A 97-year-old white woman was admitted with an acutely painful arm. She described a one week history of intense swelling of the hand and forearm for which she had been prescribed flucloxacillin by her general practitioner for presumed bacterial cellulitis. However, the arm had shown no signs of improvement.

Clinical examination showed the skin was very painful, tight, warm, erythematous, and pitted to pressure (Figure 1). A small nodule was just visible, proximal and dorsal to the metacarpophalangeal (MCP) joint of the middle finger. An ultrasound (US) examination was performed to determine the cause of the swelling and detect any fluid. It revealed extensive subcutaneous edema (Figure 2) and mild to moderate synovitis in all the small joints (Figure 3). In some joints there were abnormal hyperechoic echoes within the synovial tissue, which were presumed crystal complexes. There was also a marked flexor tenosynovitis (Figure 4) of all digits in addition to smaller fluid collections around the extensor tendons. The nodule on the dorsum of the hand was fluctuant when transducer pressure was applied from above and was much more extensive (1.5 cm) than could be determined by palpation alone (0.5 cm) (Figure 5). She also had mild synovitis of the left elbow, although the olecranon bursa was normal.

Using US, a needle was guided into the lesion and 3 ml of thick creamy material was aspirated (Figure 6). Microscopy revealed uric acid crystals but a normal Gram stain and sterile culture. Other investigations revealed a raised white blood cell count $13.2 \times 10^9/l$, plasma viscosity 1.81 mPa (normal 1.63–1.72), C-reactive protein 116 g/dl (normal < 10), urate 0.58 mmol/l (normal 0.14–0.38), urea 20.0 mmol/l (normal 2.5–7.1), creatinine 144 mmol/l.
She was treated with colchicine and her diuretic dose was reduced. Over the next 3 days her pain and swelling dramatically subsided and renal function improved.

DISCUSSION

The occurrence of pitting edema of the upper limb has been ascribed to a number of causes, but is classically linked with the RS3PE syndrome — remitting, symmetrical, seronegative synovitis with pitting edema. This case shows that gout also is an important cause, in particular as a differential diagnosis for infection. Confusion principally arises with bilateral cellulitis, usually of the lower limb. This report highlights “chemical cellulitis” as a consequence of gout in the upper limb.

US was superior and more specific than clinical examination in defining the site and extent of the inflammation. It also enabled an accurate needle placement to confirm the diagnosis. Manual palpation was hindered by the level of (normal 50–140), and negative rheumatoid factor and antinuclear antibody.

Figure 2. US image reveals severe edema within the subcutaneous tissues, producing a “marbling” effect over the dorsum of the wrist. The whiter areas (black asterix) represent adipose tissue, and inter-digitating black areas (white asterix) represent fluid. This is identical to that seen in either cellulitis secondary to infection or gravitational edema.

Figure 3. Longitudinal US image through the volar aspect of the 3rd distal interphalangeal joint. There is a heterogenous mass (S) within the joint causing bulging of the joint capsule (arrows), consistent with synovial hypertrophy. There is also increased bone to skin thickness and hypochoegenicity representing subcutaneous edema (2 headed arrow). DP: distal phalanx, MP: middle phalanx.

Figure 4. Longitudinal US image through the volar aspect of the second MCP joint. There is evidence of widening of the flexor tendon sheath (arrowheads). In addition, the tendon sheath contains echogenic foci likely to reflect deposits of urate crystals (curved arrows). M: metacarpal head, P: phalanx, FT: flexor tendon.
swelling and caused more discomfort than mild compression with the US transducer. The scans showed that inflammation may occur in several different tissues during an acute “cellulitic” presentation.

To our knowledge, this is the first US description of the pathological features of acute gout in the hand, although US\(^3\), computerized tomography\(^3\), and magnetic resonance imaging\(^4\) have been used to assess nodules and enthesopathy in patients with chronic gout. Ultrasonography can be helpful in the early diagnosis and management of patients with inflammatory arthritides who have an unclear diagnosis.

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Figure 5. Longitudinal US image through the nodule on the dorsum of the right hand. There is a large mixed echogenic mass lying superficial to the common extensor tendon sheath, which is also thickened (arrowheads). The hypo-echogenic area represents fluid and hyper-echogenic area, synovial hypertrophy and probable crystals (curved arrows). M: metacarpal head.

Figure 6. Aspiration of the nodule. The thick, creamy aspirate contained masses of urate crystals on microscopy. Note the intense edema of the fingers, particularly of the ring finger. The wedding ring had to be cut off.