

# Risk Factors for Postoperative Complications in Trigger Finger Release

Loretta Coady-Fariborzian, MD; and Amy McGreane, DNP, ARNP-BC

Postoperative complications when treating a patient with trigger finger can lead to unexpected costs and long recovery. Can an assessment of potential risk factors before surgery prevent complications?

**S**tenosing tenosynovitis, or trigger finger, is a pathology commonly referred to the plastic and hand surgery service of the North Florida/South Georgia Veterans Health System (NFSGVHS). Patients usually present to their primary care provider with symptoms of the finger being temporarily locked or stuck in the flexed position. This can be a painful problem due to the size mismatch between the flexor tendon and the pulley under which it glides.

Patients are typically referred to surgery after failing  $\geq 1$  attempt at nonoperative management. The surgery is relatively quick and straightforward; however, postoperative complications can lead to an unexpected costly and lengthy recovery. The objective of this study was to identify potential risk factors that can predispose patients to postoperative complications so that those risk factors may be better anticipated and modified, if possible.

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**Dr. Coady-Fariborzian** is the section chief of plastic surgery at the Malcom Randall VAMC and a clinical assistant professor at the University of Florida, both in Gainesville, Florida. **Dr. McGreane** is a doctor of nursing practice at the North Florida/South Georgia Veterans Health System in Jacksonville.

## METHODS

A retrospective chart review of trigger finger release surgery was performed on-site at the Malcom Randall VAMC in Gainesville, Florida, from January 2005 to December 2010 to identify risk factors associated with postoperative complications. The study was approved by both the NFSGVHS Internal Review Board and the University of Florida Institutional Review Board. Patients who underwent surgery exclusively for  $\geq 1$  trigger fingers by the plastic surgery service were included in the study.

The surgery involves making an incision over the affected A1 pulley in the hand (Figure 1) and sharply releasing it (Figure 2) under direct vision. Potential risk factors for postoperative complications were recorded. These risk factors included smoking status, diabetic status, type of incision, and number of digits released during the surgical procedure.

## RESULTS

Ninety-eight digits (on 81 hands) were identified as meeting inclusion criteria. Surgeries were performed using a longitudinal (43), transverse (48), oblique (5), or Brunner (2) incision. There were 10 complica-

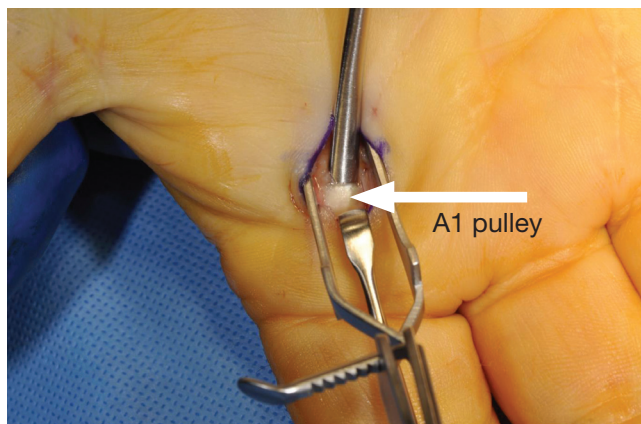
tions: cellulitis (3), pyogenic flexor tenosynovitis (3), scar adhesion (1), delayed healing (2), and incomplete release (1). The overall complication rate was 10.2%. The authors compared risk factors with complications, using the chi square test and a determining of  $P < .05$ .

There was no link found between overall postoperative complications and diabetic status, incision type, or smoking status. There was a statistically significant link between diabetic patients and the incidence of postoperative infection ( $P = .002$ ) and between 2 digits operated on during the same surgery and postoperative infection ( $P = .027$ ).

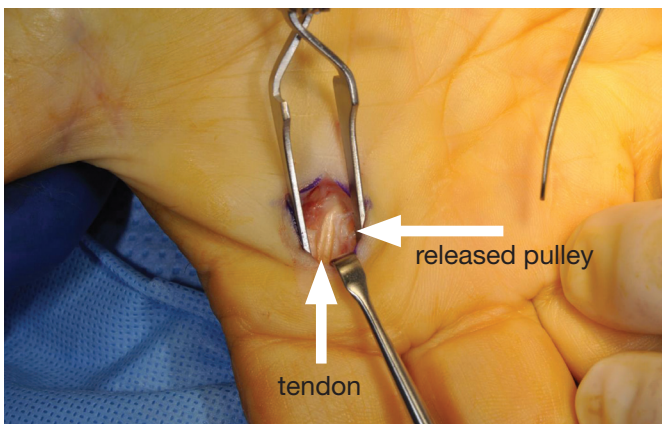
## DISCUSSION

The routine practice of the NFSGVHS hand clinic is to offer a steroid injection as the initial treatment for trigger finger. Health care providers (HCPs) allow no more than 3 injections to the same digit to avoid the rare but potentially serious complication of a tendon rupture.<sup>1</sup> Due to the large NFSGVHS catchment area, wait time for elective trigger finger surgery is several months. This 3-injection plan has been well received by patients and referring

**Figure 1.** Intraoperative Right Index Finger A1 Pulley



**Figure 2.** Intraoperative Right Index Finger A1 Pulley Released



providers due to these wait times. However, a recent article by Kerrigan and Stanwix concluded that the most cost-efficient treatment strategy is 2 steroid injections before surgery.<sup>2</sup>

More often than not, trigger finger release is a short, outpatient surgery with a quick recovery. To minimize the risk of stiffness and scar adhesions, the NFSGVHS practice is to refer all postoperative hand cases for  $\geq 1$  hand therapy appointment on the same day as their first postoperative visit.

