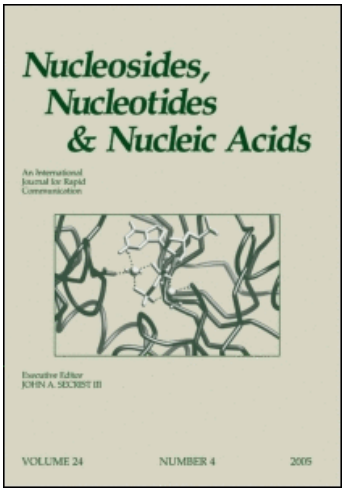

Nucleosides, Nucleotides and Nucleic Acids
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t713597286

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To cite this Article Puig, J. G. , de Miguel, E. , Castillo, M. C. , Rocha, A. López , Martínez, M. A. and Torres, R. J.(2008) 'Asymptomatic Hyperuricemia: Impact of Ultrasonography', Nucleosides, Nucleotides and Nucleic Acids, 27: 6, 592 — 595
To link to this Article: DOI: 10.1080/15257770802136040
URL: http://dx.doi.org/10.1080/15257770802136040

Nucleosides, Nucleotides, and Nucleic Acids, 27:592–595, 2008

ISSN: 1525-7770 print / 1532-2335 online
DOI: 10.1080/15257770802136040

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ASYMPTOMATIC HYPERURICEMIA: IMPACT OF ULTRASONOGRAPHY

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□ *Thirty-five patients (23 males) with asymptomatic hyperuricemia for at least two years underwent two-dimensioal ultrasonography of knees and ankles. Urate deposits (tophi) in tendons, synovium, and other soft tissues were detected in 12 patients (34%). Increased vascularity (inflammation) was evident in 8 of these patients (23%). Tophi were more frequently found in knees than in ankles and were especially prevalent in the distal patellar tendon. The presence of tophi was unrelated to the known duration of hyperuricemia (mean, 5 years). Ultrasonography allows detection of tophi and inflammation in a third and in a fourth, respectively, of asymptomatic hyperuricemic patients.*

Keywords Uric acid; hyperuricemia; ultrasonography; tophus; gout

INTRODUCTION

The diagnosis of gout can only be firmly established by "observing intracellular monosodium urate (MSU) crystals."[1] Demonstration of MSU crystal deposition in the form of tophaceous deposits is of clinical relevance because the presence of tophi should prompt consideration for hypouricemic therapy.[2] The best available procedure to investigate whether an asymptomatic hyperuricemic patient does have MSU crystal deposition has not been established. Magnetic resonance (MR) imaging, computed tomography (CT), and ultrasonography have all been used to investigate the existence of tophaceous deposits.[3,4] In this study, we report our preliminary experience on the identification of tophi in patients with asymptomatic hyperuricemia.

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MATERIALS AND METHODS

Patients were recruited from three sources: the Vascular Risk Unit at the Division of Internal Medicine and the Rheumatology Division, both at La Paz University Hospital; and the Geriatric Unit at Residencia Real Deleite, Aranjuez, Madrid, Spain. Caucasian subjects, aged $\geq$18 years, with asymptomatic hyperuricemia were admitted into the study after informed consent was obtained. Hyperuricemia was diagnosed on the basis of serum urate concentrations $\geq$7.0 mg/dL, documented at least twice during the prior two years. Patients included in the study were thoroughly questioned to assess whether they previously had acute gouty arthritis. Only patients reporting no nontraumatic articular symptoms were admitted into the study. All patients underwent a thorough clinical evaluation to establish or rule out the diagnosis of the metabolic syndrome, according to ATP III criteria.[5]

Ultrasonography of knees and ankles was performed in the grayscale mode. Vascularity within or around tophi was assessed with the color Power Doppler mode. Imaging studies included: a) anterior and posterior tibial tendons, short and long peroneal tendons, and their tendon sheaths; b) patellar tendons; c) internal and external collateral knee ligaments; and d) menisci and medial and lateral synovial recesses in the knees.

RESULTS

Thirty-five subjects (23 males) with a mean age of 63 years were included in the study (Table 1). Mean serum urate concentration was 8.5 mg/dL for the previous 2–20 years (mean, 5 years). Clinical characteristics of the subjects and their ultrasonographic findings are shown in the Table 1.

Tophi (Figure 1A) were documented in tendons, synovium, or other soft tissues in 12 patients (34%). Power Doppler ultrasound (Figure 1B)

TABLE 1 Clinical characteristics and ultrasonography findings in 35 patients with asymptomatic hyperuricemia

Characteristic	Value	Range
Patients (N)	35	
Males (N)	23	
Age (yrs)*	63 $\pm$ 15	38–98
Serum urate (mg/dL)*	8.5 $\pm$ 0.9	7.5–11.8
Mean duration of documented hyperuricemia (yrs)	5	2–20
Metabolic syndrome (N)	22	
Tophi (N)	12	
Knees	10	
Ankles	7	
Distal patellar tendon	7	
Increased vascularity (N)	8	

N, number of patients; *, mean $\pm$ SD.

