Acute calcific periarthritis of the proximal phalangeal joint on the fifth finger
A case report and literature review
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Abstract

Rationale: Acute calcium deposits, including acute calcific periarthritis or acute calcific peritendinitis, are benign calcifying soft tissue lesions that have a self-resolving course. These calcifying lesions usually develop in the shoulder, while acute calcific periarthritis in the digits is uncommon. When acute calcific periarthritis involves the digits, the lesion occasionally mimics other benign calcifying or ossifying lesions and can easily be misdiagnosed, resulting in unnecessary diagnostic studies and treatment. We present a rare case of acute calcific periarthritis around the proximal phalangeal joint of the left fifth finger that took a long time to spontaneously resolve, and review previous reports of similar cases.

Patient concerns: A 69-year-old woman complained of longstanding pain and swelling of the fifth finger of the left hand. She had visited several clinics and hospitals and had been treated with analgesics and splinting for more than 2 months, but the pain in the finger had gradually worsened.

Diagnoses: Blood chemistry analysis showed no signs of inflammation or other abnormalities. Radiographs revealed a well-defined subcutaneous calcifying lesion without bony destruction, suggesting a benign calcification process. Computed tomography and magnetic resonance imaging led to a diagnosis of acute calcific periarthritis of the proximal interphalangeal joint of the fifth finger.

Interventions: An excisional biopsy was recommended to achieve a definitive diagnosis, but this was declined by the patient. Thus, no invasive treatments were administered, and she was treated with analgesics and encouraged to massage the affected finger.

Outcomes: The pain gradually improved, and follow-up radiographs showed complete disappearance of the calcifying mass 6 months after the initial visit to our hospital, without recurrence during a follow-up period of more than 2 years.

Lessons: Acute calcific periarthritis is diagnosed based on history, clinical examination, and imaging findings, which provide evidence for the diagnosis of calcium deposition in the digits even if the lesions have been present for a long time. Watchful observation is an appropriate treatment strategy for acute calcific periarthritis of the digits.

Abbreviations: MRI = magnetic resonance imaging, PIP = proximal interphalangeal.

Keywords: acute calcific periarthritis, benign calcifying lesion, case report, phalanges, proximal phalangeal joint, pseudotumor

1. Introduction

Acute calcium deposits most commonly develop around the shoulder, and are frequently detected on radiographs. However, it is rare for similar deposits to develop in the interphalangeal joints of the digits, including the distal and proximal interphalangeal (PIP) joints of the fingers and the interphalangeal joint of the thumb.[1–24] These calcium deposits have been given various names, but are currently classified into 2 types: acute calcific arthritis and peritendinitis.[2]

Acute calcium deposits are referred to as acute calcific periarthritis if they are located in a periaricular region, and as acute calcific peritendinitis if they are present within a tendon.[2,3] When these calcium deposits occur in the digits, they can cause diagnostic confusion, with differential diagnoses including calcifying or ossifying lesions. Acute calcific arthritis and peritendinitis follow a self-limiting disease process, typically showing mild improvement during the first week and resolution within 1 month.[2,25]

Acute calcium deposits are reportedly occasionally misdiagnosed, and the patients are treated with antibiotics or unnecessary surgery. We herein describe a rare case of acute calcific
periartthritis around the PIP joint of the left fifth finger that took a long time to spontaneously resolve, and review previous reports of similar cases.

2. Case report

A 69-year-old woman presented with a 19-month history of pain and an enlarging soft tissue mass in the ulnar aspect of the PIP joint of the fifth finger of the left hand. She was a housewife who performed no particular work or sporting activity. She had a history of minor trauma involving bruising of the finger in a door and was referred to a neighboring clinic 14 months before the visit to our hospital. Plain radiographs taken at the previous clinic had shown no sign of fracture, but instead revealed an abnormal calcifying lesion of the soft tissue of the left fifth finger. She had visited several clinics and hospitals and had been treated with analgesics and splinting for more than 2 months, but the pain in the finger had gradually worsened. Thus, she was referred to our hospital for definitive diagnosis and treatment.

