

적혈구 증가증에서 거대 심혈관 혈전의 심혈관내 혈전 용해 및 혈관 성형술

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Intracoronary Thrombolysis and Delayed Percutaneous Coronary Intervention for the Treatment of Large Coronary Thrombi in a Patient with Polycythemia Vera

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The benefit of thrombus aspiration during percutaneous coronary intervention in patients with acute myocardial infarction (AMI) is well established; however, the optimal management strategy for patients with a large thrombus burden after repeated thrombectomy (i.e., “failed” thrombectomy) is unknown. Here, we report the case of a 67-year-old male with polycythemia vera who was treated with intracoronary thrombolytic therapy in combination with mechanical thrombectomy. Repeated aspiration thrombectomy did little to reduce the coronary thrombus burden; thus, intracoronary urokinase infusions were applied to the thrombus-containing lesion. Repeat coronary angiography 4 days later revealed markedly improved antegrade flow in the infarct-related artery, and successful revascularization was performed. This case demonstrates the potential utility of intracoronary thrombolytic therapy for select AMI patients with a large thrombus burden who are in a hypercoagulable state. (Korean J Med 2014;87:728-732)

Keywords: Thrombolytic therapy; Myocardial infarction; Percutaneous coronary intervention

INTRODUCTION

In patients with acute myocardial infarction (AMI), intracoronary thrombus is present in high proportion and associated with adverse outcome [1]. As is well known, culprit lesion of AMI is usually a composite of atherosclerotic plaque and throm-

bus [2]. Mechanical thrombectomy of infarct related artery (IRA) can dramatically reduce thrombus burden, which facilitates the procedure through better visualization of the culprit lesion [3]. The results of intracoronary thrombolytic therapy in dissolving thrombus, however, have been discouraging and currently rarely used [4]. We report the patients with polycythemia vera (PV)

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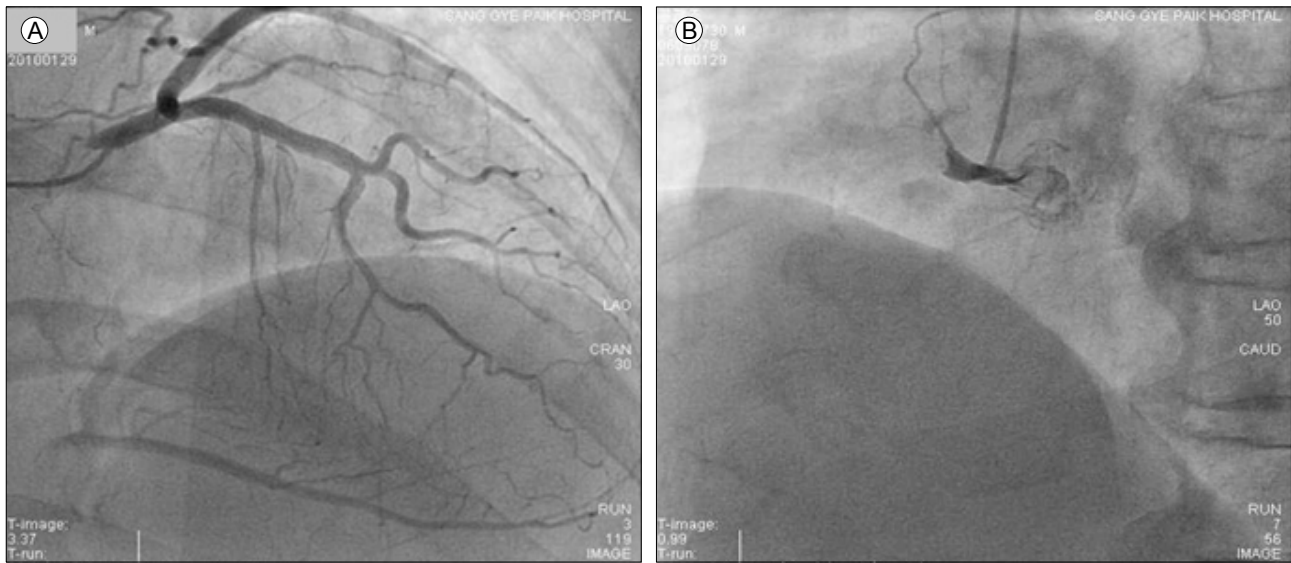


Figure 1. (A) Baseline coronary angiography showing no significant stenosis in the left coronary artery with grade 3 collateral flow to the right coronary artery (RCA). (B) Total occlusion of the proximal RCA.

who presented with AMI with large thrombus burden. The treatment option for management of intracoronary thrombi in PV patients will be discussed.

