flow, optical coherence tomography imaging demonstrated adequate stent expansion and the absence of coronary artery dissection. Platelet-rich thrombus was noted within the stented lumen.

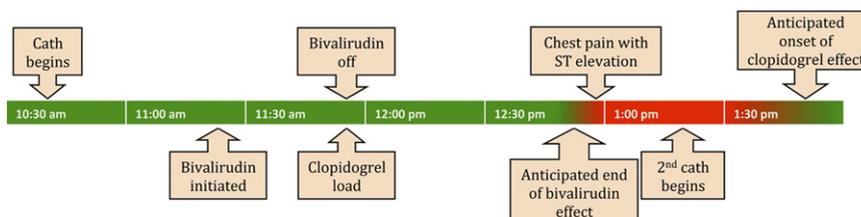


Figure 3. Timeline of Antithrombotic Therapy and Stent Thrombosis

The clinical effects of bivalirudin end approximately 1 h after its discontinuation, whereas the anticipated clinical effect of a 600-mg clopidogrel loading dose is 2 h after its administration. Consequently, simultaneous discontinuation of bivalirudin infusion and administration of the clopidogrel load results in a 1-h window of suboptimal antithrombotic therapy 1 h later (red bar). Cath = catheterization.

Our case highlights the usefulness of OCT in evaluating underlying mechanisms for AST and in characterizing thrombus composition (platelets). Additionally, it emphasizes the significant increase in ischemic events with bivalirudin in subjects not pre-treated with clopidogrel (2,4). Care is needed to ensure sufficient antithrombotic therapy in these patients with the use of rapidly acting antithrombotic agents, prolongation of bivalirudin infusion, or earlier administration of the clopidogrel loading dose.

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