Physical examination revealed tenderness around the PIP joint of the fifth finger with an apparent subcutaneous tumor, measuring around 1 cm in diameter (Figs. 1A and B). She experienced pain around the PIP joint of the fifth finger when the fist was tightly clenched and/or when the lesion contacted another object. There were no signs of infection or neurovascular disturbances, and no history of previous infection. The range of motion of the affected PIP joint was slightly more restricted than that of the contralateral side, but there was no functional impairment of the finger. Blood chemistry analysis showed no signs of inflammation or other abnormalities.

Plain radiographs of the fifth finger taken 5 months before the initial visit to our hospital revealed a well-defined calcified soft tissue mass overlying the ulnar side of the proximal and middle phalanges that was well separated from the adjacent bone, with no periosteal reaction (Figs. 2A and B). Radiographs taken at the time of presentation at our hospital revealed an enlarged 2-humped calcifying lesion overlying the ulnar side of the PIP joint (Figs. 2C and D). Computed tomography also showed a well-defined and rimmed calcifying soft tissue mass with calcification of the outer margins on the ulnar side of the left fifth finger, without bony destruction (Figs. 3A–D). T1- and T2-weighted magnetic resonance imaging (MRI) showed a well-defined soft tissue mass with low signal intensity overlying the ulnar side of the proximal and middle phalanges (Figs. 4A–D). T1-weighted MRI also showed that the lesion was well separated from the adjacent bone and surrounded by a diffuse high-intensity area, suggesting perilesional soft tissue edema. No periosteal reaction was detected. Moreover, there was no abnormal intensity in the bone marrow observed on either T1- or T2-weighted MRI, suggesting no progression to the bone.
marrow. Contrast-enhanced MRI showed no enhancement of the soft tissue mass (Fig. 4E). There was no cartilaginous matrix formation. Taken together, these imaging modalities indicated a well-defined subcutaneous calcifying mass with a characteristic peripheral radiopaque ring overlying the ulnar side of the proximal and middle phalanges, suggesting a benign calcifying lesion, namely a calcifying deposit. An excisional biopsy was recommended to achieve a definitive diagnosis, but this was declined by the patient. Thus, no invasive treatments were administered, and she was treated with analgesics and encouraged to massage the affected finger.

The pain in the left fifth finger gradually improved during the following 6 months. In addition, the limited range of motion completely recovered, and follow-up radiographs showed complete resolution of the calcifying mass at 6 months after the initial visit to our hospital (Figs. 5A and B). At the final follow-up conducted 3 years after the initial visit to our hospital, the patient had a full range of motion without recurrence of acute calcific arthritis.

3. Discussion

Acute calcific periarthritis in the digits is fairly rare,\cite{1,2,3,4,5,6,7,8,9,10} and large case series have only been reported in 3 studies. Sandstrom\cite{26} reported finger involvement in only 6 of 329 cases (1.6%) of peritendinitis carcasea in 1938, Carroll and Sinton\cite{27} reported finger involvement in 16 of 100 patients (16%) with acute calcareous deposits of the hand and wrist in 1955, and Yelton and Dickey\cite{28} reported finger involvement in 16 of 107 patients (15%) with calcification of the hand and wrist in 1958. Moreover, a review of the English literature related to acute calcific periarthritis reported that acute calcific periarthritis was observed in 20 joints in 15 patients.\cite{29} To our knowledge, acute calcific periarthritis in adults has only been reported in the English literature in 69 digits and 74 phalangeal joints in 61 patients (5 males, 19 females, and 37 patients of unspecified sex) (Table 1). Although the sex of 37 patients was not reported, acute calcific periarthritis or peritendinitis is more frequently reported in females than in males, which is consistent with previous reports of acute calcific periarthritis or peritendinitis in the hand and wrist.\cite{11,12,29} According to previously reported cases, the most frequently affected interphalangeal joint is the PIP joint, which is consistent with our case. However, acute calcific periarthritis with long-term symptoms and a residual mass seems to be uncommon.