CASE REPORT

A 67-year-old man presented to emergency room (ER) with squeezing chest discomfort for 5 days. He had been in stable condition for hypertension and PV with antihypertensive medication and occasional phlebotomy, when chest discomfort developed. He took antacids to relieve symptom without success. The 12-lead electrocardiogram at ER showed sinus rhythm with ST segment elevation accompanying pathologic Q wave in leads III and aVF. Cardiac biomarker was elevated; troponin-T was 7.22 ng/mL and Creatinine kinase-MB (CK-MB) was 41.04 ng/mL. His hemoglobin level was 10 g/dL and hematocrit level was 37.7%. The patient was referred to cardiology under the impression of recent myocardial infarction. He was loaded with oral aspirin 300 mg, clopidogrel 600 mg and unfractionated heparin of bolus 500 IU intravenously. Coronary angiography was performed immediately after via transradial approach. Left coronary angiogram showed no significant stenosis with grade 3 collateral flows to posterior descending artery, posterolateral branch,

and distal right coronary artery bifurcation (Fig. 1A). Right coronary angiogram revealed total occlusion of right coronary artery (RCA) from the very proximal portion (Fig. 1B). An aspiration catheter (Thrombuster II, Kaneka, Japan) was passed down (Fig. 2A) and multiple, large organized red thrombi was retrieved from the RCA (Fig. 2B). After repeated thrombus aspiration over 6 times, right coronary angiography revealed massive intracoronary thrombi occupying most of the lumen of RCA with Thrombolysis in Myocardial Infarction (TIMI) grade 0 distal flow (Fig. 3A). Since thrombus aspiration did not seem to be effective enough to improve coronary flow distal to the culprit lesion, a 100,000 IU bolus of intracoronary urokinase was administered five times via guiding catheter. After repeated infusion of intracoronary urokinase, coronary patency was achieved upto mid RCA with TIMI grade 1 distal flow (Fig. 3B). Percutaneous coronary intervention (PCI) was stopped at this moment due to large hematoma formed in patient's right arm. Repeated coronary angiography, performed four days after index procedure, revealed much improved antegrade flow with persistent residual thrombi at proximal RCA, with restoration of TIMI grade 2 distal flow (Fig. 4A). A 4.0 × 18 mm drug eluting stent (Endeavor resolute®, Medtronic, USA) was implanted at the culprit lesion of distal RCA and another stent (Xience prime®, 4.0

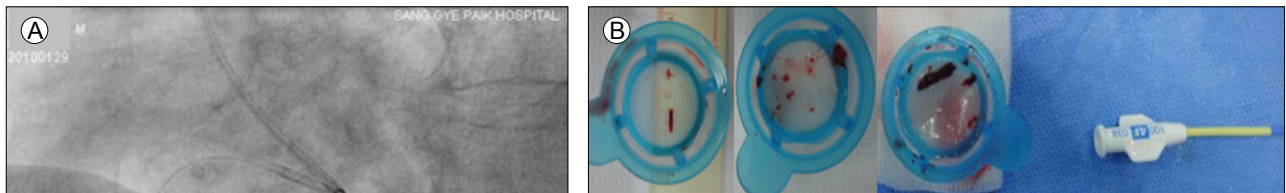


Figure 2. (A) Repeated thrombus aspiration of the infarct-related artery with Thrombuster II. (B) Multiple large, organized thrombi were retrieved from the right coronary artery.

