Emergency Microsurgical Revascularization for Critical Ischemia During Surgery for Dupuytren’s Contracture: A Case Report

Neil F. Jones, MD, Jerry I. Huang, BS, Los Angeles, CA

Injuries to the common digital or proper digital arteries during surgery for Dupuytren’s contracture are relatively rare but may be underreported. Delay in recognition and inadequate management may result in prolonged ischemia or gangrene and eventually necessitate finger amputation. A patient who sustained inadvertent injury to several digital arteries during reoperation for recurrent Dupuytren’s contracture of the ring and small fingers developed persistent critical ischemia of both fingers. He was transported emergently to a replantation center where the arterial injuries were immediately repaired by microsurgical techniques, resulting in successful salvage of both fingers. (J Hand Surg 2001;26A:1125–1128. Copyright © 2001 by the American Society for Surgery of the Hand.)

Key words: Dupuytren’s contracture, microsurgical revascularization, surgical complications.

Dupuytren’s contracture is a pathologic process that affects the palmar aponeurosis and occurs mainly in men in their 50s and 60s. No effective long-term nonsurgical treatment modalities exist, and surgical fasciectomy remains the treatment of choice.1 Indications for surgical intervention include a contracture of at least 30° at the metacarpophalangeal (MCP) joint, any contracture at the proximal interphalangeal (PIP) joint, a contracture in the thumb–index finger web space, and presence of a large tender nodule.2–4 Complications of fasciectomy include digital nerve injuries, hematoma, edema, wound dehiscence and skin necrosis, wound infection, loss of finger flexion, joint stiffness, pain, reflex sympathetic dystrophy, and recurrence of the flexion contracture of the finger.5–9

Vascular complications after surgery for Dupuytren’s contracture are rare but may be unrecognized and are underreported.5 Cold intolerance and gangrene of the distal fingers may result from arterial injury and may eventually necessitate finger amputation. McFarlane and McGrouther10 reported a 0.8% incidence of arterial injury and a 0.1% incidence of digital gangrene in 1,399 fasciectomies for Dupuytren’s contracture. Michon11 described 2 patients with arterial injuries during surgery for Dupuytren’s contracture that culminated in gangrene and amputation; however, the procedure was done before the advent of routine microsurgery. There seems to be only one report on microsurgical salvage of a vascu-
larly compromised finger after surgery for Dupuytren’s contracture; however, the procedure was performed secondarily 24 hours after the digit failed to “pink-up” after the fasciectomy.12

A patient with critical ischemia of the ring and small fingers caused by inadvertent injury to several digital arteries during surgery for recurrent Dupuytren’s contracture was transferred emergently to a replantation center where microsurgical revascularization resulted in successful salvage of the fingers.

Case Report

A 57-year-old right-handed man who had undergone surgery for Dupuytren’s contracture of the left ring finger 4 years previously presented with recurrent and progressive contractures of the MCP and PIP joints of the ring finger and progressive contractures of the MCP and PIP joints of the adjacent small finger.

A second fasciectomy was performed at another hospital through longitudinal incisions along the ring and small fingers. The neurovascular bundles to the ring and small fingers were embedded in the recurrent Dupuytren’s disease and the scar tissue from the previous surgery. After tourniquet release the ring and small fingers remained bluish-white without capillary refill and failed to pink-up despite irrigation with warm saline, 20% xylocaine, and papaverine. Exploration of the digital arteries to these fingers showed that both the radial and ulnar digital arteries to the small finger and the radial digital artery to the ring finger had been inadvertently transected, but the surgeon did not have microsurgical expertise to repair the divided arteries.

Because both the ring and small fingers remained ischemic for more than 2 hours after tourniquet release, the patient was transferred to a replantation center by helicopter while he was still under general anesthesia. This decision was made after consultation with an anesthesiologist because of the possible dangers associated with emergence from general anesthesia and the need for a second general anesthetic, in light of the patient’s history of coronary artery disease and coronary artery bypass surgery. The patient was taken immediately to the operating room where examination of the left ring and small fingers showed extremely poor capillary refill in both, worse in the small finger. Under the operating microscope the common digital artery to the ring–small finger web space, the common digital artery to the ring finger–small finger web space, and the ulnar digital artery to the small finger were identified at their origin from the superficial palmar arch. Extensive Dupuytren’s disease throughout the palm at the bases of the ring and small fingers was found, and it was extremely difficult to trace the digital arteries and nerves out to the level of the PIP joints. The ulnar digital artery to the small finger had been transected at the level of the MCP joint. The radial digital artery to the small finger had been divided approximately 5 mm beyond its origin from the common digital artery to the ring finger–small finger web space. The ulnar digital artery to the ring finger was anatomically intact but had minimal flow by the Acland flow test.13 The radial digital artery to the ring finger had been transected at the level of the PIP joint but gave off a dorsal branch that was intact. The radial and ulnar digital nerves to the ring finger and ulnar digital nerve to the small finger were intact. There was a 2.5-cm segmental loss of the radial digital nerve to the small finger, but the circumstances were not considered to be an indication for nerve grafting.