### Cost Estimates

When complications occur, they can be costly to patients due to both time spent away from home and work and additional expenses. When the current procedural terminology (CPT) codes are run through the VistA integrated billing system, based on the VHA Chief Business Office Reasonable Charges, a complication can more than double the charges associated with A1 pulley surgery.

A flexor sheath incision and drainage (I+D) (CPT 26020) charges \$8,935.35 (facility charge, \$6,911.95 plus professional fee, \$2,023.40), compared with open trigger finger release (CPT 26055) at \$8,365.66 (facility charge, \$6,911.95 plus

professional fee, \$1,453.71). According to a conversation with the finance service officer at NFSGVHS (2/11/2014), the anesthesia bill (\$490.56/15 min), anticipated level 3 emergency department visits (facility charge, \$889.22 plus professional fee \$493.40), and inpatient stays (daily floor bed \$786.19) can make an infectious complication costly.

Trigger finger can also be released percutaneously. This is a reasonable option that avoids the operating room, but NFSGVHS surgeons prefer the open surgery due to concerns for tendon and nerve injury that can result from a blind sweep of the needle.<sup>3,4</sup>

Existing studies found complications for trigger finger release ranging from 1% to 31%.<sup>5,6</sup> Wound complications and joint stiffness are known complications.<sup>5-7</sup> In this study, 60% of the complications were infections, and 80% of the complications were wound complications. Six of 8 patients with wound-healing complications received perioperative antibiotics. Three patients returned to the operating room for an I+D of the flexor sheath. The results showed a statistically significant link between  $> 1$  digit treated at the same surgery

and postoperative complications ( $P = .027$ ). A PubMed search revealed no existing hand literature with this association.

### Risk Factors

Diabetes, tobacco use, type of incision, and number of digits treated were assessed as risk factors for complications after trigger finger surgery. Nicotine is widely accepted as increasing the risk for wound complications.<sup>8</sup> Almost 20% of the U.S. population smokes, compared with 22% of the VA population and 32% of active-duty military personnel.<sup>9</sup> One in 4 veterans has been diagnosed with diabetes, a well-known predisposing factor in delayed wound healing and infection.<sup>10,11</sup> No prior studies were found comparing type of incision or multiple digits treated as complications risk factors.

There is also a well-known association between trigger finger and diabetes. Chronic hyperglycemia results in the accumulation of collagen within tendon sheaths due to impairment of collagen breakdown. Patients with diabetes tend to present with multiple digit involvement and respond less favorably to steroid injections compared with patients without

diabetes.<sup>12</sup> Wound healing is also impaired in patients with diabetes. All 6 wound infections in this study were in patients with diabetes. Proposed etiologies for wound-healing complications include pathologic angiogenesis, impaired fibroblast proliferation and migration, impaired circulation, decreased oxygenation, and a defective immune response to the injured site.<sup>13</sup>

Trigger finger may develop in multiple digits. Once surgery has been planned for 1 digit, patients may request surgery on another digit on the same hand that has not had an attempt at nonoperative intervention. The NFSGVHS plastic surgeons have raised the threshold to offer multiple surgical procedures on the same hand at the same operative visit to minimize recovery time and number of visits, particularly when patients are travelling long distances. This may be less convenient; however, the overall cost to the patient and the health care system in the event of a complication is significant. Plastic surgery providers also run an alcohol prep pad over the incision site to prevent inoculation of the flexor sheath during suture removal.

Current recommendations to ameliorate the postoperative risks to the patient and costs to the system include endorsing a more conservative approach to treating trigger finger than was previously practiced at NFSGVHS. The known, less favorable response of patients with diabetes to steroid injections plus their elevated risk of postoperative infection create a catch-22 for the treatment plan. Given the low risk of a single steroid injection to the flexor sheath, this procedure is still recommended as a first-line treatment.

During the 5-year study there was a lower threshold for surgical management and for treatment of multiple digits during the same surgery than the one currently practiced, with an

overall consensus of the hospital's HCPs. The authors recommend that all patients start with a steroid injection before committing to surgery. Patients with diabetes are informed that the injection will cause a temporary rise in their blood glucose.<sup>14</sup> If they are resistant to the injection, high-dose oral nonsteroidal anti-inflammatory drugs and/or proximal interphalangeal joint splinting is ordered.

Verification of  $A_{1C}$  values showing better chronic management of blood sugar is a procedure HCPs from the NFSGVHS will begin to follow. Preoperative  $A_{1C}$  values between 6.5% and 8% in patients known to have diabetes has been recommended.<sup>15</sup>  $A_{1C}$  values > 7% have been found to be an independent risk factor for stenosing tenosynovitis.<sup>16</sup> The total number of trigger finger surgeries may drop with the benefit of improved utilization of resources.

## CONCLUSION

The authors found a statistically significant association between postoperative infection and 2 patient populations: patients with diabetes ( $P = .002$ ) and patients having > 1 digit released during the same surgery ( $P = .027$ ). This outcome suggests using caution when offering A1 pulley release in select patient populations. ●

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## Disclaimer

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