Case Report
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Hemarthrosis: Concurrent acute presentation of pyrophosphate dehydrate and uric acid crystals in an elderly patient with a history of rheumatoid arthritis diagnosed with septic arthritis

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Concomitant septic arthritis in the presence of crystalline disease is a rare presentation of acute hemarthrosis and knee pain. Literature review showed that co-occurrence of these entities is an infrequent phenomenon but it needs to be acknowledged that these studies are few in number and were done on small patient population. This case challenges the notion that presence of crystals in the synovial fluid rules out septic arthritis even in the setting of low synovial WBC count. Additionally, the presence of pseudogout in patients suffering from gout is a rare entity as well. These findings in literature are described in case reports dispersed over the past three decades. We present a case where concurrent treatment of gout, pseudogout, and septic arthritis in a patient who presented with acute hemarhtrosis.

Keywords: gout, pseudogout, rheumatoid arthritis, infection

Introduction

Age related crystal induced arthropathies are a common phenomenon presenting to the primary care office or the emergency department [1,2]. The two most common pathologies that are encountered are pseudogout (Calcium Pyrophosphate Deposition Disease - CPPD) and gout. Gout classically presents with podagra and/or severe pain involving the joints of the upper digits. With poor management of the disease, it can progress to multi-joint involvement and subcutaneous depositions known as tophi. CPPD on the other hand involves the knee joints at the onset with later progression to other areas. The management of these entities include acute pain control, chronic suppressive therapy, and avoiding dietary and/or social triggers. The concurrent presentation of these diseases can affect chronic management and lead to increased patient discomfort. However, the co-occurrence of these entities are rare [2,3].

Patients suffering from rheumatoid arthritis usually require long term steroid and possible immunosuppressive therapy. This leads to increased susceptibility towards life threatening or limb endangering infections [1]. Vigilance is needed to have a low threshold for ruling out septic arthritis in this patient population. This is usually done via synovial fluid analysis but as demonstrated in this case report, it does not necessarily provide a clear answer to the problem, especially in patients with multiple comorbidities. Even if the diagnosis is not clear, appropriate antibiotic therapy is necessary if suspicion remains. Physicians should use their clinical judgment based on patient presentation in order to arrive at proper diagnosis and initiate appropriate care plan.

Case Presentation

62-year-old Caucasian male with a history of gout (currently on allopurinol and colchicine), rheumatoid arthritis (on chronic methotrexate suppression therapy), multiple arthroplasties in the span of last 30 years due to complications of osteoarthritis presented to the ED with acute onset right knee pain and swelling status post exiting his vehicle. He did not endorse popping sensation or pain at that time but reported worsening pain within four to five hours with subjective fevers and chills. Patient was

in moderate distress due to pain in the emergency department and had limited mobility in his right leg as well. Patient was hemodynamically stable except for elevated blood pressure of 190/95 and low grade fever of 38.00 C, which at the time was attributed to severity of the pain.

Physical exam was remarkable for tenderness to palpation of the affected knee, significant swelling of the right knee with negative anterior or posterior drawer test. Initial labs showed elevated white blood cell count of 11,000 causing concern for possible septic arthritis, which led to the ED staff to perform arthrocentesis of the affected joint. Forty milliliters of serosanguineous fluid was extracted. Fluid profile showed 40,149 WBC and crystals. Patient noted partial relief from pain. Of note, coagulation studies were unremarkable but there was a mild elevation in CRP. Broad-spectrum antibiotics were initiated due to equivocal fluid analysis and patient presentation. Within the next two hours, return of erythema and swelling was noted on the affected knee. Hydromorphone PCA was initiated for the patient. MRI and x-ray was unchanged from previous studies done 5 years ago, which showed osteopenia, chondrocalcinosis and severe cartilage loss on the patella (Figure 1).

Following day, another arthrocentesis was performed by orthopedic surgery. Fluid showed serosanguineous profile as well. Analysis showed 17,420 WBC, 17% hematocrit, monosodium urate, and pyrophosphate dehydrate crystals. No bacterial, fungal elements, or AFB were seen in the initial culture analysis but cultures three days later showed *S.aureus* that was resistant to methicillin. Patient was started on naproxen 500 mg twice daily for acute gout flare, 1.2 mg of colchicine initially then reduced to 0.6 mg daily. Broad spectrum antibiotic coverage was continued for the next three days and was switched to oral treatment regimen for fourteen days at the time of discharge. Patient noted significant relief two days later and was able to ambulate.