The clinical presentation of acute calcific periarthritis typically involves rapid onset of monoarticular pain that spontaneously resolves within several weeks. Typical symptoms include swelling, erythema, and/or fever.\cite{11,27} Laboratory inflammatory markers including complete blood count, C-reactive protein, and

![Figure 2](image-url)
erythrocyte sedimentation rate are typically normal, with negative cultures.\textsuperscript{[2,30]} Although acute calcific periarthritis resolves spontaneously with or without specific treatment, the condition may be mistaken for other pathological conditions. Because of the rarity of acute calcific periarthritis of the digits, the definitive diagnosis of this condition can be challenging, and it is particularly difficult to attain a definitive diagnosis and perform appropriate treatment when the symptoms and residual mass persist for a long time, as in our case. Although advanced imaging is usually not necessary for the diagnosis of acute calcific periarthritis,\textsuperscript{[30]} computed tomography or MRI are required when the condition persists for a long time. In our case, although the lesion was present for more than a year, computed tomography and MRI provided a diagnosis of calcium deposits in the finger.

The differential diagnoses for acute calcific periarthritis include other benign calcifying or ossifying lesions.\textsuperscript{[4–6,9,11,30]} The other benign calcifying lesions include gout, pseudogout, tumoral calcinosis, or a more concerning infectious etiology (flexor tenosynovitis, septic joint, or osteomyelitis). However, gout typically has associated erosive bony changes, pseudogout presents with a linear chondrocalcinosis, and infection typically does not present as a radiographic calcification.\textsuperscript{16,9,30} Benign ossifying lesions include fracture callus, myositis ossificans,\textsuperscript{[31–34]} fibrous reactive periostitis,\textsuperscript{[35,36]} bizarre parosteal osteochondromatous proliferation,\textsuperscript{[35,36]} acquired osteochondroma (Turret exostosis),\textsuperscript{[35,36]} and subungual exostosis.\textsuperscript{[35,36]} Fracture callus and myositis ossificans are associated with a remote history of trauma,\textsuperscript{[37]} and complete spontaneous resolution of these lesions has not been reported. Fibrous reactive periostitis,\textsuperscript{[35,36]} bizarre parosteal osteochondromatous proliferation,\textsuperscript{[35,36]} acquired osteochondroma (Turret exostosis),\textsuperscript{[35,36]} and subungual exostosis\textsuperscript{[35,36]} show similar clinical and radiological features and belong to the same group of reactive lesions of the bone surface\textsuperscript{[35,36]}; although these ossifying lesions occasionally resemble acute calcific periarthritis on imaging, they rarely undergo complete resolution.\textsuperscript{[35,38]}

In the present case, radiographs and computed tomography revealed a well-defined subcutaneous mass composed of dense, amorphous, homogenous, cloudlike, round, or ovoid calcific deposits. Additionally, there was calcification of the outer margins on the volar and ulnar sides of the soft tissue of the finger without bony destruction, and the lesions were well separated from the adjacent bone on the ulnar side of the fifth finger. MRI showed that the calcifying lesion had a thin rim of low signal intensity at its boundaries, which were surrounded by diffuse perilieuxional soft tissue edema on T1- and T2-weighted imaging; there was no abnormal intensity in the bone marrow,
suggesting no progression to the bone marrow. All imaging findings suggested a benign calcifying lesion or calcium deposit.\cite{32,38,39}

