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Rheolytic Therapy Combined With Intragraft Abciximab for Treatment in Acute Myocardial Infarction

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Abstract: After coronary artery bypass graft (CABG) surgery, patients can present with challenging lesions in the setting of acute coronary syndrome, particularly with high clot burden. Techniques including thrombectomy and local delivery of glycoprotein IIb/IIIa inhibitors have been utilized for these saphenous venous graft lesions. We report a case involving a post-CABG patient presenting with an acute ST-segment elevation myocardial infarction due to great clot burden in his bypass graft and successful restoration of Thrombolysis in Myocardial Infarction (TIMI) grade 3 flow after rheolytic thrombectomy followed by localized IIb/IIIa administration.

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After coronary artery bypass graft (CABG) surgery, patients can present with challenging lesions in the setting of acute coronary syndrome, particularly with high clot burden. Different techniques have been utilized for these saphenous venous graft lesions, including thrombectomy and local delivery of glycoprotein IIbIIIa inhibitors.[1-3] We report a case involving a post-CABG patient presenting with an acute ST-segment elevation myocardial infarction due to great clot burden in his bypass graft and successful restoration of Thrombolysis in Myocardial Infarction (TIMI) grade 3 flow after rheolytic thrombectomy followed by localized IIb/IIIa administration.

Case report

A 61-year-old male presented with precordial chest pain associated with shortness of breath beginning a few hours prior to emergency department (ED) arrival. His medical history included aortocoronary bypass in 1994, at which time a left internal mammary artery (LIMA) was anastomosed to the mid left anterior descending artery (LAD) and saphenous venous grafts (SVG) were anastomosed to the distal right coronary artery (RCA), 1st diagonal artery, and 1st obtuse marginal (OM1) branch of the left circumflex artery. In 2004, percutaneous coronary angioplasty was performed and two stents were placed in the SVG to 1st diagonal artery. ED 12-lead electrocardiogram (ECG) revealed ST-segment elevations in lateral leads I, avL, and V6, and ST-segment depressions in the anterior leads suspicious for posterolateral territory infarct. Lab results showed elevated troponin level of 0.14 ng/mL (normal, 0.00-0.04 ng/mL), creatine kinase MB (CK-MB) of 12.3 ng/mL (normal, 0.6-6.2 ng/mL) and myoglobin level of 32 ng/mL (normal, 7.0-46.2 ng/mL). The patient was given aspirin and unfractionated heparin in the ED and underwent emergent cardiac catheterization.

Cardiac catheterization revealed an occluded SVG to OM1 with TIMI flow 0 and possible thrombus (Figure 1, Video 1), a patent LIMA to LAD, an occluded stent within the SVG to Diagonal 1, and a patent SVG to RCA. A 0.014″ x 135 cm Trailblazer catheter coronary guidewire engaged the SVG to OM1 graft and crossed the lesion. A temporary pacemaker and an intra-aortic balloon pump were placed due to bradycardia and hypotension. A 5 Fr Export catheter was then passed to the thrombus and approximately 15 mL of thrombus were aspirated. Repeat aspiration resulted in a collection of 20 mL of thrombus; however, a significant amount remained (Figure 2, Video 2). A 0.041" x 135 cm TrailBlazer catheter was then advanced to the thrombus and 8 mg of intracoronary abciximab were injected. Improved flow (TIMI grade 2) was immediately seen, and a discrete lesion was apparent just proximal to the anastomosis of the SVG graft to OM1 artery (Figure 3). A VeriFLEX OTW bare-metal stent was deployed. After postdilatation and injection of 180 mcg intracoronary adenosine, there was TIMI grade 3 flow at the SVG to OM1 (Figure 4, Video3), ST elevations nearly resolved, and the patient expressed immediate relief of chest pain. Intravenous abciximab was infused (10 mcg/min) for 12 hours postprocedure. Echocardiography the following day revealed severely decreased left ventricular systolic function (ejection fraction <25%) with akinetic inferior, posterior, and anterolateral walls. The patient had an uneventful hospital course following the procedure and was discharged 3 days later.

