

Anaphylactic Reaction to Bovine Thrombin in Ultrasound-Guided Treatment of Femoral Pseudoaneurysm

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Editor:

We report a fatal anaphylactic reaction after ultrasound-guided administration of bovine thrombin for the treatment of a femoral artery pseudoaneurysm. Institutional review board approval was not required for this case report.

A 61-year-old African-American man with end-stage renal disease presented with increasing focal swelling at a femoral artery-to-great saphenous vein polytetrafluoroethylene loop graft. Past medical history included numerous hospital admissions, percutaneous image-guided interventions, and operations related to dialysis access. Ultrasonography of the graft demonstrated focal stenosis within the external iliac vein central to the venous anastomosis. A partially thrombosed 2.3 cm × 2.7 cm × 3.3 cm wide-necked pseudoaneurysm was identified near the femoral artery-graft anastomosis. A second pseudoaneurysm measuring 1.0 cm × 1.4 cm × 2.2 cm with a narrow neck was identified arising from the venous limb of the graft. Fistulography demonstrated moderate stenosis of the loop graft-venous anastomosis and moderate stenosis in right external iliac vein. A 14 mm × 40 mm self-expanding Zilver nitinol stent (Cook, Inc, Bloomington, Indiana) was placed into the right external iliac vein and dilated with a 12-mm angioplasty balloon. The loop graft-venous anastomosis was dilated to 6 mm. A 7 mm × 25 mm self-expanding stent graft (GORE VIABAHN; W.L. Gore & Associates, Inc, Flagstaff, Arizona) was deployed across the venous pseudoaneurysm at the graft outflow and dilated to 7 mm. Subsequent angiography demonstrated effective exclusion of the pseudoaneurysm. A 25-gauge needle was advanced into the residual lumen of the remaining pseudoaneurysm near the arterial limb; during ultrasound-guided compression of its neck, 0.9 mL of bovine thrombin (1,000 units/mL; Topical U.S.P., Bovine Origin THROMBIN-JMI; King

Pharmaceuticals, Inc, Bristol, Tennessee) was slowly injected. Thrombosis of the pseudoaneurysm was documented by ultrasonography.

Within minutes of thrombin administration, the patient complained of tingling in his lower extremities and developed shortness of breath, marked hypotension, and pulseless electrical activity. Cardiopulmonary *resuscitation* was started immediately and multiple doses of intravenous epinephrine and a dose of intravenous steroid were administered. The patient was pronounced dead after 45 minutes of resuscitation efforts. The autopsy examination did not reveal any evidence of pulmonary thromboembolism, myocardial infarction, or thrombosis in the lower extremity arteries distal to the dialysis loop graft.

Ultrasound-guided thrombin administration is a quick and minimally invasive procedure with a high success rate (94%–100%) and low complication rate (2%) (1). Thrombin is a serine protease that cleaves fibrinogen into insoluble fibrin, activates the platelets, provokes vascular contraction, and causes thrombosis within seconds of intravascular thrombin injection (2). Various thrombin products are approved by the U.S. Food and Drug Administration and commercially available, such as bovine thrombin, human thrombin (isolated from pooled plasma of donors), and recombinant thrombin (3,4).

Anaphylactic reactions are rarely reported after bovine thrombin administration (2). Interventional radiologists should be aware of possible higher risk of anaphylaxis to bovine thrombin among patients who receive dialysis. It has been known that patients with repeated exposure to bovine thrombin have increased serum titers of IgE (2). The likelihood of anaphylaxis in patients who receive dialysis is corroborated by the numerous prior exposures to the antigen during fistula and graft creation and during subsequent dialysis sessions.

Patients with repeated exposures to bovine thrombin could be screened by a skin prick test (2); in patients found to be allergic, an alternative thrombus-promoting medication could be administered. An attractive option for these patients might be “autologous thrombin.” Autologous thrombin can be extracted from a 30- to 60-mL blood sample before the procedure and used subsequently for therapeutic injection of pseudoaneurysm. This method offers a safe, reliable, and inexpensive method for obtaining thrombin and avoids the risk of anaphylaxis or infections (3). Alternatively, recombinant thrombin (Recothrom; ZymoGenetics, Inc, Seattle, Washington) has been approved by the Food and Drug Administration. Theoretically, recombinant thrombin does not have any risk of viral transmission, may have a more rapid onset of hemostasis, and has a superior immunogenicity profile (4).