As the clinical course of acute calcific periarthritis is self-limiting and typically resolves over the course of 1 month, the condition is effectively treated via non-surgical treatment comprising rest, icing, and non-steroidal anti-inflammatory drugs.\cite{2,30,40} Although the exact pathological mechanism of these calcium deposits remains unclear, they are thought to develop due to a mechanical or vascular insult that results in poor tissue oxygenation and metaplasia.\cite{41} Hypoxia in the critical area of the ligament or tendon initiates calcific periarthritis or peritendinitis and fibrocartilaginous metaplasia, which results in the formation of calcium deposits. Acute calcifying periarthritis reportedly involves precalcific, formative, resorptive, and healing phases,\cite{41} which are distinguishable on radiographs. The metaplastic tissue undergoes calcific deposition and eventual resorption and healing.\cite{10} Severe pain is typically associated with the resorptive phase of the disease process.\cite{42} A more rapid resolution of pain is reportedly achieved via injection with local anesthetic with or without steroids.\cite{1,9,11,27} However, it is unclear whether the quicker symptomatic resolution is due to mechanical destruction of the calcific mass by the needle resulting in a greater surface area for spontaneous resorption or due to the actions of the medication itself. Some authors have performed surgical intervention for persistent lesions and/or recurrent lesions in the hand and wrist.\cite{10} However, there were no recurrent lesions reported in a series of 17 patients with acute calcific periarthritis around the hand and digits during 12 months of follow-up.\cite{9} In the present case, the pain and calcifying lesion persisted for more than a year, and the complete resolution of acute calcific periarthritis took a long time. Although it is unclear why the pain and the lesion persisted for more than a year in our case, this persistence might have been due to the large size of the calcifying lesion.

Although the risk of recurrence of acute calcific periarthritis is still unknown, watchful observation is generally recommended for calcium deposits.\cite{33} In our case, the acute calcifying periarthritis eventually completely resolved without residual pain and/or complications. Moreover, lesion recurrence has not been observed. Our case suggests that watchful observation might be the appropriate treatment for acute calcifying periarthritis, even if the lesions are present for a long time.

4. Conclusion
We have reported a case of complete resolution of acute calcifying periarthritis of the fifth finger. Acute calcific periarthritis of the
Figure 5. Plain (A) anteroposterior and (B) lateral radiographs taken 6 months after the initial presentation to our hospital, showing complete disappearance of the calcifying lesion around the proximal interphalangeal joint.

Table 1

| Authors               | Publication   | No. of cases | Age (yrs)/sex | No. of digits | Side | Finger | Joint |
|-----------------------|---------------|--------------|---------------|---------------|------|--------|-------|
| Carroll RE et al[27]  | 1955          | 16/100       | Unknown       | 16            | 16   | Unknown| IP: 3, DIP: 5, PIP: 8, 2nd DIP: 4, 3rd DIP: 1, PIP: 1, 4th DIP: 2 PIP: 2, 5th PIP: 1 |
| Martin JF & Brogdon B[19] | 1957     | 3            | 35/F          | 1             | 1    | Right  | IP    |
| Martin JF & Brogdon B[19] | 1957     | 3            | 41/F          | 1             | 1    | Left   | PIP   |
| Martin JF & Brogdon B[19] | 1957     | 3            | 79/F          | 1             | 1    | Right  | 4th   |
| Carroll RE et al[27]  | 1955          | 16/100       | Unknown       | 16            | 16   | Left: 1, unknown: 15 | 3rd: 1, unknown: 15, PIP: 1, unknown: 15 |
| Swannell AJ et al[20] | 1970          | 2            | 33/F          | 1             | 1    | Right  | IP    |
| Swannell AJ et al[20] | 1970          | 2            | 20/F          | 1             | 1    | Right  | PIP   |
| Swannell AJ et al[20] | 1970          | 2            | 20/F          | 1             | 2    | Right  | 4th   |
| Watson FM & Purvis J[21] | 1980    | 1            | 31/M          | 1             | 1    | Right  | 3rd   |
| Gravanis MB & Gaffney E[22] | 1983    | 1            | 28/F          | 1             | 1    | Left   | PIP   |
| Baguley E & Graham E[23] | 1988    | 1            | 34/F          | 2             | 4    | Right  | 3rd, 4th |
| Daniel WW et al[24]  | 1989          | 2            | 24/M          | 1             | 1    | Unknown| 5th   |
| McCarthy GM et al[29] | 1993          | 1            | 33/F          | 1             | 1    | Left   | IP    |
| McCarthy GM et al[29] | 1993          | 1            | 33/F          | 1             | 1    | Left   | PIP   |
| McCarthy GM et al[29] | 1993          | 1            | 40/F          | 1             | 1    | Unknown| 5th   |
| Galvez J et al[28]   | 1995          | 2            | 32/F          | 1             | 1    | Right  | 1st   |
| Galvez J et al[28]   | 1995          | 2            | 19/F          | 3             | 5    | Right  | 2nd (DIP, PIP), 3rd (DIP, PIP), 4th (PIP) | 3rd (DIP, PIP), 4th (PIP) |

(continued)
digits is sometimes misdiagnosed due to its rarity and its broad list of differential diagnoses. However, acute calcifying periarthritis of the digits can be diagnosed on the basis of history, clinical examination, and imaging findings, even if the lesions are present for a long time. Watchful observation is an appropriate treatment strategy for acute calcifying periarthritis.

