Differential diagnosis of gout and tenosynovial giant cell tumor, a case report

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Gout is the most common inflammatory joint disease, related to microcrystalline arthritis. With improper or inadequate treatment, gout can lead to disability.

A patient with a misdiagnosis of tophaceous gout is described in whom a differential diagnosis with a neoplasm was performed. As a result of the additional examination, a giant cell tenosynovial tumor of the second finger of the right hand was discovered.

Keywords: *uric acid; hyperuricemia; tophus; arthritis; synovial giant cell tumor.*
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Gout is a systemic tophaceous disease characterized by deposition of sodium monurate (SMU) crystals in various tissues and development of inflammation due to hyperuricemia (HU), which is influenced by environmental and/or genetic factors [1]. Tophi are most commonly located in the small joints of the hands and feet, the olecranon, and the auricle. However, rare cases of tophaceous involvement of the thoracic spine have also been described by domestic authors [2]. The primary cause of gout is persistent chronic HU, leading to the deposition of SMU crystals in various organs and tissues. In 70–90% of cases, the disease begins with the involvement of the first metatarsophalangeal joint [3, 4], but increasingly atypical arthritis localization is being observed, such as the ankles, knee joints, and the joints of the arch of the foot, and hands (mainly in women), which may be characteristic of the later stages of the disease [5].

Interest in the study of microcrystalline arthritides is steadily growing due to their high prevalence. It is estimated that 1–3% of the population suffers from gout, with most patients being men over 45 years of age [3]. The significant prevalence of this pathology in recent decades is largely linked to rapid economic development, high socio-economic status, and lifestyle changes, such as physical inactivity, increased rates of overweight and obesity, and poor dietary habits, with a greater consumption of purine-rich foods [6, 7].

The main principle of gout treatment is the use of urate-lowering therapy to achieve and maintain a target serum uric acid (UA) level (<360 μmol/L in all patients and <300 μmol/L in those with tophi and chronic arthritis), prevent attacks of acute gouty arthritis, dissolve existing tophi, and prevent the formation of new ones [8, 9].

Errors in diagnosis of this disease are common. Some specialists view gout as episodic acute joint inflammation, while others interpret the diagnosis as isolated HU without episodes of acute arthritis or evidence of SMU crystal deposition, which leads to overdiagnosis of the condition [10]. However, even with the correct diagnosis, only a small number of patients adhere to the prescribed therapy. In most cases, rheumatologists face challenges such as reluctance to titrate the dose further, adverse reactions (AR) to medications, and exacerbation of gouty arthritis during the initial stages of urate-lowering therapy. For example, in France, the target UA level was achieved in only 25% of gout patients [11], and in the USA, in one-third of patients [12]. This leads to the development of advanced-stage gout with multiple tophi, resulting in disability.

In clinical practice, diagnosing gout is often difficult, particularly when it is necessary to confirm the presence of SMU in tissues, especially with atypical localization of acute gouty arthritis. The "gold standard" for the diagnosis is the detection of SMU crystals in the synovial fluid or tophi using polarized light microscopy [13]. However, this method is not always available in medical facilities. Other modern imaging techniques for visualizing SMU deposits in the musculoskeletal system include ultrasound and dual-energy computed tomography [14]. These diagnostic methods are accessible, non-invasive, and allow identification of SMU crystal deposition [15, 16].

Here, we present a case of a patient who presented for an initial outpatient consultation with a rheumatologist with suspicion of tophus in the hand joint.

Patient K.*, 72 years old, visited the "Clinical Diagnostic Center" in Khabarovsk in the spring of 2023 for a consultation with a rheumatologist due to a painless, whitish nodule in the area of the distal interphalangeal joint of the second finger of the right hand.*

Medical history: About a year ago (in 2022), the patient noticed a small painless nodule with no change in the skin color in the area of the specified joint. She did not seek medical help and did not self-medicate. Over the year, the nodule increased in size, prompting the patient to visit her local physician. Upon further examination, the general blood test showed no abnormalities, the ESR was 2.0 mm/h (normal up to 15 mm/h), and the biochemical blood test revealed an increased uric acid level of 464 μmol/L (normal up to 360 μmol/L). Other markers, including CRP and rheumatoid factor, were within the normal range. X-ray of the hands showed signs of osteoarthritis of the second stage in the hand joints. Based on the presence of a nodule resembling a tophus and hyperuricemia, the physician diagnosed chronic gout, tophaceous form, and referred the patient to a rheumatologist's consultation.

