

Abrupt Vessel Occlusion During Intracoronary Intervention: Is This Nightmare Related to Contrast Agent?

Koroner Arter Girişimi Sırasında Ani Tikanma: Bu Kabus Kontrast Maddeyle İlişkili mi?

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A 46-year-old man with hypertension and family history for coronary artery disease presented to our department within the second hour of acute anterior wall myocardial infarction. During rescue percutaneous transluminal coronary angioplasty, total occlusion occurred in the left anterior descending (LAD) coronary artery. A total of 150 ml of non-ionic, low-osmolar contrast agent was used and it was thought that non-ionic contrast media could have induced thrombus formation. After bolus intracoronary tirofiban administration, there was satisfactory resolution of the intracoronary thrombosis. Stent implantation at the lesion site resulted in an excellent angiographic result with a TIMI III flow. At five-month control angiography, the LAD was widely patent. Acute total occlusions during rescue coronary angioplasty can be effectively managed by tirofiban infusion and stenting.

Key Words: Non-ionic contrast media; intracoronary thrombosis; thrombolytic treatment; stenting.

Kırk altı yaşında, koroner arter hastalığı için risk faktörü olarak hipertansiyon ve aile öyküsü olan erkek hasta akut anterior miyokard infarktüsünün ikinci saati içinde kliniğimize başvurdu. Kurtarıcı perkütan koroner girişim sırasında sol ön inen arterin tam tıkandığı gözlandı. İşlem sırasında kullanılan 150 ml non-iyonik, düşük osmolar kontrast maddenin trombüse yol açarak tam tikanıklığa neden olabileceği düşünüldü. İntrakoroner bolus tirofiban infüzyonu sonrasında intrakoroner trombozun çözüldüğü görüldü. Lezyon bölgесine stent uygulandı ve TIMI III akımıla birlikte çok iyi anjiyografik sonuç elde edildi. Beş ay sonra yapılan kontrol anjiyografide sol ön inen koroner arter tamamen açık idi. Kurtarıcı işlem sırasında gelişen akut koroner tikanmaların tedavisinde tirofiban infüzyonuyla bareber stentleme tikanıklığı etkin bir şekilde gidermektedir.

Anahtar Sözcükler: Non iyonik kontrast madde; koroner içi trombü; trombolitik tedavi; stentleme.

Primary thrombotic occlusion of the left descending coronary artery (LAD) during percutaneous transluminal coronary angioplasty (PTCA) is a rare angiographic finding and a less common

cause of abrupt closure compared to coronary dissection.^[1] Repeat PTCA in conjunction with intracoronary thrombolysis has been known to be the most effective treatment in the past.^[2,3]

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Recently, abciximab has been administered as a rescue treatment for acute intracoronary thrombus developed during interventional procedures.^[4] We showed total occlusion due to thrombus which could be triggered by non-ionic contrast media and we reported the rescue implantation of stent (Advanced Medical Technologies, Germany), in conjunction with the infusion of tirofiban for the treatment of an abrupt closure due to thrombus of the LAD.

CASE REPORT

A 46-year-old man with hypertension and family history for coronary artery disease presented to our department within the second hour after the onset of chest pain with an acute anterior wall myocardial infarction. He was treated with a full dose TPA (100 mg, Reteplase, Centocor, Inc., Malvern, Pennsylvania, USA), heparin (PTT between 60 and 90), aspirin, clopidogrel (600 mg), intravenous nitroglycerin. In approximately 60 minutes, the pain was relieved and the ST-segment elevation resolved with appearance of Q waves in leads V1-3. The peak CKMB was 184 IU. Diagnostic coronary angiography was performed on the second day for recurrence of pain. It revealed a critical occlusion of the proximal LAD and apical and anterior hypokinesia in left ventricle (Fig. 1). We decided to recanalize the LAD.



Fig. 1- Left anterior oblique view with cranial angulation of the left coronary tree showing a critical occlusion of the midportion left anterior descending artery.

Left coronary ostium was cannulated with a 7 French extra backup 3.5 (XB 3.5, Cordis Corporation) guiding catheter. At control angiography, LAD was shown as total occlusion (Fig. 2). It was thought that possible thrombus was induced non-ionic contrast media. During the procedure, a total of 150 mL of non-ionic, low-osmolar contrast agent ("Iomeron", 350 mg of iodine per milliliter) was used. At this time, the patient complained of some chest discomfort, with mild ST-segment elevation in the anterior leads, with an unstable hemodynamic condition. Tirofiban (10 mg/kg) was immediately bolus administered intracoronary. After about eight minutes, there was satisfactory resolution of the intracoronary thrombosis in LAD (Fig. 3). A Carbostent (3.0x16 mm) (Sorin Corporation, Saluggia, Italy) was implanted at prox-mid LAD at 16 bars. This resulted in an excellent angiographic result with a TIMI III flow along LAD (Fig. 4). The two-dimensional echocardiogram showed no further deterioration in regional wall motion, and the ECG showed no additional Q-waves. The post-procedural medications included aspirin, clopidogrel, metoprolol, atorvastatin, and nitroglycerin. The following course was uneventful. Subsequently, no clotting abnormality was found. At five-month control angiography, the LAD was widely patent.

