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Spinal gout without spinal symptom in a junior school student: a case report

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ABSTRACT

Study Design: Case report

Objectives: We report a case of a 16-year-old boy with intermittent and migratory polyarthralgia, who made a diagnostic dilemma.

Summary of Background Data: Spinal involvement without spinal symptom in gout seems to be rare. However, the relationship of spinal gout to symptoms is poorlyunderstood.

Methods: Description of the case report.

Results: Laboratory findings can't explain his symptoms, however, a computed tomography of the pelvis revealed the presence of space-occupying lesion involving the left side of spine at L5-S1level, and the later biopsy revealed that was a urate crystal, which help us make the diagnosis of spinal gout.

Conclusions: Gout can be a cunning disease which has various manifestations, and spinal involvement can be asymptomatic.

Key Words: Albuminuria; Asymptomaticurate deposition; Gout; GSDI;Hyperuricemia; Kelley-Seegmiller syndrome; Metabolic syndrome;Partial HPRT deficiency ; Polyarthralgia; Spine; Spinal gout

Level of Evidence:4

1. INTRODUCTION

Spinal gout used to be recognized as a rare manifestation of gout, but recently, an accruing series of cases has been reported. In a review of Toprover *et al* [1], a total of 131 published spinal gout cases were found by 2015. Similarly, a study of De Mello *et al* [2] found that 12 of 42 gout patients (29%) had computed tomography (CT) evidence of spinal gout. So the actual prevalence of spinal gout is likely to be a greater degree than previously thought, and Zheng *et al* [3] suggested that to avoid progressing to devastating neurologic deficits necessitating surgery, a differential diagnosis with spinal gout when dealing with patients with gout and spinal pain was needed.

We report a unique case of spinal gout with intermittent and migratory polyarthralgia, in which spinal symptoms or typical gout manifestations were absent.

2. CASE REPORT

A 16-year-old boy of Han nationality was admitted to our hospital because of intermittent and migratory polyarthralgia with local warmth and swelling of 14 weeks' duration, concomitant with low-grade fever. There was no chill, no morning stiffness, and no back pain or pain radiating down the lower limbs. A physical examination revealed nothing other than overweight (Body Mass Index =31.5 kg/m^2). Additionally, no neurologic disorder or positive familial history was found.

The patient had reportedly been in normal health, with the exception of a history of first metatarsophalangeal joint pain and swelling before, which occurred about 2 years ago, given a football playing at the day before and a normal level of serum uric acid (SUA), trauma was considered.

Until 14 weeks earlier without any inducement when his bilateral knees, ankles, elbows, wrists, metacarpophalangeal and interphalangeal joints began to experience pain, swelling and warmth, concomitant with low-grade fever, not above 37.5 centigrade. The involved joints presented with mild, migratory and healing spontaneously within 1-2 days.

He went to a community hospital for diagnosis and treatment. Laboratory tests including rheumatoid factors (RF), creatinine (Cr), blood urea nitrogen (BUN), C-reactive protein (CRP), antistreptolysin O, blood glucose and lipids were all normal, except for elevated levels of white blood cell count (WBC) of 13,000/mm^3 with 87% neutrophils, and high-normal SUA of 412μmol/L [normal range (N) 223–416]. No positive diagnosis was made, and treatment was symptomatic with Qufengzhitong Capsule (a compound preparation of Chinese herbs). All symptoms reported were relieved within about one week.

4 weeks before presentation, the symptoms mentioned above arose again, and this time he came to our clinic. This time his laboratory findings were significant for an elevated CRP 77.7mg/L (N <5); complement C3, 2.53g/L (N 0.9-1.8); complement C4, 0.87g/L (N 0.1-0.4). In addition, the full blood count, anti-cyclic citrullinated peptide (anti-CCP), antiperinuclear factor (APF), antikeratin antibody(AKA), antinuclear antibodies (ANA), IgA, IgM, IgG, IgE, and human leukocyte antigen (HLA)-B27, were all in normal range.

Considering the symptoms of pain and swelling in multiple peripheral joints, and negative in RF or anti-CCP, juvenile ankylosing spondylitis was suspected. Then a CT scanning of the pelvis was performed, and it revealed the presence of space-occupying lesion involving the left side of the spine at

L5-S1level, and erosive changes in the right sacroiliac joint (Fig.1 A and B). The patient then chose an orthopaedic hospital for further examination, and a magnetic resonance imaging with contrast enhancement (CEMR) scan of the pelvis revealed a soft tissue mass with a ring-enhanced in the left transverse process of L5 vertebral and combined with bone erosion there (Fig.2), and schwannomas was considered. However, the later biopsy revealed that was a urate crystal.