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Author contributions

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References

[1] Moyer RA, Bush DC, Harrington TM. Acute calcific tendinitis of the hand and wrist: a report of 12 cases and a review of the literature. J Rheumatol 1989;16:198–202.
[2] Moradi A, Kachooe AR, Mudgetal CS. Acute calcium deposits in the hand and wrist. J Hand Surg Am 2014;39:1834–7.
[3] Ali SN, Kelly JL. Acute calcific tendinitis of the finger—a case report. Hand Surg 2004;9:105–7.
[4] Aguirre P, Berto I. Acute calcific periarthritis in proximal interphalangeal joint: an unusual cause of acute finger pain. Reumatol Clin 2017;13:144–5.
[5] Arandas Fde S, Santos FA, de Souza SP, et al. Acute calcific periarthritis of the hand. J Clin Rheumatol 2005;11:223–4.
[6] Doumas C, Vazirani RM, Clifford PD, et al. Acute calcific periarthritis of the hand and wrist: a series and review of the literature. Emerg Radiol 2007;14:199–203.
[7] Friedsmn SN, Margau R, Friedman L. Acute calcific periarthritis of the thumb: correlated sonographic and radiographic findings. Radiol Case Rep 2018;13:205–7.
[8] Hakozaki M, Iwabuchi M, Konno S, et al. Acute calcific tendinitis of the thumb in a child: a case report. Clin Rheumatol 2007;26:841–4.
[9] Kim JK, Park ES. Acute calcium deposits in the hand and wrist; comparison of acute calcium peritendinitis and acute calcium periarticular periarthritis. J Hand Surg Eur Vol 2014;39:436–9.
[10] Lee KR, Song KJ, Kwak HS, et al. Acute calcific periarthritis of proximal interphalangeal joint in a professional golfer’s hand. J Korean Med Sci 2004;19:904–6.
[11] Yusopovitch G, Yusopovitch Z. Acute calcific periarthritis of the hand and elbows in women. A study and review of the literature. J Rheumatol 1993;20:1533–8.
[12] Shields JS, Chhabra AB, Pannunzio ME. Acute calcific tendinitis of the fingers: 2 case reports involving the abductor pollicis brevis. Am J Orthop (Belle Mead NJ) 2007;36:605–7.
[13] Walocko FM, Sando IC, Haase SC, et al. Acute calcific tendinitis of the index finger in a child. Hand (N Y) 2017;12:284–7.
[14] Shaw JA. Acute calcific tendinitis in the hand. Orthop Rev 1986;15:482–5.
[15] Reifsnyder JW. Acute calcific periarthritis of the hand: a case report in an active duty soldier. Mil Med 2019;184:e587–9.
[16] Schneider D, Hirsch M. Acute calcific tendinitis of dorsal intersseous muscles of the hand: uncommon site of a frequent disease. Reumatismo 2017;69:43–6.
[17] Saleh WR, Yajima H, Nakanishi A. Acute carpal tunnel syndrome secondary to calcific tendinitis: case report. Hand Surg 2008;13:197–200.
[18] Galvez J, Linares LF, Villalon M, et al. Acute calcific periarthritis of the fingers. Rev Rhum Engl Ed 1995;62:602–4.
[19] Martin JF, Purvis JM. Acute calcareous deposits of the hand and wrist. South Med J 1980;73:150–1.
[20] Watson FM, Purvis JM. Acute calcareous deposits of the hand and wrist. South Med J 1980;73:150–1.
[21] Saleh WR, Yajima H, Nakanishi A. Acute carpal tunnel syndrome secondary to calcific tendinitis: case report. Hand Surg 2008;13:197–200.
[22] Galvez J, Linares LF, Villalon M, et al. Acute calcific periarthritis of the fingers. Rev Rhum Engl Ed 1995;62:602–4.
[23] Martin JF, Purvis JM. Acute calcareous deposits of the hand and wrist. South Med J 1980;73:150–1.
[24] Gravanis MB, Gaffney EF. Idiopathic calcifying tenosynovitis. Histopathologic features and possible pathogenesis. Am J Surg Pathol 1983;7:337–61.
[25] Baguley E, Grahame R. Recurrent calcific periarthritis leading to erosive osteoarthritis. Br J Rheumatol 1988;27:490–2.
[26] Daniel WW. Acute peritendinitis calcarea. Arthritis Rheum 1989;32:767–9.
[27] Kim J, Bae KJ, Lee DW, et al. Effective period of conservative treatment in patients with acute calcific periarthritis of the hand. J Orthop Surg Res 2018;13:287.
[28] Sandstrom C. Periarticular calcium: a common disease of middle life. Its diagnosis, pathology and treatment. Am J Roentgenol 1938;40:1–21.
[29] Carroll RE, Sinton W, Garcia A. Acute calcium deposits in the hand. J Am Med Assoc 1955;157:422–6.
[30] Yelton CL, Dickey LE. Calcium deposits in the hand and wrist. South Med J 1958;51:899–95.
[31] McCarthy GM, Carrera GF, Ryan LM. Acute calcific periarthritis of the finger joints: a syndrome of women. J Rheumatol 1993;20:1077–80.
[32] Nikici V, Doumas C. Calcium deposits in the hand and wrist. J Am Acad Orthop Surg 2015;23:87–94.
[33] Mooeavi CA, Al-Nahar LA, Murphy MD, et al. Fibroosseous pseudotumor of the digit: a clinicopathologic study of 43 new cases. Ann Diagn Pathol 2008;12:21–8.
[32] Kransdorf MJ, Meis JM. From the archives of the AFIP. Extraskeletal osseous and cartilaginous tumors of the extremities. Radiographics 1993;13:853–84.