Discussion

This case of ST-elevation MI due to large thrombus burden in the SVG demonstrates the potential advantage of combining different methods to treat intragraft thrombus. An aspiration device, an intragraft glycoprotein IIb/IIIa receptor inhibitor, and finally intracoronary adenosine were used in a sequential manner to achieve good TIMI flow. Cases of thrombo-occlusive SVG treated with adjunctive abciximab during percutaneous coronary intervention (PCI) were first reported toward the end of the last century.[1,2] In the EPIC trial, administration of intravenous abciximab during percutaneous management of saphenous vein graft disease decreased the rate of distal embolization and non-Q wave myocardial infarction.[3] Subsequently, a pooled analysis of five randomized clinical trials demonstrated that intravenous platelet glycoprotein IIb/IIIa receptor inhibitors do not improve long-term outcomes after percutaneous intervention of bypass grafts.[4] Randomized trials comparing intracoronary with intravenous abciximab during PCI showed reduction in infarct size with intracoronary abciximab,[5,6] but studies have not specifically investigated the effect of intragraft abciximab during PCI. However, the few existing data concerning intragraft injection do show some advantages. Intragraft abciximab before PCI showed decreased thrombus burden and improved angiographic outcomes, thought to be attributed to greater saturation of platelet receptors.[7] Further, intragraft administration of abciximab prevented no-reflow and slow-flow phenomena during SVG PCI.[8] Thrombus resolution with intragraft abciximab in our patient might be partly explained by early presentation to the hospital.

Trials examining the efficacy of aspiration devices specifically in vein grafts have been encouraging. The most notable of these are the Vein Graft Angiojet Studies (VEGAS) I and II. In Vegas II, a total of 186 patients with SVG lesions were randomized to receive rheolytic therapy versus intragraft urokinase. Angiojet patients had fewer rates of major

cardiac adverse events at 30 days and fewer bleeding and vascular complications compared to patients who received urokinase.[12]

In our patient, sequential use of rheolytic thrombectomy with Angiojet followed by intragraft abciximab achieved effective reperfusion. CK-MB peaked at a mere 13 hours after chest pain onset and 9 hours after cardiac catheterization. Furthermore, resolution of chest pain and ST-segment elevations accompanied restoration of TIMI grade 3 flow, as expected. Therefore, combined strategy may be considered when treating bypass graft lesions with large thrombus burden.

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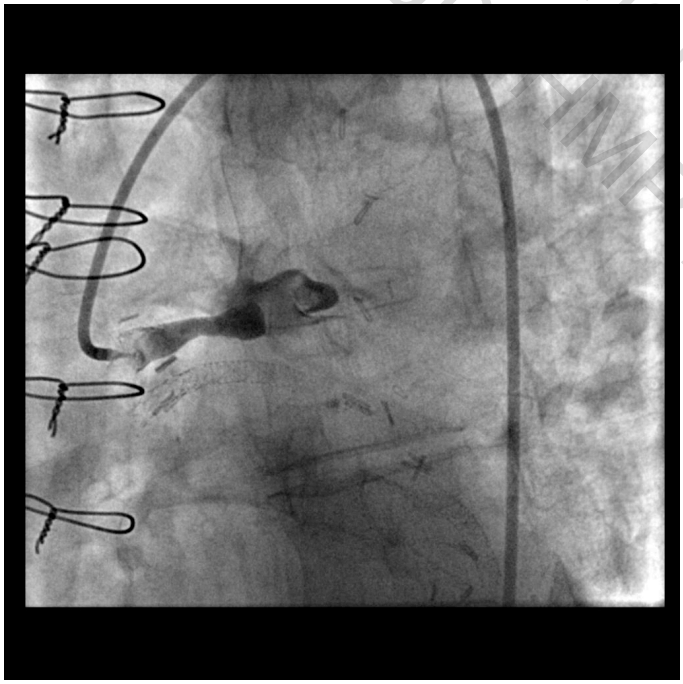

Figure 1. Significant clot burden seen at saphenous vein graft to obtuse marginal 1.