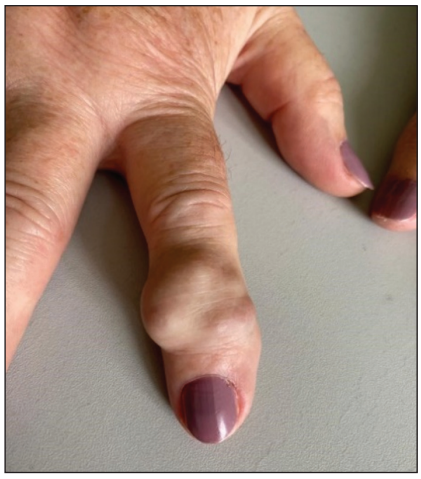

Fig. 1. *A lesion in the distal interphalangeal joint (DIPJ) of the second finger of the right hand*

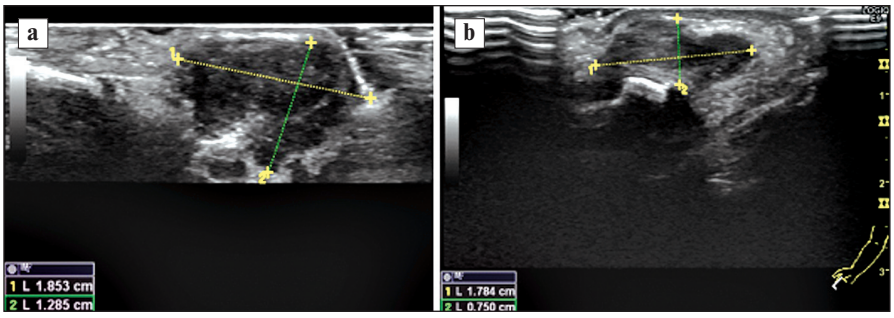

Fig. 2. *Sonograms of the lesion in the second finger of the hand. Gray scale mode: a – dorsal surface of zone in the second DIPJ; b – palmar surface of zone in the second DIPJ*

Life history: The patient denied clinical signs of arthritis (including involvement of the first metatarsophalangeal joints of the feet) and a family history of gout. According to her, hyperuricemia was detected for the first time. From her medical history it is known that she suffers from ischemic heart disease and arterial hypertension, and had two myocardial infarctions (in 2005 and 2006). She regularly takes the following medications: lisinopril, metoprolol succinate, indapamide, amlodipine, rosuvastatin, and cardiomagnyl.

Examination: The patient has a normal body constitution with a body mass index (BMI) of 25.22 kg/mI. In the area of the distal interphalangeal joint of the second finger of the right hand, there is a nodule up to 1.5–2 cm in diameter, firm to the touch, slightly whitish, painless, with protrusions, and with no change in the skin color above it (Fig. 1). Flexion of the distal phalanx of the finger is limited but painless. No similar nodules were found in other joints upon examination. Given the presence of hyperuricemia, a tophus was suspected in the projection of the distal interphalangeal joint of the second finger of the right hand, and an ultrasound examination of the nodule and kidneys was performed to rule out nephrolithiasis.

Ultrasound: In the projection of the distal interphalangeal joint of the second finger on the right hand, a soft tissue formation was identified, consisting of several nodules with a total size of 2.5×1.5×2.0 cm, with reduced echogenicity, clear irregular contours, homogenous structure, and isolated blood flow signals (Figs. 2, 3). The integrity of the extensor and flexor tendons of the finger was preserved. Conclusion: The structure of the formation is atypical for a tophus, with more evidence in favor of a synovial giant cell tumor.

Kidney and renal artery ultrasound: Diffuse changes in the renal parenchyma were noted, with the cortical echogenicity of the kidneys of grade 1 (moderately increased). No signs of nephrocalcinosis or any additional formations suggesting the presence of calculi were observed.

Diagnosis: A soft tissue formation of the second finger of the right hand (suspected synovial giant cell tumor?), osteoarthritis of the hand joints, stage II, asymptomatic hyperuricemia. Recommendations were given for non-pharmacological correction of the elevated uric acid levels, and the patient was referred for consultations with an oncologist and a hand surgeon.

Surgical treatment: In November 2023, surgical removal of the neoplasm on the second finger of the right hand was performed. Histological examination confirmed a synovial giant cell tumor. After the surgery, the function and configuration of the joint were restored (Fig. 4).

Discussion. The tenosynovial tumor is characterized by slow growth, location near tendons or joints, primarily under the skin. Externally, the tumor may consist of one or more painless nodules, white or grayish in color, ranging from 0.5 to 5 cm in size. Histologically, nodular tenosynovitis can be represented by several types of cells: histiocyte-like cells, fibroblast-like cells, spdle-shaped cells, giant cells, and xanthoma cells with rare mitoses [21]. The location and appearance of the tumor, especially when combined with gouty tophi, can lead a physician to the erroneous diagnosis of gout.