[33] de Silva MV, Reid R. Myositis ossificans and fibroosseous pseudotumor of digits: a clinicopathological review of 64 cases with emphasis on diagnostic pitfalls. Int J Surg Pathol 2003;11:187–95.

[34] Skater J, Mullins D, Chun K, et al. Fibro-osseous pseudotumor of the digit: a comparison to myositis ossificans by light microscopy and immunohistochemical methods. J Cutan Pathol 1996;23:373–7.

[35] Dorfman HD, Czerniak B. Reactive, and metabolic conditions simulating neoplasms of bone. Bone tumors St Louis: Mosby Inc; 1998;1120-94.

[36] Dhondt E, Oudenhoven L, Khan S, et al. Nora’s lesion, a distinct radiological entity? Skeletal Radiol 2006;35:497–502.

[37] Vinson EN, Desai SV, Reddy S, et al. AJR teaching file: periarticular calcifications in two patients with acute hand pain. AJR Am J Roentgenol 2010;195(Suppl 6):S76–9.

[38] Calisir C, Kocman AE, Oztunali C, et al. Imaging findings of an extradigital fibro-osseous pseudotumor. Jpn J Radiol 2014;32:613–7.

[39] Jelinek J, Kransdorf MJ. MR imaging of soft-tissue masses. Mass-like lesions that simulate neoplasms. Magn Reson Imaging Clin N Am 1995;3:727–41.

[40] Greene TL, Louis DS. Calcifying tendinitis in the hand. Ann Emerg Med 1980;9:438–40.

[41] Ulthoff HK. Calcifying tendinitis, an active cell-mediated calcification. Virchows Arch A Pathol Anat Histol 1975;366:31–8.

[42] Carcia CR, Scibek JS. Causation and management of calcific tendonitis and periarthritis. Curr Opin Rheumatol 2013;25:204–9.