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Hybrid Microsurgical Reconstruction and Percutaneous Endovascular Stent Placement for Management of Dissected Graft Hepatic Artery during Living Donor Liver Transplantation

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Editor:

Hepatic artery reconstruction is a crucial step in living donor liver transplantation (LDLT) because arterial complications can lead to graft loss. Intraoperative dissection of the recipient artery is usually self-limiting and managed by anastomotic revision or using another recipient artery. However, dissection of the graft artery is more dramatic and requires repair. Endovascular interventions are useful in postoperative arterial complications and are employed in many centers before open surgery, but they have not been used in a combined

intraoperative approach (1). We report a case of intraoperative graft artery dissection and occlusion during LDLT that was managed with hybrid microsurgical reconstruction and percutaneous endovascular stent placement.

Approval of this report was obtained from the institutional review board. A 68-year-old man with hepatitis C-related liver cirrhosis underwent LDLT and received a right lobe graft from a living, related donor. During

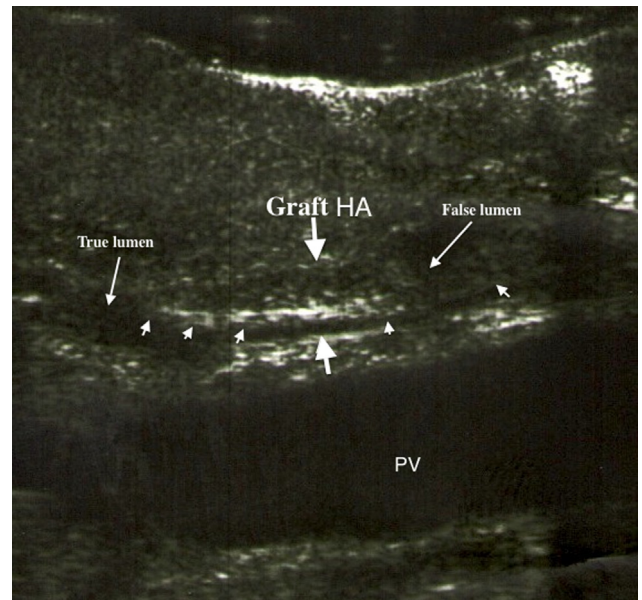


Figure 1. Intraoperative ultrasound image after surgical reconstruction of the hepatic artery showing the dissected intrahepatic portion of the graft artery extending to just before its bifurcation. The intimal flap appears as echogenic lines separate from the arterial wall (short arrows). The false lumen is filled with blood and occludes the true lumen. HA = hepatic artery; PV = portal vein.

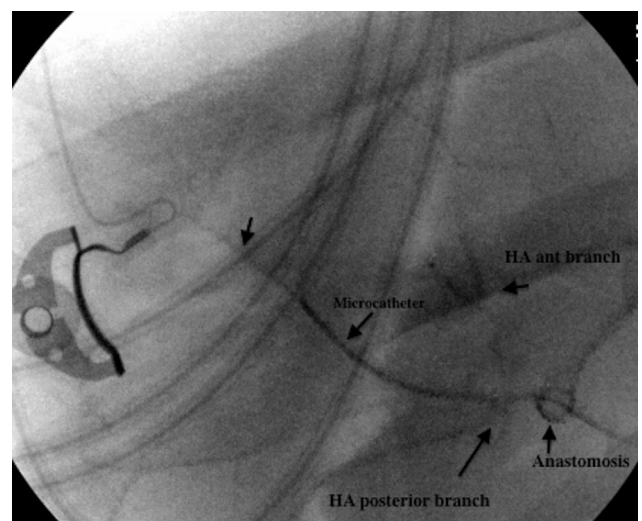


Figure 2. Hepatic artery angiography through the microcatheter after successful catheterization of the true lumen. The tip of the microcatheter is seen in the posterior segmental branch. A metallic marker was applied at the site of anastomosis. HA = hepatic artery; HA ant branch = hepatic artery anterior branch.