

Radiological Detection of Advanced Gout in Patients with Diabetes and Foot Ulcers

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Background:

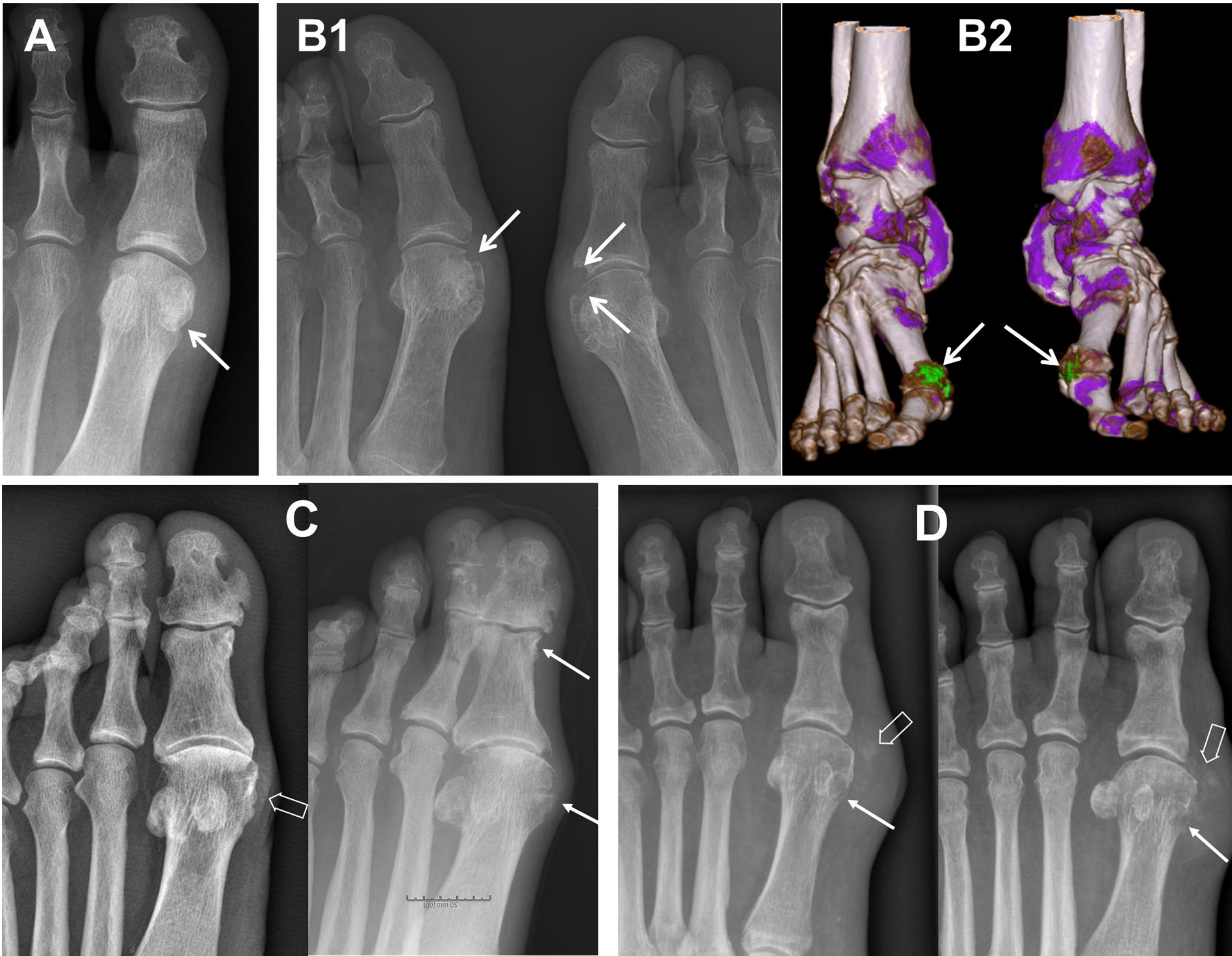
Gout is often overlooked in patients with diabetes and foot ulcers, as neuropathy and ischemia can mask its typical inflammatory presentation. Undertreated gout frequently leads to tophus formation in the feet, which may ulcerate. Gout independently increases the risk of lower-extremity amputations by 50%. Urate-lowering therapy can prevent and dissolve tophi, making early diagnosis crucial. While conventional radiography (CR) and dual-energy CT (DECT) can detect advanced gout with osseous changes, their diagnostic utility in this population remains unevaluated.

Methods:

This study examined patients with diabetes referred to a tertiary foot-ulcer clinic. Patients underwent foot assessment with CR, supplemented by DECT when available. Radiological findings were assessed blind to clinical gout status and classified as consistent/inconsistent with gout. Clinical gout (urate-lowering therapy + clinical assessment) was the reference standard.

Results:

Among the 37 examined patients, radiological assessment accurately identified gout in 16 of 18 (89%) with clinical gout, despite limited DECT availability. This suggests that conventional radiography alone may retain substantial diagnostic utility in this high-risk population. Of the 20 patients with radiographic gout, 4 did not meet clinical criteria for gout, indicating that radiological findings, while sensitive, lack specificity. However, such false-positive cases can often be ruled out through a brief clinical assessment, which is essential before initiating urate-lowering therapy. Among the 18 patients with clinical gout, 5 were undiagnosed and 10 were undertreated.



Definite radiographic signs of gout.

