

Thrombolysis via an Operatively Placed Mesenteric Catheter for Portal and Superior Mesenteric Vein Thrombosis: Report of a Case

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Abstract

Mesenteric venous thrombosis (MVT) is a catastrophic form of mesenteric vascular occlusion. In the absence of peritoneal signs, anticoagulation therapy should be started immediately. For selected patients, thrombolysis through the superior mesenteric artery (SMA), jugular vein, or portal vein via a transhepatic route might be successful; however, exploratory laparotomy is mandatory when peritoneal signs develop. We report a case of acute MVT associated with protein C and S deficiency, treated successfully by limited bowel resection and simultaneous thrombolytic infusion, given via an operatively placed mesenteric vein catheter.

Key words Mesenteric vein thrombosis · Thrombolysis · Streptokinase · Protein C · Protein S

Introduction

Mesenteric venous thrombosis (MVT) is a catastrophic form of mesenteric vascular occlusion, which can result in infarction of the intestine. It accounts for 5%–15% of acute causes of mesenteric ischemia.¹ Hypercoagulopathy disorders, such as deficiencies of antithrombin III, protein S or C, and Leiden mutation, are risk factors for MVT.¹ There have been reports of successful nonoperative management of MVT by thrombolytic infusion via the superior mesenteric artery (SMA),^{2,3} or directly into the portal (PV) or superior mesenteric veins (SMV) via the transjugular or transhepatic routes.^{4,5} On the other hand, operative thrombolysis via a mesenteric vein has rarely been reported.^{6,7} We report a case of acute MVT in a patient with protein C and S deficiency whom we treated successfully with limited

bowel resection and thrombolytic infusion via a jejunal vein.

Case Report

A 52-year-old woman who had been taking warfarin for 4 years because of previous portal vein thrombosis presented with acute abdominal pain. Evaluation of hypercoagulability revealed decreased protein C activity to 20% (70%–140%) and decreased protein S activity to 56% (70%–123%). The patient stated that she had stopped taking warfarin 6 months earlier.

Physical examination revealed a distended abdomen with diminished bowel sounds and rebound tenderness. Laboratory analysis detected an elevated WBC count, and normal prothrombin time (PT), international normalized ratio (INR), activated partial thromboplastin time (aPTT) levels, and blood chemistry. Computed tomography (CT) showed thrombosis of the SMV with a thickened small bowel wall (Fig. 1). Heparin treatment was initiated with a bolus dose of 5000 U followed by a continuous infusion of 1000 U/h. Surgical exploration identified free peritoneal fluid, a thickened small bowel, and edematous mesentery with hard and thrombosed jejunal veins. We resected a 20-cm jejunal segment, which was infarcted, and performed end-to-end anastomosis. A peripheral jejunal vein was isolated and cut down. A central venous catheter with side holes was inserted and positioned at the confluence of the SMV and splenic vein under fluoroscopic guidance. Angiography through the catheter showed a tortuous and dilated splenic vein, but no image of the SMV and PV (Fig. 2). The other end of the catheter was brought through the abdominal wall, and a temporary abdominal closure was done in preparation for the planned second-look operation.

Mesenteric thrombolysis was carried out with a bolus infusion of 1 500 000 U streptokinase just after the

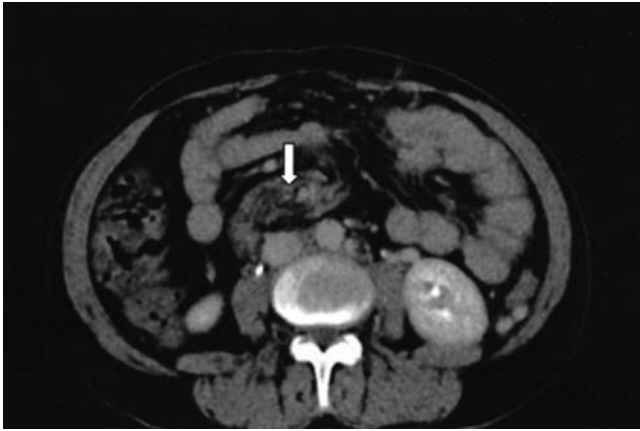


Fig. 1. Computerized tomography scan shows a thrombosed superior mesenteric vein (*arrow*) with portal collateral veins

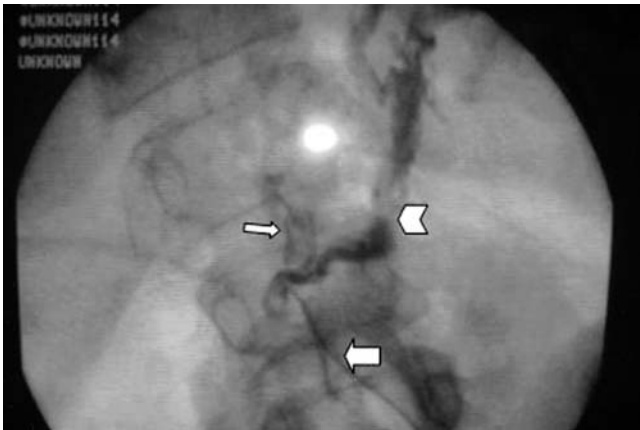


Fig. 2. Portography shows a tortuous and dilated splenic vein without an image of the superior mesenteric and portal veins. *Large arrow*, catheter in the superior mesenteric vein; *small arrow*, occluded portal vein; *arrowhead*, tortuous splenic vein

operation. The heparin was titrated postoperatively according to aPTT measurements. Another streptokinase bolus dose was given the next day. Complete resolution of the SMV thrombosis was attained by 36h postoperatively (Fig. 3). Although complete filling of the PV was not achieved during the fluoroscopic study, we decided that the MVT had resolved sufficiently, considering her history of PV thrombosis. The patient was returned to the operating room for a second-look procedure 36h after the index operation. The anastomosis and small bowel were viable, so the catheter was removed and the abdomen was closed.