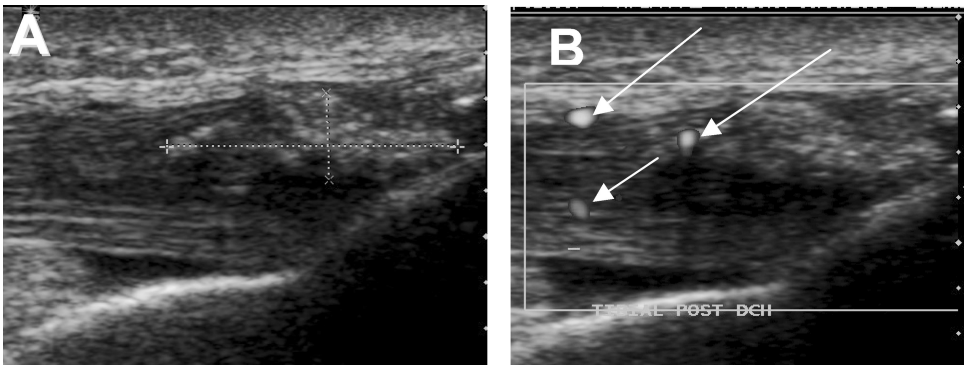

FIGURE 1 A) Ultrasonographic image of a tophus located in the distal patellar tendon (longitudinal section). The horizontal and vertical dotted lines indicate the tophus size. B) Same image with color Power Doppler showing increased vascularity (bright ovals; arrows) due to inflammation.

detected increased vascularity within or around tophi in 8 patients (23%). Tophi were more frequently found in knees (10 patients) than in ankles (7 patients), and were most prevalent in the distal patellar tendon (7 patients). Multiple lesions were seen in 10 of the 12 patients. Twenty-two patients showed at least three criteria defining the metabolic syndrome. Age, gender, serum urate levels, and the presence of the metabolic syndrome were not significantly different between subjects with and without tophi. The presence of tophi was not related to the known duration of asymptomatic hyperuricemia.

DISCUSSION

In this preliminary study, ultrasonography identified tophi and increased vascularity, as a sign of inflammation, in a third and in a fourth, respectively, of asymptomatic hyperuricemic patients. We believe that these findings are of clinical relevance for several reasons. First, although the majority of patients with hyperuricemia never develop gout, the cumulative risk of gout over five years has been shown to be 3% in patients with serum urate between 7.0 and 8.0 mg/dL, and 22% when serum urate is 9.0 mg/dL or more.[6] Second, the presence of tophi in asymptomatic hyperuricemic patients may mark a more aggressive condition that may cause additional tissue damage. In fact, hypervascularization, a sign of inflammation, was detected in the majority of patients with subclinical tophi, suggesting a pathological process of uncertain long term consequence. Third, tophus identification should prompt hypouricemic therapy.[2,7] Although urate-lowering therapy demands close monitoring to assure achievement and maintenance of a subsaturating serum urate level, the best available technique to monitor resolution of MSU crystal deposits remains to be established.[4]

An important limitation of our study relates to the specificity of our findings: ultrasonographic deposits were not analyzed to identify MSU crystals. In accordance with previous reports,[8] hypoechogenic structures of high attenuation with shadowing and hyperechogenic surroundings were considered tophi. These characteristics may, however, not be absolutely specific for gouty tophi.[9] It will be critical to establish whether the structures identified as tophi in this study are indeed collections of urate crystals, a point that might be ascertained by aspiration of the identified lesions, with polarized microscopy of aspirated material.[7]

In summary, the significant finding of tophus-like structures in patients with asymptomatic hyperuricemia may modify our diagnostic evaluation for this condition. Although the reliability and validity of CT, MR, and ultrasound imaging are being evaluated for the diagnosis and monitoring of chronic gout,[4] we need information from longitudinal studies looking at modifications in tophi induced by therapy and at the cost-effectiveness of joint imaging in asymptomatic hyperuricemic persons.

REFERENCES

1. Keith, M.P.; Gilliland, W.R. Updates in the management of gout. *Am. J. Med.* **2007**, 120, 221–224.
2. Ellman, M.H.; Becker, M.A. Crystal-induced arthropathies: recent investigative advances. *Curr. Opin. Rheumatol.* **2006**, 18, 249–255.
3. Gerster, J.C.; Landry, M.; Dufresne, L.; Meuwly, J.Y. Imaging of tophaceous gout: computed tomography provides specific images compared with magnetic resonance imaging and ultrasonography. *Ann. Rheum. Dis.* **2002**, 61, 52–54.
4. Pérez-Ruiz, F.; Naredo, E. Imaging modalities and monitoring measures of gout. *Curr. Opin. Rheumatol.* **2007**, 19, 128–133.
5. Grundy, S.M.; Brewer, H.B.Jr, Cleeman, J.I.; Smith, S.C. Jr, Lenfant, C.; et al. Definition of metabolic syndrome: Report of the National Heart, Lung, and Blood Institute/American Heart Association conference on scientific issues related to definition. *Circulation* **2004**, 109, 433–438.
6. Campion, E.W.; Glynn, R.J.; Delabry, L.O. Asymptomatic hyperuricemia: risks and consequences in the Normative Aging Study. *Am. J. Med.* **1987**, 82, 421–426.
7. Pascual, E.; Sivera, F. Therapeutic advances in gout. *Curr. Opin. Rheumatol.* **2007**, 19, 122–127.
8. Pérez-Ruiz, F, Martin, I.; Canteli, B. Ultrasonographic measurement of tophi as an outcome measure for chronic gout. *J. Rheumatol.* **2007**, 34, 1888–1893.
9. Tiliakos, N.; Morales, A.R.; Wilson, C.H. Use of ultrasound in identifying tophaceous versus rheumatoid nodules. *Arthritis Rheum.* **1982**, 25, 478–479.