After mobilization of the proximal and distal ends of the radial and ulnar digital arteries of the small finger and the radial digital artery of the ring finger, end-to-end anastomoses were performed under the operating microscope by standard microsurgical techniques with 10–0 nylon sutures. After release of the microsurgical clamps there was normal pulsation in the distal radial and ulnar digital arteries. Adequate release of the flexion contractures of the fingers had been achieved at the previous hospital and no additional contracture release was necessary. A full-thickness skin graft from the left groin was used to cover the skin defect in the palm.

After surgery the patient was maintained on an intravenous infusion of dextran 40 at 25 mL/h for 3 days and continued to have excellent capillary refill to the ring and small fingers. At a 3-month follow-up visit arterial inflow to both the ring and small fingers was normal as determined by Doppler examination. The patient had no symptoms of cold intolerance. Both fingers had excellent flexion and extension but there was diminished sensibility down the ulnar aspect of the ring finger and the radial aspect of the small finger. One year later the patient underwent release of the Dupuytren’s contracture of the right ring and small fingers without any complications.
Discussion

Injuries to the common digital or proper digital arteries during surgery for release of Dupuytren’s contracture are infrequent but may be underreported. Inadvertent transection of one digital artery in a finger is unlikely to lead to any significant vascular compromise but may result in cold intolerance. Inadvertent transection of both digital arteries to one finger is more likely to occur except in reoperations for recurrent Dupuytren’s contracture, but the digit may still survive based on intact dorsal circulation. Critical digital ischemia, however, may ensue after both digital arteries are injured if the dorsal circulation is inadequate and may progress to gangrene of the distal finger and necessitate eventual amputation. Tubiana et al suggested that if both neurovascular bundles to a finger are severed during surgery for Dupuytren’s contracture, one artery should be repaired to prevent this progression. Despite routine use of microsurgical techniques to repair the common and proper digital arteries because of trauma, we found no reports of emergency microsurgical repair or vein graft reconstruction of a transected digital artery during surgery to release Dupuytren’s contracture. One report described secondary microsurgical salvage of a vascularly compromised digit after Dupuytren’s fasciectomy. Chung and Segalman described digital ischemia 10 hours after palmar fasciectomy that was caused by thrombosis of both proper digital arteries resulting from a tight Z-plasty at the MCP joint crease. The radial digital artery was reconstructed with a reversed interposition vein graft and the digit survived.

Reoperations for recurrent Dupuytren’s contracture are associated with an increased risk of injury to the digital nerves and arteries, as was the case with our patient. Preoperative evaluation of the vascular supply to a finger by either a digital Allen’s test or noninvasive vascular studies may occasionally alert surgeons to potential intraoperative problems. Meticulous dissection of the digital nerves and arteries under the operating microscope may reduce the incidence of vascular and nerve injuries during fasciectomy for recurrent Dupuytren’s contracture. Because of lack of microsurgical expertise to immediately repair the inadvertently transected digital arteries, our patient was transferred emergently to a replantation center. Perhaps dissection under the operating microscope and the availability of micro-
surgical expertise should be obligatory for patients undergoing surgery for recurrent Dupuytren’s contracture. Patients should also be warned of the possibility of vascular problems and asked for consent to harvest a vein graft should revascularization become necessary.

The surgeon should have a logical treatment algorithm for dealing with poor perfusion of a digit either after primary release of Dupuytren’s contracture or after surgery for recurrent disease. If a finger fails to pink-up after tourniquet release, the surgeon should allow the finger to return to a partially flexed position to prevent any vasospasm caused by stretching of the digital arteries. Both the finger and the incision should be irrigated with warm saline solution and the digital arteries bathed with 20% plain xylocaine or papaverine to reverse any component of vasospasm. A glyceryl trinitrate skin patch may also be applied to the proximal arm to induce vasodilatation. If there is still no return of capillary refill, the entire course of both digital arteries should be explored under the operating microscope to exclude inadvertent transection or segmental thrombosis of the digital arteries. Immediate microsurgical repair either by end-to-end anastomosis or reconstruction with an interposition vein graft should successfully prevent the progression of critical ischemia to gangrene and eventual amputation.

References


