Case Report

Successful Revascularization of Coronary Artery Occluded by Massive Intracoronary Thrombi with Alteplase and Percutaneous Coronary Intervention

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A 67-year-old man was admitted to our institution with sudden and persistent chest pain for 3 days. Coronary angiography showed massive thrombotic occlusion of the right coronary artery. The patient received intracoronary thrombolysis with alteplase (recombinant tissue-type plasminogen activator, rt-PA). On repeated angiography, there was marked resolution of intracoronary thrombus. After percutaneous coronary intervention with stent implantation, the final result was complete revascularization of the right coronary artery (TIMI grade 3 distal flow). This case demonstrates that intracoronary rt-PA can result in local thrombus reduction in patients undergoing PCI, especially with a large thrombus burden.

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Key words; Myocardial infarction, Thrombolytic therapy, Percutaneous Transluminal Coronary Angioplasty

Introduction

In patients with acute coronary syndromes, intracoronary thrombus is present in a high proportion and in associated with adverse outcomes^{1,2}. Although several anti-platelet agents, such as thienopyridine and glycoprotein IIb/IIIa receptor antagonist, have been providing a better outcome of the treatment of this kind of lesion, it is still an important technical issue to elucidate how to effectively treat thrombus-containing lesions in coronary intervention^{3, 4}. Intracoronary thrombolysis by selective administration of a fibrinolytic agent has been used with and without percutaneous coronary intervention (PCI) to treat patients with intracoronary thrombus. This case shows that intracoronary thrombolysis deserves reconsideration as an

adjunct to PCI in selected cases, such as massive intracoronary thrombosis.

Case Report

A 67-year-old man presented at the emergency room with sudden and persistent chest pain (CCS III) and dyspnea (NYHA II) for 3 days. His cardiac risk factor was diabetes and he had a medical history of anterior myocardial infarction 3 years previously. On admission, his blood pressure was 100/60 mmHg and his heart rate was 66 bpm. The 12-lead ECG showed ST segment elevation in leads II, III, aVF and pathologic Q waves in leads III and aVF, as well as leads V1-4. The cardiac markers were elevated: troponin I was 73.12 ng/mL and CK-MB was 76.7 μ /L. The patient received oral aspirin 300 mg and clopidogrel 600 mg as well as intravenous unfractionated heparin (bolus 4,000 IU, infusion 80 IU/hour). Coronary angiography was performed immediately via the right femoral artery with 5Fr Judkins catheter (Cordis, USA). Left coronary angiography showed diffuse 90% stenosis at the proximal left anterior descending artery and tubu-

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Fig. 1.

- A.** Baseline coronary angiography illustrating right coronary artery with massive intracoronary thrombosis with TIMI grade 2 distal flow.
B. Repeated angiography after intracoronary infusion of alteplase showing marked dissolution of thrombus with TIMI grade 3 distal flow.
C. Final coronary angiography showing successful revascularization of the right coronary artery.

lar 90% stenosis at the left circumflex artery near the bifurcation of the first obtuse marginal branch, respectively. Right coronary angiography revealed massive intracoronary thrombosis occupying most of the lumen of the right coronary artery with TIMI grade 2 distal flow (**Fig. 1-A**). Because the patient and his family were reluctant to consent to surgery, we planned PCI, but we were concerned about massive intracoronary thrombosis and additionally, given the poor LV systolic function, no-reflow phenomenon or thrombus propagation to the distal coronary artery after revascularization could lead to fatal results. Thrombus aspiration did not seem to be effective because of the extremely heavy and large thrombus burden. Nonetheless, cardiac MRI showed a significant amount of viable myocardium in the RCA region (**Fig. 2**), so we decided to try intracoronary thrombolysis: alteplase 10 mg was injected as a bolus dose, and 90 mg was infused via a 7Fr Amplatz's guiding catheter (AR1) for 90 minutes subsequently (1 mg/min). Repeated coronary angiography was performed soon after intracoronary thrombolysis. Surprisingly, the heavy thrombus almost completely dissolved and only a small amount remained in the mid-RCA with restoration of TIMI grade 3 distal flow (**Fig. 1-B**). A 0.014 inch guidewire (BMW universal®; Guidant, USA) was introduced into the RCA lesion and predilatation was performed with a 3.0 × 20 mm balloon (Ryuji®; Terumo, Japan) at 16 atm. Then, a 3.5 × 24 mm bare metal stent (Driver®; Medtronic, USA) was implanted at 18 atm into the proximal RCA lesion. Final angiography showed successful revascularization of the RCA (**Fig. 1-C**). The patient's clinical condition was stabilized after PCI without any bleeding complications

Fig. 2. Cardiac MRI shows an area of subendocardial enhancement, localized bright zone (white arrows), in the left ventricular inferior wall, which was corresponding to subendocardial infarction of RCA territory.

and he was discharged 10 days later.

Discussion

In the 1980s, before the era of coronary stents, when PTCA was introduced as a therapy for chronic coronary artery disease, there was considerable interest in the local delivery of thrombolytic agents for the

treatment of complicated coronary artery diseases and acute myocardial infarction.

Angiographic resolution of intracoronary thrombus has been variable after intracoronary thrombolysis before angioplasty, but the results have largely been discouraging⁵⁻⁸⁾. As a result, intracoronary thrombolysis is rarely used in clinical practice; however, several studies still support the usefulness of intracoronary thrombolysis in selected cases. For instance, intracoronary t-PA registry investigators found significant improvements in the coronary TIMI flow grade and thrombus dissolution with intracoronary t-PA in 198 patients (206 cases)⁹⁾. Gurbel PA *et al.* found that lesion-directed delivery of alteplase resulted in more prolonged local thrombolysis and thrombus score reduction in 45 unstable angina patients with coronary thrombus¹⁰⁾. Recently, Kelly RV *et al.* reported that the administration of intracoronary thrombolytics (tenecteplase) in complex PCI after the onset of thrombotic complications is safe and may even improve the success rate in PCI complicated by thrombus in the study of 34 patients (22 with acute ST elevation MI, 4 with rescue PCI, 6 with non-ST elevation MI, and 2 during elective PCI)¹¹⁾. Additionally Hara *et al.* demonstrated in their report that the incidence of no-reflow was lower and the angiographical success rate was higher for thrombolysis than angioplasty in acute myocardial infarction patients with thrombus-rich lesions¹²⁾.

We hope that our case will support the usefulness of intracoronary thrombolysis adjunct to PCI in specific situations and selected cases.

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