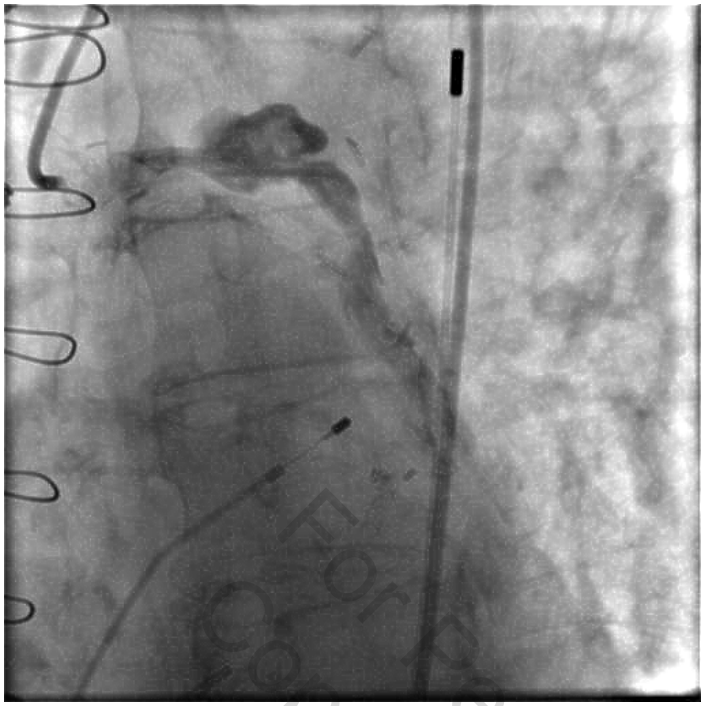

Figure 2. After first aspiration with Angiojet, a significant amount of clot remains.

Figure 3. Distal saphenous vein graft to obtuse marginal 1 stenosis.

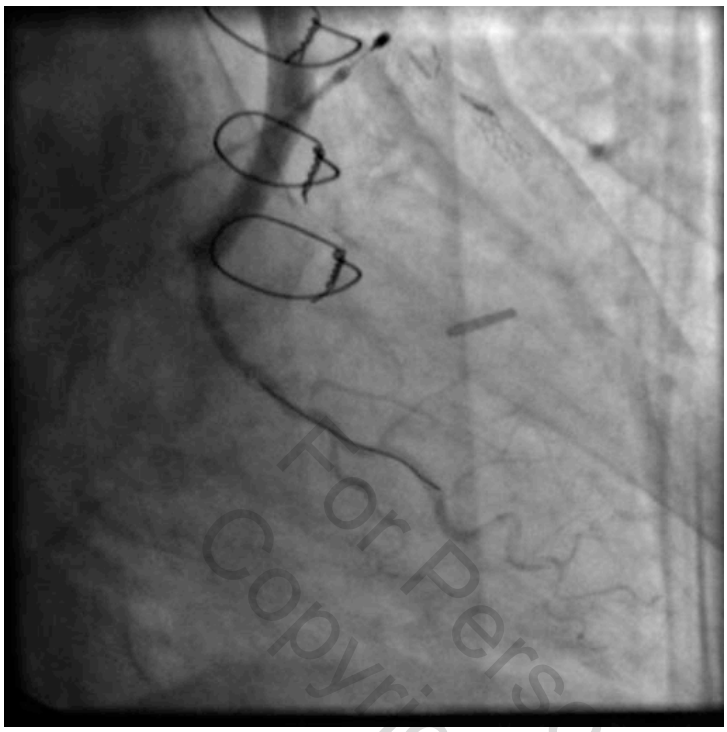

Figure 4. Post stent placement.