Acute Calcific Tendinitis of the Index Finger in a Child

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Abstract

Background: Calcific tendinitis is characterized by calcium hydroxyapatite crystal deposition within tendons and is a common cause of musculoskeletal pain in adults. Its clinical manifestations may be acute, chronic, or asymptomatic. Acute calcific tendinitis is self-resolving condition that is rarely reported in the pediatric population and may be overlooked for more common processes, leading to unnecessary treatment. **Methods:** A chart review was performed of a single case of acute calcific tendinitis of the index finger in a child. **Results:** We describe a case of calcific tendinitis of the index finger in a 9-year-old boy who was referred to us for a second opinion after surgical exploration of an acutely inflamed digit was recommended based on his initial presentation. The calcifications and symptoms resolved over time without operative management. **Conclusions:** Although rare in children, acute calcific tendinitis can present similar to an infection. However, appropriate management is non-operative as the symptoms and radiographic findings resolve over time.

Keywords: calcific tendinitis, calcium hydroxyapatite, pediatric, hand, periarticular

Introduction

Acute calcific tendinitis is an inflammatory condition characterized by calcium hydroxyapatite deposition in tendons and is associated with rapid onset of localized monoarticular pain.²⁰ The condition most commonly affects the rotator cuff in adults; its occurrence at other sites, including the hand, is much less common. Calcium deposition in the hand or other unusual locations coupled with symptoms mimicking more common inflammatory etiologies can lead to misdiagnosis of this relatively benign condition and result in unnecessary and aggressive management.^{1,23} Limited cases exist in the literature for acute calcific tendinitis in the pediatric population. Cases involving the hand in children are even less common.^{2,3,11,14,18} We describe a rare case of acute calcific tendinitis involving the flexor tendon of the index finger in a child and discuss its pathogenesis and management based on the literature.

Case Report

A 9-year-old, otherwise healthy, left-handed boy presented to an outside hospital with a 2-day history of erythema, pain, and swelling of his left index finger. There was no history of trauma, prior illness, or sick contacts. Plain radiographs showed a calcific mass over the volar aspect of his proximal interphalangeal (PIP) joint (Figure 1). He was started on intravenous antibiotics and evaluated by the local

hand surgeon. Given the concern for suppurative infection, recommendations were for surgical exploration.

His parents elected to transfer him to our institution for a second opinion. On presentation, the patient continued to have tenderness with active flexion. There was persistent swelling and erythema that had reportedly improved since initial presentation, but there was no concern for flexor tenosynovitis, deep space infection, or septic joint. In addition, the patient's history and radiographic findings did not favor juvenile gout or pseudogout.

The patient was continued on intravenous antibiotics and admitted overnight for observation given initial concerns for an infected phlebolith. His erythema and swelling slowly improved. Ultrasound demonstrated a 1.0 × 0.6-cm radiodense mass at the volar aspect of the PIP joint immediately adjacent to the flexor tendon that moved in synchrony with the tendon (Figure 2). Acute calcific tendinitis of the flexor tendon was suspected, and the patient received a finger resting splint and treatment with nonsteroidal anti-inflammatory medication.

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Figure 1. Conventional radiographs at the time of presentation demonstrating a calcified lesion over the volar aspect of the left index finger proximal interphalangeal joint.

Figure 2. A 1×0.6 -cm radiodense sonographic abnormality (arrowheads) is noted in the (a) transverse and (b) sagittal planes within the volar soft tissues of the index finger immediately adjacent to the flexor tendon.
Note. PIP = proximal interphalangeal.

Figure 3. Conventional radiographs at 3-week follow-up demonstrating resolution of the calcified lesion.

Three weeks later, his swelling had nearly resolved, and no nodule was palpated. He had full flexion of his digit, and there was no triggering. Plain radiographs showed that his calcium deposit had completely disappeared (Figure 3). Based on the patient's clinical course, ultrasounds findings, and radiographs, a diagnosis of acute calcific tendinitis of the flexor tendon was confirmed.

Discussion

Acute calcium deposition of the hand is an inflammatory condition that is often overlooked due to lack of familiarity by clinicians.³ Although Sandstrom report that the incidence of calcification in the hand is only 2.4%, other studies suggest this condition may be more common than previously thought.^{3,22,23,28} Calcification of the hand is most commonly observed at the insertion of the flexor carpi ulnaris tendon in middle-aged or peri-menopausal women.^{3,15,28,29} Finger joints are less commonly involved, with the metacarpophalangeal (MCP) joint being the most commonly involved joint in the hand.^{15,16} The few cases that exist in the pediatric population describe acute calcific tendinitis involving the soft tissues within the palm, the flexor tendons over the MCP joint, the flexor pollicis longus tendon at the wrist, and the extensor pollicis longus tendon over the interphalangeal joint.^{2,11,14,18} To our knowledge, this is the first case of acute calcific tendinitis involving the flexor tendons over the PIP joint in a child.