In the presented clinical case, differential diagnosis with a tophus of the hand joint was appropriately conducted, as an asymptomatic stage with monosodium urate crystal deposits can occasionally be present in gout [22].

Radiography in this type of tumor is of limited value [23]. The preferred methods for differential diagnosis and confirming the diagnosis of a tumor are magnetic resonance imaging (MRI) and fine-needle biopsy with cytological examination of the material [24, 25]. The location of the tumor near the skin allows to use ultrasound for diagnosis, visualizing the nodules and their proximity to the tendon sheaths and joint capsules. On an ultrasound, the tenosynovial giant cell tumor appears as a hypoechoic mass with a homogeneous structure that contacts the tendon sheath or joint capsule [26].

Ultrasound (US) is the most accessible and informative imaging method for diagnosing gout [27]. Domestic clinical guidelines indicate the need for ultrasound in all patients with suspected gout when synovial fluid analysis via polarized light microscopy is not available [22]. A characteristic sign of monosodium urate crystal deposition in gout on an ultrasound scan is a double contour, which is caused by the deposition of crystals on the surface of hyaline cartilage, forming a hyperechoic band parallel to the bony contour [16]. On an ultrasound, a tophus appears as a heterogeneous mass with increased echogenicity, sometimes with an acoustic shadow, and an anechoic zone around its periphery, resembling a rim [28].

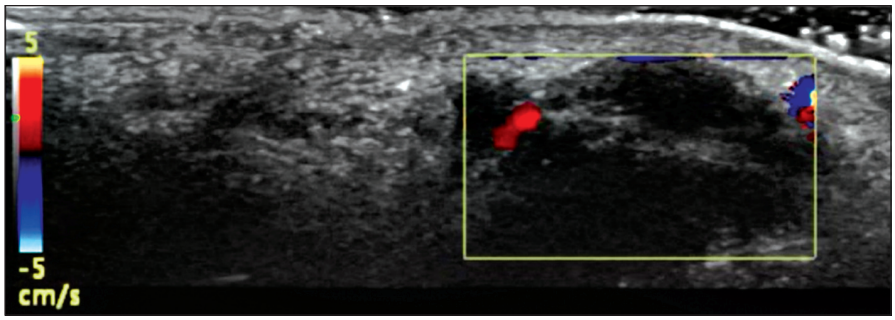

Fig. 3. *Sonogram of the lesion of the second finger of the hand. Color Doppler mapping mode. Single blood flow signals in the lesion*

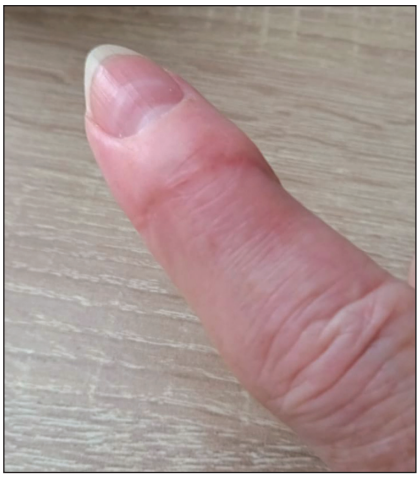

Fig. 4. *DIPJ of the second finger of the right hand after removal of a synovial giant cell tumor*

During the initial examination, without additional tests, a physician must differentiate a tenosynovial giant cell tumor not only from a tophus but also from other soft tissue formations, such as hemangiomas, enchondromas, schwannomas, mucoid cysts, pyogenic granulomas, localized fibromatosis, ganglia, lipomas, and giant cell tumors of bone.

In our patient, given the absence of characteristic tophus signs on the ultrasound, the presence of several hypoechoic nodules with isolated blood flow signals within the mass, lack of previous episodes of gouty arthritis in the history, and absence of other tophus-like formations, no other methods were used for differential diagnosis.

The only optimal treatment for this tumor is the removal of the affected tendon sheath, joint capsule, periosteum, ligamentous structures, and tendon [29]. However, there is a high risk (up to 47%) of tumor recurrence after surgery [30].

The tenosynovial giant cell tumor of the tendon sheath is a common soft tissue neoplasm of the hand, and its appearance can mislead the physician, making it difficult to immediately determine the nature of the pathology.

Conclusion. This clinical example highlights the need to use, in addition to clinical and laboratory tests, other methods, among which ultrasound is the most accessible and informative.

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Conflict of Interest Statement

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