

# Injury of a giant tophus on the elbow – Case Report

Piotr Łukasiewicz<sup>1</sup>, Andrzej Prystupa<sup>1</sup>, Jacek Sompór<sup>1</sup>

<sup>1</sup> Medical University, Lublin, Poland

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## Abstract

Tophaceous gout is a chronic form of gout with the formation of uric acid crystalline masses deposited in the soft tissues of numerous regions of the body. Various factors can influence the formation of the nodular masses called tophi, which differ in size and can involve many years of ongoing gouty arthritis. Tophus formation, among others, may end with ulceration of the skin, infection, deformities and mechanical impairment, with many cases serving as direct indications for surgery. Treatment involves pharmacological control of uric acid levels, prevention of infection and methods of surgical removal of tophi depending on stage of the disease and accompanying complications. This case report discusses a local 69-year-old patient with a long history of tophaceous gout with giant tophus on the injured elbow, leading to a rare indication for surgical intervention due to the wound severity.

## Key words

gout, uric acid, gouty arthritis, tophaceous, tophus, tophus injury, tophus surgery

## INTRODUCTION

Uric acid is synthesized in the liver, intestines and the endothelium as the end product of purines. Increase in the concentration of uric acid above its solubility level leads to its precipitation as urate crystals, especially in the joint cavities. This increase can be attributed to ageing, obesity, metabolic syndrome, hypertension, alcoholism, increased intake of proteins and a fructose-enriched diet.

Gout is described as an inflammatory arthropathy that affects the peripheral joints. It affects 1–2% of adults in developed countries, generally middle-aged to elderly men and post-menopausal women. Gouty tophi presenting as periarticular masses are uncommon. Tophi generally develop after an average of 11 years of gouty arthritis [1]. Tophaceous gout is characterized by macroscopic deposits of urate crystals associated with a central proteinaceous core, foreign body giant cells and macrophages. The most commonly involved joint is the first metatarsophalangeal joint. Other frequently affected joints include the tarsal joints, ankles, knees, wrists, Achilles tendon and helix of the ear [2]. The presence of tophaceous gout correlates with a long duration of hyperuricaemia and/or a poor response to urate-lowering medications. The primary therapy is treatment with antihyperuricemic drugs. The long-term therapy is to reduce serum uric acid levels and prevent tophi formation.

## CASE REPORT

A 69-year-old Caucasian male, a retired farmer from the Lublin province in eastern Poland was admitted to the ER of Independent Public Teaching Hospital No. 1 in Lublin, following a week-long history after a fall on his left upper limb. The impact on the skin over the elbow resulted initially in a bruise which, after 6 days, became an open wound with moderate but continuous blood loss from the small vessels



Figure 1. Injured tophus upon arrival at the ER

of the tophus, which resulted in the above-mentioned visit to hospital (Fig. 1). A sterile pressure dressing was applied to the wound to block the bleeding and reduce the risk of infection, and the patient was admitted to the Trauma Surgery and Emergency Medicine Clinic for surgical removal of the pathological mass and closure of the wound.

The patient presented a 30-year-long history of gout. The disease first manifested only with pain in the wrists which he could not associate with any particular stimuli or event. Changes in the joints became clearly visible 27 years ago, with first metatarsophalangeal joints being the earliest affected. Progression of the disease then impacted, respectively, on the fingers of both hands, knees and elbows. A slow but continuous growth of nodular masses was present over the mentioned joints. The current size of the tumour over the wound region was reached during the last 3 years of continuous growth.

Tophi varying in size were visible over the joints, and upon closer physical examination, over multiple other regions of the body (Fig. 2). No additional signs of trauma were visible on the body, with the skin staying in a good condition appropriate to the patient's age.

Notable dietary triggers leading to gout flares mentioned by the patient included alcohol, red meat, cheese and coffee. Current gout treatment involves Allopurinol in a dosage of

Address for correspondence: Piotr Łukasiewicz, Medical University, Lublin, Poland  
E-mail: pluka@gumed.edu.pl

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**Figure 2.** Tophi visible on hands and fingers

100mg administered orally once a day, and Colchicine in a dosage of 0.5mg in case of a gout flare. The only accompanying disease mentioned by the patient was mild hypertension. He had not undergone any surgery in the past, nor was he able to recall any trace of a family history of gout, rheumatic diseases, genetic or rare diseases. The patient is under the continuous care of his family doctor and a rheumatologist, with regular visits and tests taken. The last diagnostic imaging performed included X-rays of multiple joints taken in 2002 and during a current visit (Fig. 3). Laboratory data from the perioperative time revealed values as shown in Table 1.

**Table 1.** Laboratory data from the perioperative time

Examination	Result	Normal Value	
WBC	9.44	4.0–10.0	K/uL
RBC	4.82	4.0–5.7	M/UI
Hemoglobin	14.3	13.0–16.0	g/dl
Hematocrit	41.1	40.0–54.0	%
PT	11.5	11.0–14.0	sec
INR	0.93	0.86–1.30	
APTT	26.7	28.0–38.0	sec
GLUC	93	70–99	mg/dl
Total cholesterol	233.5	115–190	mg/dl
HDL	62.1	>40	mg/dl
LDL	177	<115	mg/dl
Triglycerides	148	<150	mg/dl
CRP	0.5	<5	mg/l
Urea	37.5	18–55	mg/dl
Creatinine	1.141	0.7–1.20	mg/dl
Uric Acid	7.829	3.4–7.0	mg/dl
Sodium	138.9	136–145	mmol/l
Potassium	4.57	3.5–5.1	mmol/l
Chlorides	101.5	98–107	mmol/l

