Acute Hemorrhagic Flexor Tenosynovitis due to Vincula Injury

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Summary: A 20-year-old previously well woman presented to the emergency department with classical signs of acute flexor tenosynovitis, 4 hours after a minor puncture wound over the volar aspect of her right middle finger distal interphalangeal joint. Exploration of the flexor sheath in theatre revealed frank blood within the sheath and extension of the puncture wound through the profundus tendon into the short vincula beneath. The blood was irrigated from the sheath, and the patient made a complete recovery by 2 weeks postoperatively. Although rare, irritation and distension of the flexor sheath caused by vincular hemorrhage can be an alternative mechanism for the development of acute flexor tenosynovitis, and as with pyogenic flexor tenosynovitis, prompt surgical treatment can minimize the risk of long-term functional impairment. (Plast Reconstr Surg Glob Open 2015;3:e458; doi: 10.1097/GOX.0000000000000425; Published online 16 July 2015.)

CASE

A 20-year-old woman with no past medical history presented to the emergency department with a 1-hour history of right middle finger pain and swelling. Four hours prior, she had been wiping a bench top and sustained a tiny puncture wound over the volar aspect of the distal interphalangeal joint from an unknown object.

Examination revealed diffuse swelling of the right middle finger, which was held in a flexed position. There was significant pain on passive extension of the digit and tenderness on gentle palpation of the flexor tendon sheath. She was systemically well with normal vital signs.

Plain x-ray was normal other than soft tissue swelling. Ultrasound confirmed the presence of tenosynovitis, with thickening of the flexor tendons over the proximal phalanx and adjacent fluid, without a focal collection.

The patient was taken to theatre shortly after for washout of the flexor sheath. When the sheath was opened, frank blood was seen within. The puncture wound over the distal interphalangeal joint was discovered to extend through the flexor digitorum profundus tendon into the short vincula beneath. No ongoing bleeding was evident. The sheath was irrigated with saline and the incision was tacked closed with nylon sutures.

Microscopic examination of the flexor sheath fluid showed only red and white blood cells, and no organisms were cultured. The patient recovered well postoperatively and was discharged home 2 days later. Resolution of pain and recovery of full movement was achieved by 2 weeks postoperatively.

DISCUSSION

The flexor tendons of the fingers run within a sheath between the A1 pulley and the bony insertion of the profundus tendon.1 This sheath is composed of an inner visceral layer and an outer parietal layer, with an essentially closed synovial space between the 2 layers. The long and short vinculae join the flexor tendons to the underlying bone, and vessels within the vinculae provide the blood supply to the tendons both directly and by diffusion of nutrients through the synovial fluid.

Acute pyogenic flexor tenosynovitis (PFT), bacterial infection within the flexor tendon sheath, is one of the most significant infections encountered by the hand surgeon. The usual pathophysiological

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mechanism is laceration or penetrating injury of the flexor sheath with introduction of bacteria, most commonly normal skin flora, such as *Staphylococcus aureus*. Clinical diagnosis is classically made by eliciting 4 cardinal signs, first described by Kanavel over 80 years ago. They are fusiform swelling of the affected digit, tenderness to palpation along the flexor sheath, the digit held in a semiflexed position, and exquisite pain on passive extension. Patients usually present with these signs 2–5 days after injury, when infection has set in and inflammation developed. The resultant inflammation causes tendon adhesions and an increase in pressure of up to 30 mm Hg within the sheath, which can inhibit blood flow and ultimately lead to tendon necrosis and loss of hand function if untreated.

To our knowledge, this is the first reported case of acute flexor tenosynovitis caused by vincular hemorrhage, as opposed to the usual infective etiology. Dacruz et al described a case of extensor tenosynovitis because of irritation from an adjacent hematoma; however, this does not occur within a closed sheath and does not present with Kanavel’s cardinal signs.

In our case, the patient presented with a penetrating injury to the digit, with all the classical signs of PFT. However, the onset of symptoms and signs developed within hours of the injury rather than days, consistent with contact irritation of the sheath by blood. Preoperatively, with the cause of the tenosynovitis not yet known, the possibility of a rapidly progressing infection was considered, and therefore, the patient was transferred to the operating theatre expeditiously. Although there was subsequently found to be no infection, evacuation of the blood and irrigation of the sheath resolved the irritation and provided a quick recovery for the patient. Other possible benefits are the interruption of the inflammatory process that leads to adhesion formation and reduction in the risk of tendon necrosis via a decrease in intrasynovial pressure.

Although rare, it is important to consider the possibility of noninfectious acute flexor tenosynovitis in patients with rapid onset of symptoms and no risk factors for severe infection. Prompt exploration and washout of the flexor sheath should be performed to maximize functional outcomes.

**SUMMARY**

A 20-year-old previously well woman presented to the emergency department with classical signs of acute flexor tenosynovitis, 4 hours after a minor puncture wound over the volar aspect of her right middle finger distal interphalangeal joint. Exploration of the flexor sheath in theatre revealed frank blood within the sheath and extension of the puncture wound through the profundus tendon into the short vincula beneath. The blood was irrigated from the sheath, and the patient made a complete recovery by 2 weeks postoperatively.

Although rare, irritation and distension of the flexor sheath caused by vincular hemorrhage can be an alternative mechanism for the development of acute flexor tenosynovitis, and as with pyogenic flexor tenosynovitis, prompt surgical treatment can minimize the risk of long-term functional impairment.

**PATIENT CONSENT**

*The patient provided written consent for the publication of her case.*

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