Discussion

Simultaneous presentations of pseudogout, gout with concomitant septic arthritis have been described in handful of case reports in patients suffering from chronic arthritic disease [2,3]. There have been handful reports describing these diseases occurring together in the last three decades. According to Stockman et al, 5.8% of patients (8/138) who suffered from gout had concomitant pseudogout [10]. Imaging findings show concomitant erosions and chondrocalcinosis associated with both types of crystalline disease, which is rarely seen on conventional imaging (Figure 2).

Diagnosis in this patient was relatively straightforward since both of the crystalline diseases were identified under synovial fluid analysis using careful polarized light microscopy. Furthermore, it is important to rule out serious pathology such aseptic arthritis by obtaining synovial fluid culture before starting treatment [6]. Our patient has a history of RA, which according to some studies indicate 15 times increased risk of septic arthritis, especially given the current disease-modifying anti-rheumatic drug (DMARD) therapy [1,4]. Given the patient had an elevated white count with mono-articular presentation, septic arthritis was higher on the differential versus crystal deposition dis-

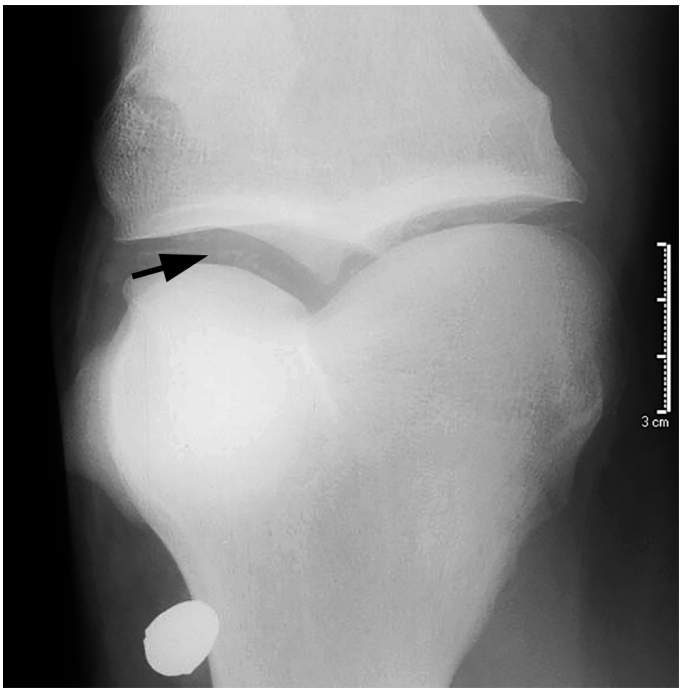

Figure 1.
Knee X-ray performed in the emergency department shows chondrocalcinosis (arrow) suggestive of severe long standing pseudogout as well as severe cartilage loss consistent with patient's history.

Figure 2.
Rare radiological coexistence of CPPD and gout in a patient with poor management of underlying disease. Classic punched-out lesions (black arrow) are seen with interspersed joint space chondrocalcinosis (white arrow).

ease. Nevertheless, synovial fluid analysis revealed the causative bacterial organism and the treatment was initiated accordingly.

This patient had extensive history of osteoarthritis with surgical interventions dating back to his early 20's as well as history of RA. Thus it would not be unusual for this patient to present with hemarthrosis after a minor trauma causing ACL or PCL tear [9]. This was ruled out from MRI even though it was of limited value due to patient's inability to fully comply due to pain. Hemarthrosis due to RA is not unusual, and was considered here as it was observed that a patient had a significant increase in synovial WBC's [9]. Conversely, RA induced flare usually have WBC count of above 50,000 with significantly elevated CRP and ESR. This patient's CRP level was not impressive at the time of presentation and marker levels decreased as expected with the initiation of therapy. It is also unusual to have an acute RA flare from minor trauma in a patient who has been compliant with therapy.