(A): Early changes with a solitary punched-out erosion of the 1. metatarsal head (arrow). B1: More pronounced bilateral erosions at the first metatarsophalangeal (MTP) joint with slight soft tissue swelling, but not detectable soft tissue mineralization although there was urate crystal deposition on a concomitant DECT CT (arrows on B2). (C): Anterior and oblique view shows the early occurrence of soft tissue mineralization (open arrow) in addition to erosions at the 1. MTP and interphalangeal joints (arrows); (D): Anterior and oblique views illustrates voluminous soft tissue mineralization (open arrow) consistent with tophus formation and erosion of the 1. metatarsal head (arrows).

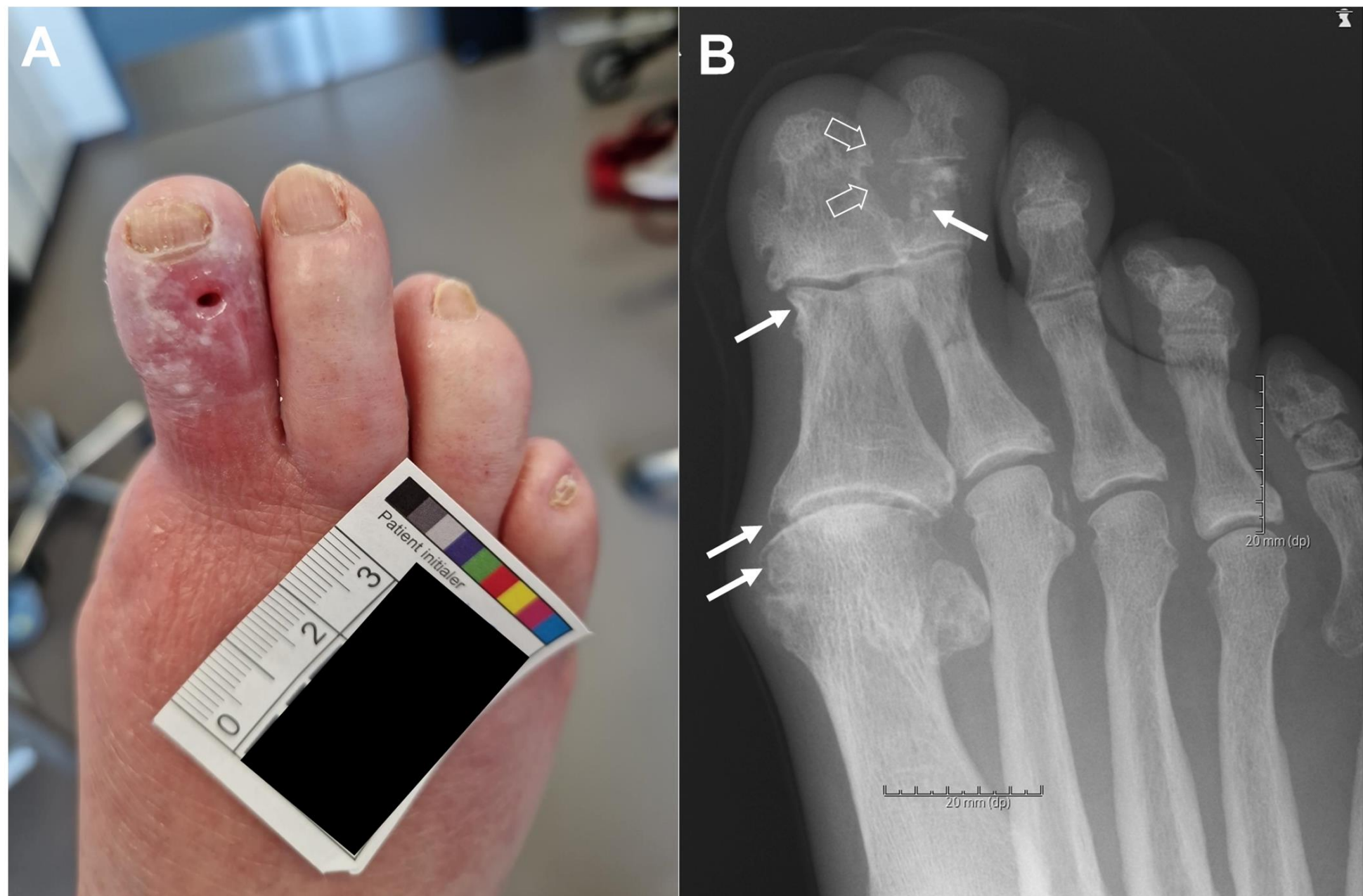
Conclusions:

Radiological assessment in patients with diabetes and foot ulcers may serve as a sensitive marker for advanced gout, although differentiation from other pathological conditions can be challenging. The clinical utility of routine radiological evaluation for gout in this population warrants further investigation, as untreated gout is frequent and may impair ulcer healing, increase the risk of recurrent ulcers, and significantly raise amputation risk.



Multimodal Confirmation of Gout in a Ruptured Tophus.

Left: Clinical photograph of a spontaneously ruptured tophus at presentation. Right: Abundant draining tophaceous material collected the same day. Polarized light microscopy revealed birefringent, needle-shaped urate crystals. Radiographs showed soft tissue calcifications and erosions, and dual-energy computed tomography (DECT) confirmed urate crystal deposition. Photographs provided by the patient.



(A). Photograph of the right second toe taken on the day ulcer debris was sampled. The right first toe had been amputated two years earlier. Anterior radiographs of the right foot 7 years previously show tophus formation in the soft tissues at the second distal interphalangeal joint (open arrows) with accompanying osseous destruction (arrow) in addition to characteristic erosive changes at the first metatarsophalangeal and interphalangeal joints (arrows).