

**Abstract:**

In patients with diabetes an isolated "sausage toe" is suggestive of underlying osteomyelitis. Neuropathic (Charcot) arthropathy, devastating complication of diabetes, normally presents in the midfoot and can be precipitated by surgery or minor trauma. We report a 62 year old man with a 2 year history of well controlled type 2 diabetes [HbA1c 56 mmol/mol], with no micro or macro vascular complications, referred to diabetic podiatrist with a hot, red, swollen, left hallux (sausage toe appearance) eight weeks following minor trauma. The temperature difference between left and right hallux was 6.0-8.1 OC. Examination of the fore and midfoot was normal, all pedal pulses were biphasic, there was objective peripheral neuropathy. Initial appearances suggested underlying osteomyelitis but blood results were not supporting this: WCC 8.5 10\*9/L, CRP 2.1 mg/L. X-rays revealed fragmentation of the distal phalanx compatible with previous crush fracture but clinical suspicion of osteomyelitis remained high. Subsequent MRI suggested fracture of the terminal phalanx of the left hallux with surrounding extra osseous calcification and ossification but no definite evidence of associated infection. In view of normal inflammatory markers no antibiotic therapy was initiated and conservative management (off loading, foot wear) adopted. Repeat CRP and WCC stayed within the normal limits although the hallux remained swollen and warm (7.5 OC temperature difference). After four months X-ray appearances progressed to show destruction at the interphalangeal joint yet clinically the toe improved with reduced swelling and temperature. A diagnosis of localised hallux Charcot was made. Two months later the patient presented with classical Charcot's of the right midfoot with typical radiological changes.

Localised Charcot changes of the Hallux is not widely reported but should be considered in the differential of a hot swollen hallux prior to assuming a diagnosis of osteomyelitis. Clinicians must be aware of these unusual sites of Charcot's arthropathy.

**INTRODUCTION**

Patients with diabetes complicated by combined sensory and autonomic neuropathy may develop a progressive destructive osteoarthropathy. The most frequently involved joints are the tarsus and tarsometatarsal joints, followed by the metatarsophalangeal joints and the ankle [1,2]. Charcot changes of the Hallux are not widely reported. In patients with background of diabetes presentation with isolated "sausage toe" may raise suspicion of underlying osteomyelitis.

**CASE**

We report a case of 62 year old male patient referred to the Multidisciplinary Diabetic Foot Clinic with a hot, red, swollen, left hallux eight weeks following minor trauma. Patient had past medical history of hypertension and a 2 year history of well controlled type 2 diabetes. Most recent HbA1c result was 56 [mmol/mol]. There was no evidence of microvascular or macrovascular complications as yet.



**PHYSICAL EXAMINATION**

- erythema and oedema of the left 1<sup>st</sup> toe
- normal fore- and mid-foot examination
- all pedal pulses biphasic and bounding
- present objective peripheral neuropathy on monofilament testing

**Temperatures at presentation taken with digital thermometer (Dermatemp) [°C]**

HALLUX	left	right	Difference [°C]
plantar aspect	30	24	6
dorsal aspect	31.4	23.3	8.1

**Cicumference of hallux [cm]**

	13.5	9
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**BLOOD RESULTS AT PRESENTATION:**

WCC 8.5 [10\*9/L], CRP 2.1 [mg/L], HbA1c 56 [mmol/mol] (7.3%), eGFR >60, Corrected Calcium 2.41 [mmol/L]

X-rays of the left foot (AP + LAT) at presentation



fragmentation of the distal phalanx compatible with previous crush fracture

In view of normal inflammatory markers antibiotic therapy was withheld. Clinical suspicion of osteomyelitis remained high, so we proceeded to urgent MRI.

MRI showed abnormal bone marrow signal in the terminal phalanx of left great toe consistent with the healing fracture. There was no definite evidence of associated infection or abscess formation.

Treatment with immobilization and non-weight bearing was implemented.

**2 MONTHS FOLLOW UP**

Patient remained under the close review of foot clinic. Inflammatory markers remained normal

**Temperatures taken at 2 months with digital thermometer (Dermatemp) [°C]**

HALLUX	left	right	Difference [°C]
plantar aspect	31.2	23.6	7.6
dorsal aspect	31.4	24	7.4

**Cicumference of hallux [cm]**

	12.5	9.5
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**4 MONTHS FOLLOW UP**

Gradual and slow improvement of clinical appearances

**Temperatures taken at 4 months with digital thermometer (Dermatemp) [°C]**

HALLUX	left	right	Difference [°C]
plantar aspect	31.1	26.5	4.6
dorsal aspect	31.7	26.8	4.9

**Cicumference of hallux [cm]**

	12	9
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X-rays of the left foot at 4 months - worsening appearances, progressive periosteal reaction extending along the 2nd metatarsal and proximal phalanx

**6 MONTHS FOLLOW UP**

Patient represented to the Multidisciplinary Diabetic Foot again with acute right foot pain. On examination temperature of right foot had risen. Diagnosis of Charcot of the right midfoot with typical radiological changes was made



X-rays of the right foot at 6 months - widening of the 1st intertarsal space, consistent with a Lis-Franc deformity, - incongruity of the metatarsal-cuneiform joints on the lateral view, with a degree of posterior subluxation of the meta-tarsals, suggesting ligamentous instability.

**DISCUSSION**

Although Charcot neuroarthropathy is common complication in patients with diabetes and coexisting peripheral neuropathy, the localised Charcot of the hallux is a very rare condition. There have been only few reports of Charcot neuroarthropathy of the hallux or 1<sup>st</sup> metatarsophalangeal joint in the literature [3, 4].

The patient presented in our case developed rare changes in his 1st toe of the left foot consistent with Charcot neuroarthropathy and subsequently typical Charcot changes of the right midfoot.

Hot swollen hallux needs to raise suspicion of osteomyelitis, but clinicians must be also aware of unusual sites of Charcot arthropathy.

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2. Forgács SS. Diabetes mellitus and rheumatic disease. *Clin Rheum Dis* 1986; 12:729.
3. Charcot arthropathy of the first metatarsophalangeal joint. Wünschel M1, Wülker N, Gesicki M. *J Am Podiatr Med Assoc.* 2012 Mar-Apr;102(2):161-4
4. Charcot arthropathy of the first metatarsophalangeal joint. Lee MM1, Noeller KR. *J Foot Surg.* 1991 Nov-Dec;30(6):564-7.