Spontaneous hemarthrosis of the knee should also raise suspicion for possible hemophilia but negative past history, family history, age of presentation and normal coagulation studies makes this unlikely at this stage. Regardless of etiology, proper acquisition and interpretation of synovial fluid is paramount for proper diagnosis and treatment of acute monoarthritis with presumed concomitant septic arthritis [5,6,10]. Shah et al showed that presence of either urate or CPPD crystals does not exclude septic arthritis with certainty. Their patient database showed 4/267 (1.5%) of their patients with the similar diagnosis [8]. Of note, all 4 patients had elevated WBC count above 50,000. Nevertheless, in a series patients followed by Weng et al, they found synovial count varying from 11,610 to 85,000 with the mean value of 44,102±30,306 [8].

Treatment of simultaneous gout and pseudogout utilize same treatment regimen. Colchicine 1.2mg BID initially the first day and 0.6 mg BID thereafter is initiated with high dose twice daily NSAID (naproxen or indomethacin) [1]. However, in this case, due to suspicion of septic arthritis, the infectious disease team was consulted. Upon discussion of this case, the patient was started on broad spectrum antibiotic coverage as consequences for adverse outcomes would be significant. The regimen should be tailored to synovial fluid culture results.

Additionally, due to significant discomfort induced by the crystalline deposition, proper analgesic treatment with opioids may be necessary depending on the patient's pain tolerance levels [7]. If the patient does not show rapid improvement or is unable to ambulate, corticosteroid injection can also be implemented but septic arthritis needs to be ruled out prior to initiation. This was not the case with our patient as he was able to walk around using crutches within 48 hours of treatment initiation.

Conclusion

It is important to emphasize that upmost attention is needed when evaluating patients for septic arthritis with acute knee swelling. This is especially true in patients with history of rheumatoid arthritis treated with immunomodulatory drug regimens. In these patients, presence of crystals in the synovial fluid does not rule out septic arthritis. Correlating clinical and laboratory patient presentation can aid in rapid initiation of treatment.

References

1. Al-Ahaideb A. Septic arthritis in patients with rheumatoid arthritis. J Orthop Surg. 2008 Jul 29;3:33.
2. Alappatt C, Clayburne G, Schumacher R. Concomitant polyarticular septic and gouty arthritis. The Journal of rheumatology. 2006;33(8):1707–1708.
3. De Bari C, Lapadula G, Cantatore FP. Coexisting psoriatic arthritis, gout, and chondrocalcinosis. Scand J Rheumatol. 1998;27(4):306–309.
4. Galloway JB, Hyrich KL, Mercer LK, Dixon WG, Ustianowski AP, Helbert M, Watson KD, Lunt M, Symmons DPM. Risk of septic arthritis in patients with rheumatoid arthritis and the effect of anti-TNF therapy: results from the British Society for Rheumatology Biologics Register. Ann Rheum Dis. 2011 Oct 1;70(10):1810–1814.
5. Margaretten ME, Kohlwes J, Moore D, Bent S. Does this adult patient have septic arthritis? Jama. 2007;297(13):1478–1488.
6. Shah K, Spear J, Nathanson LA, McCauley J, Edlow JA. Does the presence of crystal arthritis rule out septic arthritis? J Emerg Med. 2007 Jan;32(1):23–26.
7. Tejera B, Riveros A, Martínez-Morillo M, Caíellas J. Septic Arthritis Associated to Gout and Pseudogout: The Importance of Arthrocenthesis. Reumatología Clínica (English Edition). 2014 Jan;10(1):61–62.
8. Weng CT, Liu MF, Lin LH, Weng MY, Lee NY, Wu AB, Huang KY, Lee JW, Wang CR, others. Rare coexistence of gouty and septic arthritis: a report of 14 cases. Clin Exp Rheumatol. 2009;27(6):902–6.
9. Abe E, Arai M. Synovial fluid ferritin in traumatic hemarthrosis, rheumatoid arthritis and osteoarthritis. Tohoku J Exp Med. 1992 Nov;168(3):499–505.
10. Stockman A, Darlington LG, Scott JT. Frequency of chondrocalcinosis of the knees and avascular necrosis of the femoral heads in gout: a controlled study. Ann Rheum Dis. 1980 Feb;39(1):7–11.