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**Prasanna Chandiralingam**  
Associate Professor, Department  
of Orthopaedics, PSG Hospitals,  
PSGIMSR, Peelamedu,  
Coimbatore, Tamil Nadu, India

**Vijay Baba N**  
Associate Professor,  
Department of orthopaedics,  
A.C.S. Medical College and  
Hospital, Velappanchavadi,  
Chennai, Tamil Nadu, India

## Original Article

### The Charcot foot: Is it a commonly overlooked entity in diabetic population

**Prasanna Chandiralingam and Vijay Baba N**

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#### Abstract

Charcot Osteoarthropathy of the foot and ankle is one of a complication of diabetic neuropathy. The identification and diagnosis of these cases pose a challenging task to the general care physicians. Equally a challenging condition to treat, Charcot foot management can pose significant difficulties unless the treatment is initiated in early stages. The present study aimed at finding out the prevalence rate of Charcot foot among the diabetic patients presenting to a tertiary care centre.

We had a prevalence rate of 0.01% for Charcot foot among the study population. We could identify that the diagnosis was made late in all our cases and it was difficult to differentiate between infection and Charcot foot. The prevalence rate doubled to 0.02% when we take into account the cases with no clear cut evidence of infection.

Charcot foot is a debilitating complication of diabetes mellitus. Though not a common one we encounter, this complication needs an early diagnosis for prompt treatment. Hence any diabetic foot complications may be ideally referred for specialist opinion at the earliest.

**Keywords:** Charcot foot, diabetes mellitus, debilitating, early referral

#### Introduction

Charcot foot is a type of arthropathy due to peripheral neuropathy. It is named after Jean-Martin Charcot, who first recognised that peripheral neuropathy could lead to neuropathic joints <sup>[1]</sup>. Apart from diabetes mellitus, Charcot foot may present as a complication of various other peripheral neuropathic conditions like Neurosyphilis, syringomyelia, leprosy, poliomyelitis, and/or congenital neuropathy <sup>[2]</sup>. The Charcot foot disease, though an uncommon entity of diabetes it is a serious and potentially limb threatening complication.

The prevalence rate of Charcot foot in diabetes is not clearly known, but now it is appreciated that it is not as infrequent as it was generally thought<sup>2</sup>. Often it may be easily overlooked by the general practitioners, especially in its earlier stages leading to underestimation of its frequency <sup>[2, 3]</sup>. In the present study we evaluated the prevalence rate of this complication among the diabetic population presenting to a tertiary care hospital.

#### Materials and Methods

The aim of this study was to determine the prevalence of Charcot foot among the patients presenting to the diabetic clinic of a tertiary care centre. All the patients who presented to the clinic from January 2018 to June 2019 were retrospectively analysed. The diabetic clinic of the hospital was managed by the general medicine department. Hence all the diabetic patients presenting to the hospital were initially managed by the general physicians.

The necessary data were collected with the help of out-patient register and in-patient case records. The total number of patients who were referred to the diabetic foot clinic, managed by the general surgery department for expert management of complications was noted down. The reasons for referral, if any mentioned in the register were also noted. The number of patients referred from the foot clinic to the orthopaedic department for the management of bone related complications was noted.

**Corresponding Author:**  
**Vijay Baba N**  
Associate Professor,  
Department of orthopaedics,  
A.C.S. Medical College and  
Hospital, Velappanchavadi,  
Chennai, Tamil Nadu, India

The patient details who were admitted for the management of foot complications as in-patients were taken from the case records.

## Results and Discussion

A total of 2750 cases were enrolled in the diabetic clinic during the study period. 2175 of them were male and the remaining 575 female patients. The average age was 58 years (42 – 86 years). No specific data was available with regard to the types (type I or II) of diabetes. Neither the data regarding the duration of the disease were available.

365 cases were referred to the diabetic foot clinic for management of complications. Pain was the predominant reason for referral in 250 of the cases. The other reasons for the referral were swelling in the foot and leg in 65 cases and ulcerations in the foot and ankle region in 50 cases. A majority of these 365 cases were managed as out-patients with 88 of them being admitted for the management of severe complications. 37 of them were admitted for the management of diabetic foot ulcer. The remaining 51 cases were diagnosed as cellulitis and were admitted for intravenous antibiotics and further appropriate management.

An orthopaedic referral was given for 35 of the ulcer case after the X- rays taken had shown bone abnormalities. The referrals were given with the suspicion of osteomyelitis, but were proven to be a case of Charcot foot after the orthopaedic referral. This resulted in a prevalence rate of 0.01 percent (35/2750) of Charcot foot in the present study.

Charcot Osteoarthropathy is a degenerative, progressive and a relatively painless arthropathy of single or multiple joints caused by underlying neuropathy, with peripheral joints most commonly affected. The commonest cause of Charcot disease nowadays is diabetes mellitus. It presents as an erythematous, warm, swollen foot and ankle, thereby making it difficult to distinguish from infection clinically [4].

In the present study, when we evaluated the case records of the admitted patients diagnosed as cellulitis there was no conclusive evidence of cellulitis in more than half of the cases. 27 of the 51 cases were having an erythematous, warm and swollen foot, which were managed as cellulitis. These cases could probably represent an earlier stage of Charcot foot.