Calcific tendinitis follows either an acute or chronic course. Acute calcific tendinitis is a self-limited condition that typically resolves in 3 to 4 weeks.^{10,25} It is associated with rapid onset of localized tenderness, erythema, swelling, and decreased range of motion secondary to pain.²⁰ Occasionally, the patient may present with fever or malaise during the acute flare.²⁴ Comparatively, patients with chronic calcific tendinitis may present with intermittent pain and joint stiffness from chronic tendinopathy, or they may be completely asymptomatic.^{8,17,21} Symptoms associated with calcific tendinitis have not been found to correlate with the size of calcification.⁵

Diagnosis of acute calcific tendinitis primarily relies on imaging studies. Plain radiographs are often sufficient for diagnosis and monitoring resolution as was illustrated in this case. High-resolution ultrasound can be helpful to further define calcium deposit location and size.¹⁷ Magnetic resonance imaging is often unnecessary but can detect inflammation and edema within the surrounding soft tissues.^{4,17} Laboratory values are not essential for diagnosis but can help differentiate between etiologies. White blood cell count and inflammatory markers (sedimentation rate, C-reactive protein) may be elevated in acute presentations but are typically normal.^{10,19,28} Other values, including serum calcium phosphorus, glucose, alkaline phosphatase, urea, and uric acid, are also usually normal.^{10,19,29}

Although acute calcific tendinitis is largely considered idiopathic, several theories exist for its pathogenesis. Studies on calcific tendinitis in the shoulder suggest that it is a degenerative condition.^{9,12,13} Repeated tissue stress leads to tissue hypovascularity, which in turn results in development of necrotic tissues in which calcium can be deposited. Other theories include cartilaginous metaplasia,²⁷ underlying metabolic disorders,¹³ or overuse/repetitive activity leading to the development of inflammation.²⁶ Reports involving children suggest acute calcific tendinitis occurs in sites of repeated stress,^{2,14} but it is unclear if joint overuse is the primary cause for calcium deposition. The patient in this case presented with pain in his dominant left hand, and although an inciting traumatic event was not identified, overuse of his hand could have caused local tissue stress, thereby predisposing him to calcium deposition in his digit.

Calcium deposition in the hand and wrist has a high rate of misdiagnosis not only because it shares a similar symptomatology with more commonly encountered conditions, but also due to the lack of familiarity with the disease process by clinicians.^{7,19,20} The differential diagnosis is broad and includes infection, fracture, metabolic conditions (hyperparathyroidism, gout, pseudogout, hypervitaminosis D, hypercalcemia), degenerative or inflammatory conditions, and autoimmune conditions.^{4,7,20,23} Radiographic evidence of calcium deposition, monoarticular joint involvement, and clinical presentation can help differentiate acute calcific tendinitis from other etiologies.⁷ For example, calcium deposits associated with pseudogout tend to be more linear and less rounded or oval shaped than those of acute calcific tendinitis.²² Clinician awareness of acute calcific tendinitis can help reduce misdiagnosis and avoid extensive workup and invasive treatment as illustrated in this case.²⁰

Treatment for acute calcific tendinitis is conservative and typically includes nonsteroidal anti-inflammatory medications and splint immobilization.^{6,23} Warm water soaks and lidocaine injections can help with pain management.^{3,19} In patients who fail to improve with conservative measures, needle aspiration followed by steroid injection can help disperse calcium deposits, decrease local inflammation, and encourage calcium resorption.¹⁰ Complete pain relief typically occurs in around 6 days, but temporary relief of symptoms with steroids can occur within hours.³ Due to the self-limited nature of acute calcific tendinitis, surgery is rarely indicated and is reserved for persistently tender nodules that do not respond to more conservative medical management.^{3,20}

Conclusion

Acute calcific tendinitis is a rare condition in the hand, particularly in children. It is important for physicians to be aware of the disease process to avoid misdiagnosis and

unnecessary intervention. Though the pathogenesis is not completely understood, clinical presentation and radiographic findings can lead to accurate diagnosis. The vast majority of cases resolve spontaneously with conservative management and surgery is rarely indicated.

Ethical Approval

This study was approved by our institutional review board.

Statement of Human and Animal Rights

This article does not contain any studies with human or animal subjects.

Statement of Informed Consent

Because this is a case report with no identifiable patient information, no informed consent was needed.

Declaration of Conflicting Interests

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