Thrombolytic therapy for critical limb ischemia in a Jehovah's Witness with severe anemia

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ABSTRACT

A patient's refusal to receive blood products can pose both clinical and ethical challenges to the surgeon. In this report, we review the case of a Jehovah's Witness presenting with critical lower limb ischemia and severe anemia for whom the decision of whether to perform thrombolytic therapy was complicated by his refusal to accept blood products. The case demonstrates that thrombolytic therapy can produce favorable results in severely anemic patients even when transfusion is not an option. We conclude that offering thrombolytic therapy in this context is a reasonable therapeutic option from both a clinical and ethical perspective. (J Vasc Surg Cases and Innovative Techniques 2017;3:152-4.)

A patient's refusal to receive blood products can pose clinical and ethical challenges to the surgeon.[1-3] This is particularly true when the incapacity to transfuse substantially increases the risks of an intervention that would otherwise be indicated. As an example, we review the case of a Jehovah's Witness presenting with critical limb ischemia and severe anemia, in which the decision to perform thrombolytic therapy was complicated by the patient's unwillingness to accept blood products. Consent for publication of this report was obtained from the patient.

CASE REPORT

A 64-year-old man presented to the emergency department with acute-on-chronic left leg pain and a bulla on his left foot. The distal leg was cool and pale and exhibited weakness of dorsiflexion and plantar flexion as well as absent sensation of pain and light touch. Duplex ultrasound examination demonstrated diminished flow distal to the left femoral artery; thrombus in the proximal profunda; and occlusion of the superficial femoral artery (SFA), posterior tibial artery, and peroneal artery. Trace flow was observed in the proximal anterior tibial artery but quickly dissipated. The patient's hemoglobin and hematocrit (H/H) values at the time of presentation were 5.5/18.8. Transfusion was recommended but refused on account of religious beliefs.

The cause of thrombosis was unclear. A hematologist was consulted, but workup failed to reveal a hypercoagulable state or definitive provoking factor. Notably, the patient had a history of left femur, tibia, and fibula fracture at the age of 19 years, which may have predisposed him to thrombosis. The cause of the patient's anemia was likewise unclear. He reported no history of gastrointestinal bleed, and the result of stool guaiac testing was negative. Poor nutrition may have been a contributing factor.

MANAGEMENT AND OUTCOME

The patient was admitted to the vascular surgery service. A heparin drip was initiated. In addition to iron and folate supplements, epoetin alfa was administered. The indications for, potential benefits of, and alternatives to thrombolytic therapy were discussed with the patient, and informed consent was obtained. The relative risks of limb loss and death that could be anticipated with and without thrombolytic therapy were mentioned. Exploration of a distal artery for possible bypass was also considered, but given the paucity of distal flow observed on duplex ultrasound examination, the likelihood of success of distal bypass was considered too small to justify the associated bleeding risks. The patient was taken to the operating room on hospital day (HD) 1 for aortography, left lower extremity (LLE) angiography, AngioJet (Boston Scientific, Marlborough, Mass) thrombectomy of the left SFA and popliteal artery, placement of an EKOS catheter (EKOS Corporation, Bothell, Wash), and initiation of thrombolytic therapy (Fig 1). Access was obtained by puncture of the right femoral artery under ultrasound guidance. Postoperatively, the patient's H/H dropped to 4.0/13.8. On HD 2, the patient returned to the operating room, at which time the EKOS catheter was removed and AngioJet thrombectomy of the left SFA and popliteal arteries was performed. This was followed by angioplasty of the proximal SFA with a 5-mm balloon and LLE angiography. An EKOS catheter was then positioned in the posterior tibial artery. At this time, the clot above the knee appeared to have resolved, whereas the clot below the knee remained. It seemed plausible that an additional day of thrombolysis might clear the distal clot and allow salvage of the foot. The following day, the EKOS catheter was removed and LLE

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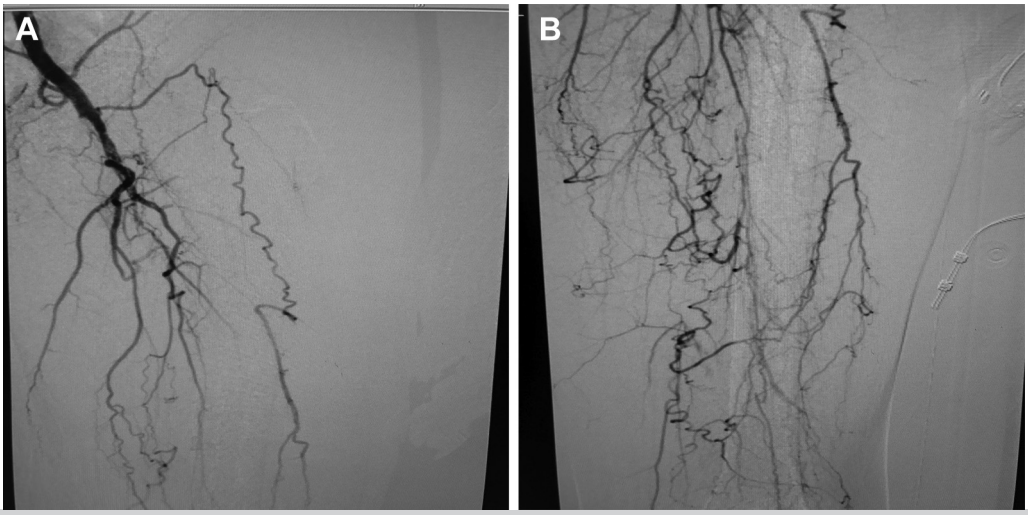

Fig 1. A, Left lower extremity (LLE) angiogram at time of initial intervention, proximal thigh. **B,** LLE angiogram at time of initial intervention, distal thigh.