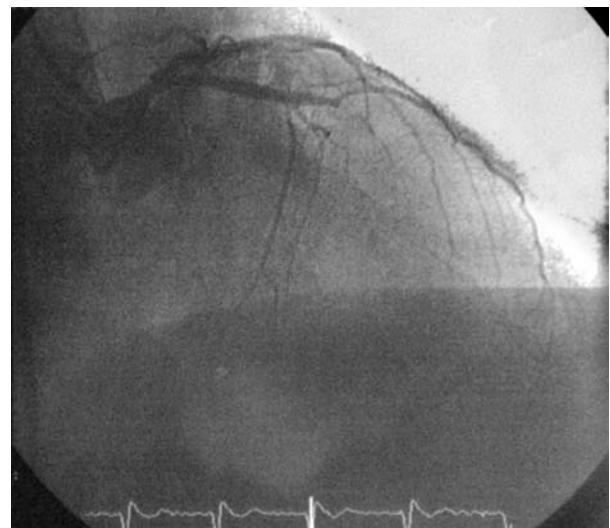


Fig. 2- Left anterior oblique view with cranial angulation of the left coronary tree showing a complete occlusion of the midportion left anterior descending artery.

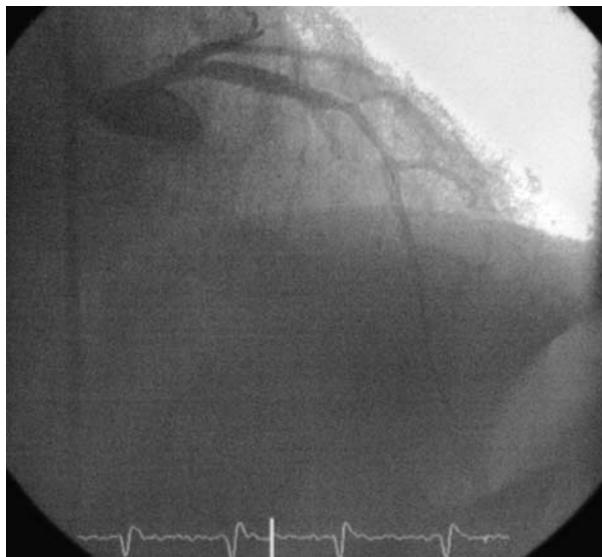


Fig. 3- Partial recanalization of complete lesion in left anterior descending artery after tirofiban has been shown.



Fig. 4- Complete recanalization of critical lesion in left anterior descending artery after drug eluting stent implantation has been shown.

DISCUSSION

Abrupt vessel closure occurs in 2-8.3% cases of elective PTCA, 50-80% of which develop while the patients are still in the catheterization laboratory.^[5-7] The most common causes of acute closure include coronary dissection, thrombus formation, and spasm. Coronary dissection exposes the prothrombogenic constituents of the plaque and vessel wall, initiating a series of platelet-coagulation cascade-vessel wall interactions that may lead to thrombus, spasm, and acute closure. Small intimal dissections are frequent after balloon angioplasty, although they are usually associated with a benign course. In contrast, large complex dissections may cause acute vessel closure with a high incidence of emergency coronary artery bypass graft (CABG), myocardial infarction, or death. Patients with abrupt closure virtually always require further interventional therapies, such as prolonged balloon inflations, stenting, rheolytic thrombectomy, directional atherectomy, or emergency CABG.^[7] The occurrence of abrupt closure by dissection has recently markedly decreased with the routine employment of coronary stents.

Compared to vessel dissection, primary thrombosis is a much less common cause of abrupt closure. Thrombus formation has been

observed in an angiographic syringe containing non-ionic contrast media.^[8] Interaction of these agents, resulting in blood coagulation, has been extensively evaluated in vitro and in vivo. The first reported in vitro data indicated that low osmolar non-ionic contrast media confers less of an anticoagulant effect than ionic contrast media. The latter interacts with the haemostatic system at various levels, mostly inhibiting fibrin monomer polymerization, binding and inactivating protein of the coagulation cascade, but also hindering the ability of thrombin to activate platelets. All these properties are less evident with non-ionic agents. On the other hand, both agents alter fibrin assembly making thrombi more difficult to lyse when they occur.^[9,10] These experimental observations were corroborated by several clinical studies showing less thrombus formation, fewer acute vessel closures and a significant reduction in deposits of platelets and thrombi on the guide wire during angioplasty procedures with the use of ionic contrast media.^[10-12] For thrombotic closure resistant to PTCA and lytics, an optimal treatment in the catheterization laboratory appears to be revascularization of the vessel facilitated by the use of new thrombectomy devices, antiplatelet agents, and IIb/IIIa receptor antagonists.^[13] In a small observational report, abciximab was given

to 16 patients who developed intracoronary thrombus in response to PTCA, four of whom failed to respond to intracoronary urokinase.^[14] The authors reported that abciximab decreased thrombus size, improved coronary flow, and was safe, not having been associated with significant bleeding complications.

In our case, an acute thrombotic coronary occlusion developed at the LAD during PTCA due to non-ionic contrast media probably. With tirofiban administered as bolus, we successfully deployed the stent to treat abrupt closure due to intracoronary thrombus. As a result, ionic contrast media can be used rather than non-ionic contrast media in serious conditions such as PTCA, in order not to bring about intracoronary thrombosis.

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