Streptokinase for Vein Graft Thrombosis — A Caveat

We read with interest Doctor Rentrop’s impressive case report describing recanalization of an acutely occluded saphenous vein bypass graft using intragraft streptokinase. Our recent experience in a similar patient, which had a less fortunate outcome, prompts us to write this caveat.

Our 65-year-old male patient underwent aortocoronary artery saphenous vein bypass graft surgery October 28, 1980, for the treatment of severe angina pectoris. A single graft was placed (end-to-side) into the distal right coronary artery and a sequential graft into the diagonal and left anterior descending coronary arteries with resting flows of 65 and 60 ml/min, respectively. The postoperative period was uncomplicated except for transient atrial fibrillation. Seven days postoperatively, as part of an ongoing prospective study, elective vein graft angiography was performed. At the time of angiography, a large thrombus just above a venous valve was noted in the proximal 2 cm of the right coronary artery graft, which resulted in a tubular 80% stenosis of the luminal diameter. Because of the large size of this thrombus and the significant stenosis it caused, we decided to try fibrinolytic treatment. The patient was returned to the cardiac catheterization laboratory later that day.

Through a coronary graft catheter placed within 1 cm of the right coronary graft thrombus, streptokinase was infused by a Harvard pump at rates of 1200–2400 units/min. No initial bolus of streptokinase was administered. The patient did receive 5000 units of i.v. heparin at the start of angiography. During 60 minutes of infusion, the patient received a total dose of 130,000 units of streptokinase. Intermittent radiographic contrast injections demonstrated partial resolution of the thrombus. After 60 minutes of infusion, the patient became dyspneic, agitated, hypotensive, and complained of back pain. The jugular venous pressure was elevated and Kussmaul’s sign was present. Repeat graft angiography then showed extravasation of contrast media from the distal anastomosis into the pericardial space. Venous blood was drawn at that time for a coagulation profile. After stabilization, the patient underwent immediate surgery, when 150–200 ml of blood were removed from the pericardial space. This resulted in prompt hemodynamic improvement. The distal graft anastomosis was found to be intact, without any active bleeding. The venous valve and remaining thrombus in the proximal right coronary artery graft were removed. The patient’s subsequent clinical course was uneventful.

This case illustrates the potentially deleterious consequences of even selective infusion of fibrinolytic agents in patients early after surgery. The frequency of this complication is unknown. The patient was 7 days after surgery and Dr. Rentrop’s patient was 5 days after surgery; the total dose of streptokinase was similar. Our patient had a tubular 80% stenosis of the graft; Dr. Rentrop’s patient had an occluded graft. The occlusion in Dr. Rentrop’s case partially resolved within 15 minutes and required another 45 minutes of infusion, while streptokinase was flowing across the distal anastomosis. In our patient the distal suture line could have been faulty, but that, of course, cannot be established before streptokinase infusion. There were no significant changes in the prothrombin or activated partial thromboplastin time from normal before or after thrombolytic therapy in our patient. The serum fibrinogen level did drop from 625 mg/dl (normal 195–365 mg/dl) before thrombolytic therapy to 61 mg/dl immediately afterward, and fibrin split products appeared after therapy. These laboratory changes did not occur in Dr. Rentrop’s patient. In other studies, these changes do not correlate with therapeutic benefit or hemorrhagic risk. On the basis of a single case report, the importance of any of these factors cannot be determined.

A clear logic has been recently developed for intracoronary infusions of streptokinase in acute coronary thrombosis. There is, however, an equally clear logic for believing that similar thrombolytic therapy for acute vein graft thrombosis may not be appropriate in patients early after surgery. Experimental studies have emphasized the significant bleeding hazards in the first postoperative week, when the hemostatic plug consists predominantly of fibrin. In view of the theoretic (and now observed) potential for anastomotic bleeding in early postoperative vein graft recipients, we suggest that consideration of intragraft streptokinase be tempered with caution.

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References

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