Surgery was planned, with daily changes of dressings over the opened tumour in order to avoid local infection and potential blood loss. The procedure was performed under Bier's block anaesthesia of the upper left limb. The incision line was marked prior the cut to provide a satisfying



**Figure 3.** Recent X-ray showing pathological deposits over unoperated elbow

cosmetic outcome after tophus removal. The main mass was excised with perceptible resistance of the tissues due to crystal deposits. The tophus was well supplied with blood, although coming from small vessels that were safe and easy to locate and coagulate. Numerous smaller masses with pathological deposits were also removed (Fig. 4). All the incised masses were sent for examination in the histopathology department. After careful examination of the subcutaneous and deep tissues over the joint region accessible from the performed incision, excess skin was removed. The joint itself was not opened during the procedure, with full range of passive motion possible. Subcutaneous and skin sutures have been used to bring the sides of the wound together, with drainage left in the bottom of the wound. A moderate pressure dressing was applied over the wound. Drainage took only a trace amount of serosanguineous fluid and was removed from the wound the day after surgery. Dressing was generally dry with only small spots of blood visible over the line of incision on the first day after surgery. Little or no swelling of the limb was noted over the region distal to the operated area. On the second day after the surgery, the patient was discharged home in a good general condition with no major complaints and moderate local pain of the operated area.



**Figure 4.** Intraoperative view of the elbow after tophus excision

Sutures were removed after 12 days in the outpatient clinic with the wound staying clean and without signs of inflammation. Histopathology results confirmed that the pathological mass consisted of uric acid crystals. The wound continued to heal and 3 months after the surgery showed good cosmetic results with no nodular masses palpable under the incision line or its surrounding area (Fig. 5). The elbow presented the full range of motion and the patient did not report any complaints locally. Three months after surgery, no gout flares affecting the operated region took place.



Figure 5. Cosmetic results 3 months after surgery

## DISCUSSION

Tophi can accompany ongoing gout, varying at their moment of appearance and time of growth. Those pathological masses can reach notable sizes, as in the case of presented patient. Not only size, but localization is important in the case of tophus formation. Typically these grow most commonly over the joints of fingers on both hands and feet, wrists, knees, elbows as well as the ulnar aspect of the forearm and Achilles tendon (pressure points), and helix or pinna of the ear. Apart from these, numerous atypical localizations should be considered, with examples such as the nasal bridge, middle ear, tissues of the mouth, larynx, spine, viscera, bones, tendons, ligaments, and more rarely, sternoclavicular and acromioclavicular joint locations [3]. A rare, yet noteworthy form of the disease is gouty panniculitis, where the crystal deposits are abundantly located in the subcutaneous tissue [4].

It is important to remember that not every pathological mass reaching the size in the presented case can originate from the deposition of uric acid crystals, even if the laboratory findings may indicate gout. In fact, the disease can be mimicking tumours as effects of many various diseases, such as synovial tumors, bone tumors, tumors of the soft tissues, or even malignancies of the pancreas, colon or metastases, especially when located in atypical locations [3]. A careful conversation with the patient and collection of medical history might give important hints on a typical time of more than a decade before the tophi first showed up [3, 5]. This usually corresponds with the time after which common signs of the disease, such as periarticular erosions with overhanging edges, can be seen on conventional x-rays [6].

Although the primary method of treatment accompanies that of gouty arthritis, some cases may necessitate surgical removal of the tophi. These include recurrent attacks with deformities and urgent complications, such as infection, ulceration, drainage or entrapment neuropathy, functional problems such as joint instability, motion impairment or inability to wear shoes or clothing, and last but not least – cosmetic reasons, which can also be very embarrassing for the patient [7, 8]. Not all of the above-mentioned should be treated equally as sometimes risks of complications after surgery may be higher than the desired benefits, as in the cosmetic surgery of tophus excision [7].

The surgical approach should be carefully chosen and determined by several factors, such as consistency of the

tophus and degree to which it affects given joints. The most common procedures include incision and aspiration, tophectomy, arthroscopy with joint debridement, arthroplasty/arthrodesis, complete joint resection in the case of destruction of joint surfaces, or even amputation [8, 9]. Upon deciding to perform surgery, possible adverse effects need to be considered, with delayed wound healing being the most common [7], and the possibility of infection [9]. It is worth mentioning that it is still difficult to decide on the right moment for tophus removal, due to lack of controlled clinical studies and specific guidelines [7].

## CONCLUSIONS

Tophaceous gout is a specific type of gout manifesting as multiple masses called tophi. Those pathological formations vary in size and grow in various locations of a human body and may at times require surgical removal. The presented case shows another indication for urgent surgery, with injury leading to wound formation over the damaged area. Such a wound can be difficult to heal without surgical treatment, even without potential accompanying diseases. Direct trauma of a giant tophus as presented can lead to serious bleeding. Moreover, the wound can reach a size that would not be able to heal without surgical intervention due to an insufficient area of soft tissues, including skin, to cover it. This could potentially result in infection of the damaged area. The case also demonstrates that even after such a long history of gout diagnosis due to its sometimes obvious signs, symptoms and available diagnostics, including advanced imaging, the disease is still present and leads to such an extreme case.

Nowadays, the available treatment methods, along with well-known individual genetic, dietary and lifestyle predispositions, make it definitely easier to control gout and gout flares. However, when the tophaceous form does develop, surgical methods of treatment should be taken into consideration for a variety of reasons and in order to attain satisfactory outcomes.

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