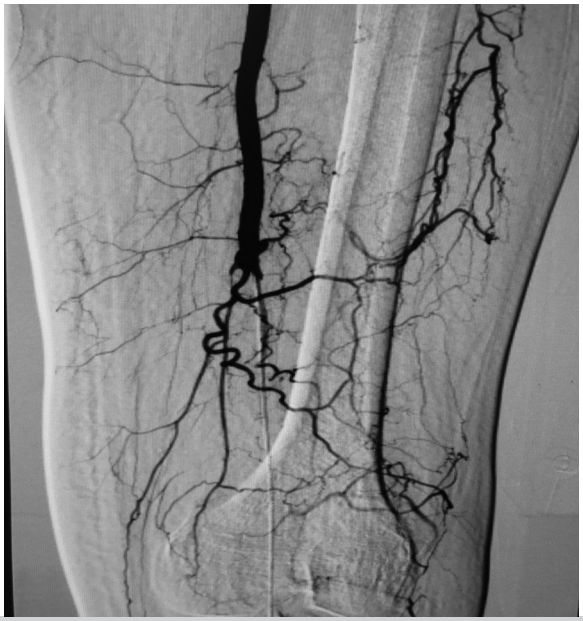

Fig 2. Left lower extremity (LLE) angiogram at time of third and final intervention, distal thigh.

angiography was performed. This was followed by Angio-Jet thrombectomy of the popliteal and posterior tibial arteries. Repeated arteriography showed no improvement (Fig 2). At this point, we concluded that the risk of bleeding complications outweighed the possibility of additional benefit. The catheter, wire, and sheath were removed, and the right groin puncture site was closed with an Angio-Seal device (Terumo Interventional Systems, Somerset, NJ). When the patient had sufficiently recovered from the procedure, amputation was recommended. The respective benefits and risks of below-the-knee amputation (BKA) vs above-the-knee amputation (AKA) were discussed, and the patient consented to BKA. The amputation was postponed for 6 days to allow improvement of anemia and demarcation of nonviable tissue. On postoperative day 1 from the final thrombolytic procedure, the patient's H/H values were 4.4/15.3. At the time of BKA 6 days later, levels had risen to 5.5/18.7, and the border of grossly necrotic tissue had stabilized below the knee. A tourniquet was used to minimize blood loss. The patient tolerated the procedure well. The H/H levels the following day were stable at 5.3/18.2. His postoperative course was uneventful. He was discharged to home on HD 15 and continued to progress well at the time of follow-up.

DISCUSSION

This case illustrates ethical and clinical challenges that may arise in caring for patients who refuse the standard of care. With respect to the ethical challenges of the case, it should first be noted that the patient's right to refuse blood products was honored. This is in keeping with the principle of autonomy that upholds a patient's right to refuse treatment. A feature of this case that is more controversial is the question of whether, having refused transfusion, the patient should have been offered an intervention that was made significantly more risky by his refusal to accept blood products. One might argue, for instance, that the surgeon would have been justified in declining to offer thrombolytic therapy to avoid the potential consequences of a poor outcome. This argument notwithstanding, the surgeon maintained that the patient had the right to assume the risks of the procedure to be afforded its potential benefits.

Another important decision was the choice to attempt a BKA rather than an AKA. The decision of whether to perform BKA or AKA can be complex.[4] Factors to be considered include objective parameters, such as proximal extent of devitalized tissue, severity of vessel

disease, hemodynamic stability, and comorbidities that may have a negative impact on wound healing.[5,6] The patient's functional status must also be taken into account.[7]

Algorithms that use objective clinical data to quantify risk and to predict clinical outcomes in peripheral vascular disease have been validated in the literature and can be of assistance in clinical decision-making.[8,9] Included among these is the Hamilton Anemia Mortality Risk Score, which has been shown to be of value in assessing risk among Jehovah's Witness patients in particular.[10] Had the Hamilton Anemia Mortality Risk Score been calculated preoperatively, our patient's score would have fallen into the lowest range of the index, indicating an absolute mortality risk of only 4% and lending support to an aggressive treatment approach. The benefits of BKA over AKA for this patient were obvious,[11] perhaps the most notable being the significant savings in ambulation-associated energy expenditure that is achieved with a BKA prosthesis.[12] On the other hand, the risks of BKA, including wound infection, pressure sores, and reoperation in the event that the BKA were to fail, were significant.[13] What is more, the patient's anemia was itself a risk factor for BKA failure.[14,15] Risks notwithstanding, the decision was made to perform BKA, with favorable results. Factors that were likely to have contributed to the ultimate success of the BKA in this patient include thrombectomy and thrombolysis; administration of epoetin alfa, iron, and folate[16]; and the use of a tourniquet to minimize blood loss during the BKA.[17]

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