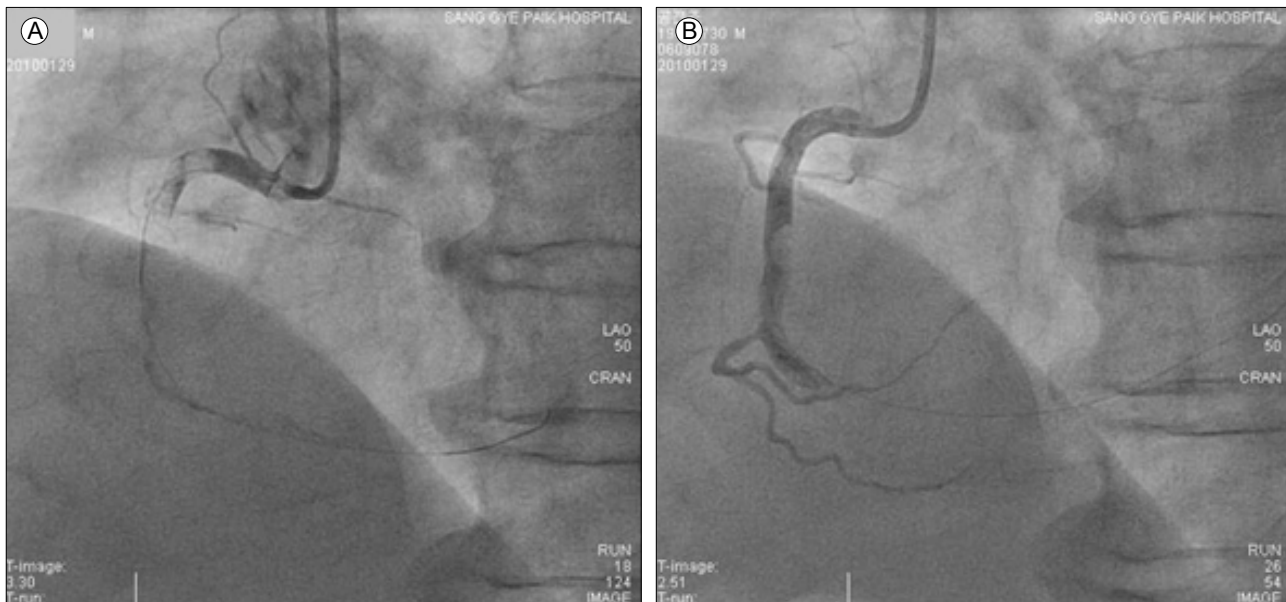


Figure 3. (A) Coronary angiography after repeated thrombus aspiration (more than six times), demonstrating still-visible thrombi occupying most of the lumen of the right coronary artery. (B) Improvement in coronary flow after repeated infusions of intracoronary urokinase.

× 15 mm, Medtronic, USA) was placed at thrombi containing lesion of proximal RCA. Final angiography showed successful revascularization of the RCA (Fig. 4B). His inpatient stay was uncomplicated and hematoma in right arm was resolved without complication. He was discharged home 10 days after his initial presentation.

DISCUSSION

This case demonstrates the challenges in treating a large intracoronary thrombus in patients presenting with AMI who are in hypercoagulable status. In this case, repeated mechanical thrombectomy did not successfully improve the coronary flow distal to the culprit lesion. The main consideration at this stage was how to dissolve the large thrombi occupying the lumen of IRA before PCI. Although several anti-platelet agents including gly-



Figure 4. (A) Coronary angiography 4 days after the administration of intracoronary urokinase demonstrated marked improvement of antegrade flow with residual thrombi in the proximal right coronary artery. (B) Successful revascularization of the infarct-related artery with two drug-eluting stents.

coprotein IIb-IIIa receptor antagonist have been proved to be effective in thrombi-containing lesion, little is known about how to dissolve such lesion in patients who were medically in hypercoagulable status.

In the 1980s, before the era of PCI for AMI, there was considerable interest in the intracoronary delivery of thrombolytic agent. Angiographic resolution of intracoronary thrombi, however, has been variable and results have largely been discouraging [5]. However, several studies still support the effectiveness of intracoronary thrombolysis in selected case. Pre- [6] or post- [7] treatment of low dose intracoronary thrombolysis during PCI was reported to be beneficial for complex lesion of AMI [8], especially with large thrombus without significant increase in bleeding. Delayed PCI after pharmacologic treatment was also reported to be successful in large amount of coronary thrombosis [9].

There is no firm evidence base to guide the management of AMI in patients with PV. It is not known whether AMI in patients with PV is caused by a typical platelet-rich “white” thrombus on a disrupted plaque. Macrovascular thrombosis is largely due to the associated hyperviscosity. Therefore, it is possible that

coronary occlusion may be due to fibrin-rich “red” thrombi. Little is known about the management of coronary thrombosis in AMI patients with PV. In the present case, coronary flow of culprit vessel was significantly limited even after the repeated thrombus aspiration. Even though there is a concern which PV might causes an unpredictable bleeding diathesis that may potentially increase the risk of fibrinolytic therapy, repeated infusion of intracoronary thrombolytic agents improved the coronary antegrade flow of culprit vessels. This is the first case which demonstrates successful pharmaco-mechanical approach for revascularization of large thrombi-containing lesion in AMI patient with PV. This case shows that intracoronary thrombolysis deserves reconsideration as an adjunct to mechanical thrombus aspiration in selected patients, especially in patients with huge thrombus burden in hypercoagulable status.

중심 단어: 혈전용해요법, 심근 경색, 경피적 심혈관 중재술

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