Again, the patient came to our hospital, and was admitted as an inpatient. His blood pressure was 130/85mmHg. The laboratory findings showed WBC 15,000/mm^3 with 85% neutrophils; total cholesterol 5.92 mmol/L (N<5.2); triglycerides 2.7 mmol/L (N<1.7); Low-density lipoprotein cholesterol 3.5 mmol/L (N<3.12); SUA 804μmol/L (N 223–416); 24h urate excretion 4861μmol/24h (N 1500-4400); proteinuria was positive with "++" in urinalysis; 24h urinary protein 2.87g/24h (N <0.14); estimated glomerular filtration rate (eGFR) 57.97mL/min/1.73m^2 (N >90); Cr and BUN were still in normal rang; CRP 7.3 mg/L (N <5); erythrocyte sedimentation rate 25mm/h (N <20). In addition, the texts of human immunodeficiency virus, hepatitis, and tuberculosis were all negative. Color doppler ultrasound examination of liver, spleen and kidneys didn't indicate any abnormal changes. Dual-energy CT was also used to confirm the urate crystal in spine. Finally, the diagnosis of spinal gout was made.

A non-steroidal anti-inflammatory drug and febuxosta were prescribed, and he was discharged as his clinical symptoms were markedly improved within one week. He was followed up in our out-patient clinic with urate lowering therapy over the next 6 months; he remained well, with no new arthritis or spinal symptom. We encouraged him to adhere to the urate lowering therapy, and expected him to

review with CT one year later. Besides, his renal function was monitored as well, and a healthy diet/lifestyle was recommended.

3. Discussion

Gout is an inflammatory arthritis triggered by the deposition of monosodium urate crystal, which forms in the presence of increased SUA concentrations. And factors controlling crystal formation are poorly understood, apart from the elevated SUA concentration, features as pH, temperature, salt concentration, cartilage matrix components may also contribute to the process [4].

The exact aetiology of crystal accumulation in the spine is also unknown. Maybe the degenerative disease of the spine, necrosis of the tissues, previous injuries or spinal osteoarthritis should be counted [3]. Volkov *et al* [5] suggested that poor vascularization in the axial skeleton creating an optimal environment for crystal formation, combined with a patient's hyperlipidemic state, obese body habitus and minimal physical activity, together with the small caliber vasculature, leading to inability to adequately filter the uric acid load deposited there, eventually triggers the process of crystal formation. The explanation seems fitting for our case, given the existence of overweight with hyperlipidemia, and little physical activity, which commonly occurs with senior school student under heavy schoolwork.

The clinical manifestations of spinal gout range from asymptomatic radiographic lesions [6] to back pain or paraparesis [7], even encephalopathy perhaps [8]. Toprover *et al* [1] found that among the 130 previously reported cases of spinal gout, back pain was the most common symptom, present in 89 (68.5 %) cases, and neurological symptoms present in 85 (65.4 %) cases was the second complaint.

Furthermore, another 2 cases were diagnosed incidentally on autopsy, while the spinal symptoms were absent when the patients were alive. Both of the cases were middle-aged men with poorly controlled gout for several years, combining with hypertension and died of renal failure at last [9, 10]. Except for spinal involvement, urate crystal could be found in some peripheral joints as well. One of them even had severe deforming arthritis and obvious subcutaneous urate deposition because of 32-year chronic gout.

To the best of our knowledge, our patient would be the third case which had no spinal symptom but was diagnosed by biopsy. However, different from the previous 2 cases, our patient was a young boy with intermittent and migratory polyarthralgia for 14 weeks' duration, and no joint deformation or subcutaneous urate deposition had emerged at this stage.

Asymptomatic spinal gout seems to be rare, but some studies [2, 10] indicated that there was no correlation between symptoms (pain or neurological syndromes) and spinal gout. Maybe it is just missed because of the absence of a CT scan as no spinal symptom show up there.

Intermittent, mild polyarthralgia healing spontaneously within 1-2 days and negative in the test of RF and Anti-CCP can be seen in palindromic rheumatism (PR). But before the diagnosis of PR can be made, other arthritides such as rheumatoid arthritis, systemic lupus erythematosus, or gout should be excluded [11]. Many tests for the diagnosis and antidiastole had been done, and fortunately, a CT scan of pelvis gave us a hint.

The pain and swelling of our patient were mild and presented in multiple peripheral joints, which were different from a typical acute episode of gouty arthropathy. Acute polyarticular gout has been reported previously [12]. It seems to occur more frequently in elderly patients or those who with poorly controlled gout [13].The onset of polyarthritis can be simultaneous or sequential, concomitant with fever occasionally, acute with a systemic inflammatory response syndromes [12], or subacute with less inflammatory symptoms [13]. Atypical symptoms always make a dilemma to diagnosis; especially in our case, this 16-year-old boy had a normal SUA level at his first visit, without any definite history of gout.

Normal SUA level in spinal gout had been seen in case reports before [14]. It is recognized that SUA can fall into the normal range during the acute episode of gout in almost 32% of the patients [4]. Some studies suggested that this phenomenon related to the increased urinary excretion of UA, and some inflammatory factors such as IL-6 might play a role in it [15]. Our patient's test of SUA was normal at his first visit, but elevated almost twice after the biopsy. What caused such a big difference? The function of UA excretion was still normal according to laboratory findings. Thus we speculated that it might be the biopsy itself, which might break the original structure of the urate crystal and induce its disintegration, increasing the UA level in blood and urine as a result. And the first text of SUA might not sufficiently represent his uric acid pool.