Eichenholtz [5] has defined 3 stages of Charcot arthropathy based on the natural history of the condition. (Table 1)

**Table 1:** The modified Eichenholtz [5] classification.

Stage	Radiographic findings	Clinical findings
<b>0 (prodromal)</b>	<b>Normal radiographs</b>	<b>Erythema, warmth, swelling</b>
I (development)	Osteopenia, fragmentation, joint subluxation or dislocation.	Erythema, warmth, swelling, ligamentous laxity.
II (coalescence)	Absorption of debris, sclerosis, fusion of larger fragments.	Decreased erythema, warmth and swelling.
III (reconstruction)	Consolidation of deformity, joint arthrosis, fibrous ankyloses, smoothening and rounding of fragments	Absence of erythema, warmth and swelling with stable joint +/- fixed deformity.

**Note:** Stages I – III were originally described by Eichenholtz, and stage 0 was later added by Shibata *et al.* [6], since the clinical signs in Charcot foot were found to precede the radiological changes.

Accordingly if the 27 cases diagnosed as cellulitis were counted as stage 1 Charcot foot, it would bring the total number of cases as 62. Then the prevalence of Charcot arthropathy would double to 0.02% (62/2750). Literature estimates of Charcot Arthropathy prevalence ranges from 0.08% in the general diabetic population to 13% in high-risk diabetic patients [7].

An anatomical classification depending on the pattern of involvement of Charcot foot was proposed by Brodsky *et al.* [8]. (Table 2)

**Table 2:** The anatomical classification of Charcot foot (Brodsky).

Type	Lesion location	Joints involved
1	Midfoot	Naviculocuneiform, tarsometatarsal.
2	Hind foot	Subtalar, calcaneocuboid, talonavicular.
3A	Ankle	Tibiotalar.
3B	Calcaneus	Tuberosity fracture.

In our study the majority (10) of the cases were of type 3A (Fig. 1) and the remaining (6) were of type 1 (Fig. 2). Charcot foot is most common in people with type 1 diabetes in their 5<sup>th</sup> and 6<sup>th</sup> decade of life but can also occur in younger patients with type 2 diabetes mellitus as well [9]. In our study the average age at presentation was 58 years. The patients could not be categorised into type 1 or 2 as the details were not available. None of our patients had bilateral involvement, whereas Charcot foot can be bilateral in about 25% of cases [10]. Usually the duration of diabetes is more than 12 years [11] and men are commonly affected as compared to women.



**Fig 1:** a, b: Clinical picture of a diabetic foot ulcer over the ball of great toe. c,d: X-rays the same patient reveal severe destruction of 1<sup>st</sup> MTP joint, suggestive of Charcot arthropathy.



**Fig 2:** note the grossly deformed ankle joint (a), with ulceration over the lateral malleolus (b), and a gross destruction of the ankle in X-rays (c).

### Conclusion

The diagnosis of Charcot foot in its initial stages is still a challenging task for the general physicians. The best treatment for the Charcot foot however has to be initiated in its early phase for better outcomes. Though uncommon, Charcot foot is a debilitating complication of diabetes especially at later stages. Hence all diabetic patients with foot and ankle complications may be referred earlier to the concerned specialist for appropriate management.

### References

1. Sanders LJ. The Charcot foot: historical perspective 1827\_2003. *Diabetes Metab Res Rev.* 2004; 20:S4-8.
2. Gouveri E, Papanas N. Charcot Osteoarthropathy in diabetes: A brief review with an emphasis on clinical practice. *World J Diabetes* 2011; 2:59-65.
3. Rajbhandari SM, Jenkins RC, Davies C, Tesfaye S. Charcot neuropathy in diabetes mellitus. *Diabetologia.* 2002; 45:1085-96.
4. Ryan Donegan, Bauer Sumpio, Peter A. Blume. *Diabetic foot and ankle.* 2013; 4:21361.
5. Eichenholtz SN. *Charcot Joints.* Springfield, IL, USA Charles C. Thomas, 1966.
6. Shibata T, Tada K, Hashizume C. The results of arthrodesis of the ankle for leprotic Neuro arthropathy. *J Bone Joint Surg Am.* 1990; 72:749-756.
7. Jeffcoate W, Lima J, Nobrega L. The Charcot foot. *Diabet Med.* 2000; 17:253-58.
8. Brodsky JW. The diabetic foot. In: Coughlin MJ, Mann RA, Saltzman CL, eds. *Surgery of the Foot and Ankle.* 8th ed. St Louis, MO, USA: Mosby. 2006, 1281-1368.
9. Gupta PPK, Mohan V. Charcot foot - an update. *Journal of the Association of Physicians of India.* 2003; 51:367-372.
10. Frykberg RG. Charcot foot. In: Boulton AJM, Connor H, Cavanagh PR. Eds. *The foot in diabetes.* John Wiley Sons. Chichester, 2000, 235-60.
11. Laing PW. The foot in diabetes. In: Klerman L, Ed. *The foot and its disorders.* Blackwell Scientific, London, 1991, 139-52.