

# Dermatologic manifestations of vascular access steal syndrome

Daniel Hekman, Kyle Burton, Sahand Rahnama-Moghadam

Indiana University School of Medicine, Indianapolis, IN 46202, USA

**Corresponding author:** Dr. Daniel Hekman, E-mail: dhekman@iu.edu

Sir,

A 32-year old right-handed female with past medical history significant for end stage renal disease undergoing hemodialysis and type 2 diabetes mellitus presented to our dermatology clinic with crusted ulcerations of her first, second and fifth digits of her right upper extremity. The patient endorsed associated cramping and pain of her right-hand during dialysis, while performing chores or even after prolonged typing or writing. She noted that lesions began after initiating dialysis, however she was unsure how long they had been present. The patient had tried using hydrogel dressings as well as triamcinolone 0.1% ointment without significant improvement. Of note, she denied any rashes or history of rashes over other locations on her body.

Skin exam of RUE (Right Upper Extremity): Ulceration with central crusting and surrounding hyperpigmentation overlying the PIP (Proximal Interphalangeal) joints of the 2<sup>nd</sup> and 5<sup>th</sup> right digit and DIP (Distal Interphalangeal) joint of the thumb (Fig. 1).

Cardiovascular exam: LUE (Left Upper Extremity): Radial pulses +2. RUE: Radial pulses (not palpable). Ulnar pulses weak. Improved with occlusion of arteriovenous (AV) fistula.

Shave biopsy showed epidermal ulceration with transepidermal elimination of collagen and necrotic debris.

Dialysis fistulogram demonstrated findings of profound steal (Fig. 2). The underlying arteries were generally intact. There was no flow in the forearm arteries prior to fistula compression. Following fistula compression there

is robust flow in the radial, ulnar and interosseous arteries. Labs were consistent with a patient undergoing dialysis.

Patient had her AV fistula revised and experienced marked improvement of the ulcerations and associated symptoms.

Vascular access “steal syndrome” occurs due to decreased blood flow to the distal extremity as a result of the shunting of arterial blood into a fistula. The presence of radiographic steal syndrome in patients with surgically-inserted arteriovenous (“AV”) fistulas can be as high as 73%. However, studies have shown that approximately only 10% of patients with steal syndrome become symptomatic [1].

The time to presentation of this syndrome varies and depends on whether an AV fistula or graft is used. Patients with grafts typically display symptoms approximately two days after placement, whereas patients with AV fistulas notice symptoms closer to 165 days on average after surgery [1].

Steal syndrome is a clinical diagnosis. Patients present with ulcerations, pain, hand stiffness, and/or paresthesia in the affected extremity. On physical exam, there may be decreased sensation and absent radial/ulnar pulses. Skin biopsy results will be non-specific. When the shunt is compressed, there is often alleviation of symptoms as well as a return of the pulses to the radial and/or ulnar arteries [2].

The workup for steal syndrome should start with a duplex ultrasound that can identify arterial stenosis or retrograde flow. If this test is unremarkable and the patient remains symptomatic, arteriography should be

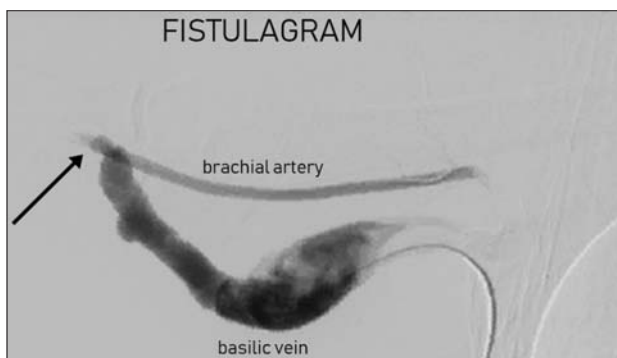
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**Figure 1:** Ulcerations with central crusting and surrounding hyperpigmentation overlying the PIP joints of the right 2<sup>nd</sup> and 5<sup>th</sup> digits.



**Figure 2:** A fistula arteriogram (“fistulagram”) showing predominant flow through the basilic vein shunt yet near absent flow to the right upper extremity.

performed. Treatment is typically revascularization in conjunction with ligation of the AV fistula.

This patient was treated by an interventional radiologist who revised her arteriovenous fistula. She experienced

marked resolution of her symptoms as well as healing of her ulcerations within weeks following the procedure. However, all-cause mortality after any procedure for severe steal syndrome is high, and the particular intervention for management of steal must account for anatomic, patient, and disease related considerations [3].

### Consent

The examination of the patient was conducted according to the Declaration of Helsinki principles.

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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