What caused the development of hyperuricemia (HUA) and gout at such a young age?

Autosomal dominant tubulointerstitial kidney disease (ADTKD) should be suspected when encounter a patient with an early-onset HUA and gout [16]. Fractional urate excretion is usually decreased (<5%) in uromodulin associated ADTKD, consequential HUA and gout in an early age. A

positive familial history of kidney disease would be found in typical case. However, the urate excretion function of our patient seemed to be normal as the test of urate excretion was 4861μmol/24h, high above the normal range, and the fractional urate excretion was 7.3%. It was more likely that SUA overproduction rather than dysfunction of urate excretion was to blame for his HUA. He also denied familial history of kidney disease. So alternative diagnoses should be considered, and no further test like renal histological examination or genetic testing for ADTKD was performed.

Hypoxanthine-guanine phosphoribosyltransferase (HPRT) deficiency can cause HUA and hyperuricosuria, accompanied by severe neurologic disorder such as choreoathetosis, mental retardation, and self-injurious behavior [17]. In some case reports [18] the neurologic disorder would be mild or even absent and presented with gout only as initial appearance in young people, which was named "partial HPRT deficiency" or "Kelley-Seegmiller syndrome". Suggestive clinical symptoms, tests of HPRT activity, adenine phosphoribosyltransferase activity and purine catabolism would be helpful to diagnosis [17]. Regrettably, we had no equipment to perform these tests. Although partial HPRT deficiency should be considered in this patient, the evidence of it was not strong enough.

Glycogen Storage Disease type I (GSDI) is associated with HUA and hyperlipidemia in early age, presents as hepatomegaly and renomegaly because of genetically determined errors of glycogen metabolism consequential accumulation of glycogen and fat in the liver and kidneys. Furthermore, gout, renal disease, poor growth and delayed puberty would be the longterm complications of untreated GSDI [19]. However, no hepatomegaly and renomegaly was found in our patient, moreover, he had gone through a healthy childhood followed with a normal onset of puberty, with a stature of 178cm as a healthy young man at this moment. So GSDI can be ruled out.

Metabolic Syndrome (MetS) is also associated with HUA and gout. With the underlying risk factors like obesity, hyperlipidemia and elevation in blood pressure of our patient, MetS was highly suspected. He is the only child in his family, and has doting parents, so that no housework was required for him. Diet rich in fat and sugar, like fried chicken and soft drinks were those he liked best. As a senior school student under heavy schoolwork, physical activity was absolutely deficient. So the unhealthy diet/lifestyle which might result in MetS, should take a big responsibility for the HUA and gout.

We also considered that it might be that his high SUA level was to blame for albuminuria and decline in eGFR. Takae *et al* [20] found that the higher SUA level was a significant risk factor for developing renal insufficiency and albuminuria. And depending on the existing research, a study [21] concluded that HUA could cause glomerular sclerosis and renal arteriolar damage through activating the renin-angiotensin-aldosterone system (RAAS) or inflammation reaction. HUA is also associated with a greater risk of kidney stones, which could damage the renal function as well. But the color doppler ultrasound didn't find stones in our patient's kidney.

4. CONCLUSION

In summary, gout has been widely recognized today, but it is still a cunning disease with various manifestations. Spinal involvement seems to be rare, but its exact incidence and prevalence might be underestimated, because crystal accumulation in spine can be asymptomatic. Tests of albuminuria and eGFR should be performed for a gout patient with HUA to evaluate renal function comprehensively.

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Fig.1 Computed tomography of the pelvis revealed the presence of space-occupying lesion involving the left side of spine at L5-S1level (A), and erosive changes in the right sacroiliac joint (B).

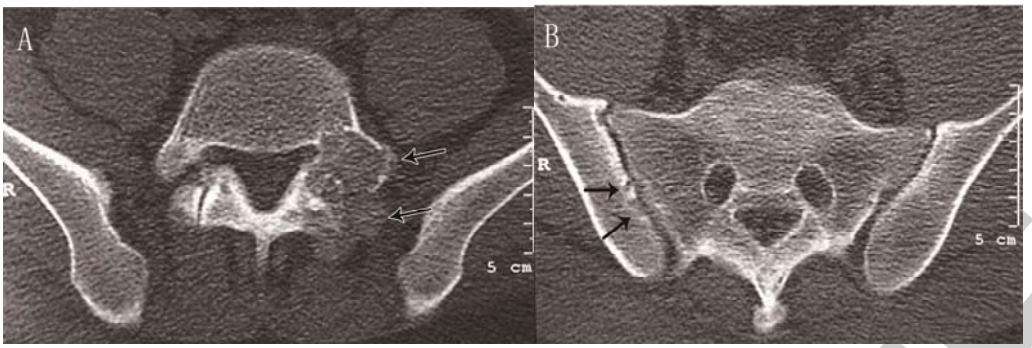

Fig.2 Contrast enhancement scan of the pelvis revealed a soft tissue mass with a ring-enhanced in the left transverse process of L5 vertebral and combined with bone erosion there.