The heparin infusion was continued until postoperative day (POD) 10. Warfarin was started on POD 5 with an oral regimen. The patient was discharged on POD day 12 with a PT-INR level two times higher than nor-

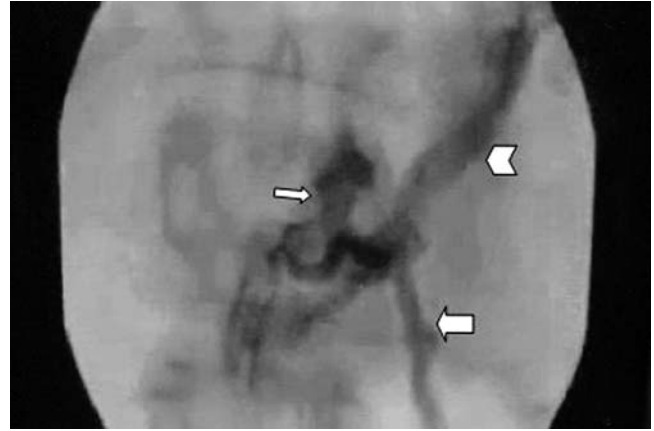


Fig. 3. Portography after the thrombolytic infusion shows improved blood flow in the superior mesenteric and portal veins. *Large arrow*, complete resolution of the superior mesenteric vein; *small arrow*, portal vein; *arrowhead*, splenic vein

mal. The patient is now in good health 6 months after the operation.

Discussion

Thrombosis of the mesenteric venous system often has an insidious clinical presentation, which leads to a delay in diagnosis. A previous thromboembolic episode and a documented hypercoagulable disorder in a patient presenting with acute abdominal pain must increase the index of suspicion and prompt the physician to perform diagnostic tests. Abdominal CT has been reported as the most sensitive diagnostic tool for acute MVT.^{1,8}

The mortality rate of MVT ranges from 20% to 50%.⁸ It was reported that when the mesenteric-portal blood flow was restored by thrombectomy or local thrombolysis, the mortality rate decreases.⁶ Management of MVT complicated by intestinal infarction may involve operative thrombectomy or thrombolysis, or both, and anticoagulation along with bowel resection.^{6,7,9,10} In the absence of peritoneal signs indicating bowel infarction, MVT may be managed conservatively with systemic anticoagulation or combined thrombolytic and anticoagulation treatment. Immediate anticoagulation with heparin, even intraoperatively, increases the chance of survival and decreases the risk of recurrence.^{8,10} A few reports described successful treatment with a thrombolytic infusion via the SMA^{2,3} or directly into the PV or SMV via the transjugular or transhepatic routes^{4,5} in selected nonoperatively treated patients.

Although thrombolysis via the SMA may be useful for SMV thrombosis, once laparotomy is indicated for bowel infarction, it would not be practical to perform a standard mesenteric angiography, which requires the

transfer of a potentially unstable patient to the angiography unit and would prolong the overall procedure time. Conversely, the catheterization of a small jejunal vein branch, as in our patient, is a quick and practical way to achieve thrombolysis. We found only three reports in the English literature discussing direct splanchnic thrombolysis through an operatively placed mesenteric catheter.^{6,7,9} Kaplan et al. reported a case of mesenteric venous thrombosis secondary to gangrenous appendicitis⁷ treated by appendectomy and operative catheterization of the SMV. They started a thrombolytic infusion 6h after the operation to avoid perioperative bleeding and achieved complete resolution of thrombosis by 36h postoperatively. Demertzis et al. successfully combined portal thrombectomy with intraoperative and postoperative mesenteric thrombolytic infusion.⁹ Klempnauer et al. reported cases of thrombosis of the SMV and PV treated with the combination of bowel resection, portal thrombectomy, and regional mesenteric thrombolysis. All these 5 patients survived, despite 35% mortality in their series of 31 patients with MVT.⁶ Our case report lends support to this rarely performed operation.

Complete resolution of thrombosis was attained through the whole SMV, even proximal to the catheter holes, possibly because of the initial backflow of the thrombolytic agent in the presence of the confluence occlusion caused by the portal thrombosis. Both intraoperative heparinization and early postoperative mesenteric streptokinase infusion were well tolerated without any bleeding complications. The patient had a good clinical and radiologic response to the treatment and is now on lifelong warfarin sodium to prevent recurrent MVT.¹⁰

In conclusion, perioperative thrombolytic treatment of mesenteric and portal venous thrombosis via a mesenteric catheter is a feasible treatment option for this rare and potentially fatal condition in selected patients.

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