



Diabetic Charcot Neuroarthropathy of the Knee: Conservative Treatment Options as Alternatives to Surgery

Case Reports of Three Patients

Diabetes Care 2014;37:e129–e130 | DOI: 10.2337/dc13-3045

Ulrich Illgner,¹ Jaap van Netten,²
Carolyn Droste,¹ Klaas Postema,³
Thomas Meiners,⁴ and Hans H. Wetz¹

In contrast to the well-known Charcot neuroarthropathy (CN) of the foot, CN of the knee is hardly recognized. In a literature search, we only found five articles on total knee arthroplasty for Charcot joints (1–5). We did not find a single article dealing with alternative treatment options or the general clinical course of this disease.

We started our study because we saw two young patients with CN of knee within 2 months in our clinic. We reviewed all patients' reports who had been treated in our clinic for CN of the foot ($N = 281$) from 1998 to 2010. Written consent was obtained as required, and all demands of the Declaration of Helsinki were fulfilled.

We found three patients with CN of the knee (all female; patient A: 25 years old, type 1 diabetes for 10 years, HbA_{1c} was 11.6% [103 mmol/mol]; patient B: 26 years old, type 1 diabetes for 16 years, HbA_{1c} 9.8% [84 mmol/mol]; patient C: 30 years old, type 1 diabetes for 13 years, HbA_{1c} 9.1% [76 mmol/mol]). All had multiple complications of the diabetes, including severe polyneuropathy of the affected joints. All three had swelling, loss of strength, instability of the affected joints without trauma, and severe paresthesia without pain of the knee.

Two patients died before the age of 36 years. In two cases, total knee arthroplasty in other hospitals had failed

through dislocation of the prosthesis after progression of bone loss. In one case, open reduction of the tibial head using a locking screw plate had failed. After transfer to our clinic, we stabilized the knee by applying a Hoffmann-II external fixator.

Consistent immobilization and initial offloading in a cast followed by a knee-ankle-foot orthosis stopped the process of joint destruction and led to remineralization in all cases, as seen in CN of the foot.

The same clinical course familiar to us from CN of the foot was seen in all three patients: painless swelling, reddening, and instability, combined with massive destruction of bone and joints were shown in the acute stage (Eichenholtz stage I), followed by decrease of clinical signs and reintegration of bone after immobilization (Eichenholtz stage II, coalescence), leading to Eichenholtz stage III (reconstruction) with remineralization and stabilization (Fig. 1). All of the patients were admitted for CN of the foot, and the diagnosis of CN of the knee was made on first admission to our hospital, even though they had seen multiple physicians. For this reason, we assume there could be a large number of patients with undiagnosed CN of the knee. More studies are needed in this field.

Patients with diabetes who present with instability, swelling, and/or paresthesia of the knee should be immediately examined for polyneuropathy and



Figure 1—CN of the knee. Note the massive irregular and pathologic destruction of the medial tibial head with loss of bone integrity. No clear borders can be seen, and there are irregular new osseous structures (similar to CN of the foot).

CN of the knee. The clinical course of CN is the same in the knee as in the foot, and corresponding treatment plans seem to be effective. This treatment schedule

¹Clinic for Technical Orthopedic Surgery and Rehabilitation, University Hospital of Münster, Münster, Germany

²Department of Surgery, Hospital Group Twente, Almelo, the Netherlands

³Department of Rehabilitation Medicine, Center for Rehabilitation, University Medical Center Groningen, University of Groningen, Groningen, the Netherlands

⁴Clinic for Spinal Cord Injuries, Bad Wildungen, Germany

Corresponding author: Ulrich Illgner, ulrich_illgner@web.de.

© 2014 by the American Diabetes Association. See <http://creativecommons.org/licenses/by-nc-nd/3.0/> for details.

could be a valuable alternative to knee arthroplasty, which seems to be risky.

Duality of Interest. No potential conflicts of interest relevant to this article were reported.

Author Contributions. U.I. initiated the study and wrote the draft of the manuscript. J.v.N., K.P., and T.M. revised and edited the manuscript. C.D. interviewed patients and searched the data and literature. H.H.W. co-initiated the study, examined patients, and revised the

manuscript. U.I. is the guarantor of this work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

References

1. Kucera T, Urban K, Šponer P. Charcot arthropathy of the knee. A case-based review. *Clin Rheumatol* 2011;30:425–428
2. Troyer J, Levine BR. Proximal tibia reconstruction with a porous tantalum cone in a patient with Charcot arthropathy. *Orthopedics* 2009;32:358
3. Parvizi J, Marrs J, Morrey BF. Total knee arthroplasty for neuropathic (Charcot) joints. *Clin Orthop Relat Res* 2003;416:145–150
4. Lambert AP, Close CF. Charcot neuroarthropathy of the knee in type 1 diabetes: treatment with total knee arthroplasty. *Diabet Med* 2002;19:338–341
5. Tani Y, Inoue K, Kasahara H, Nishioka J, Hukuda S. Asymptomatic big toe changes in diabetic patients with early Charcot knees—a report of 2 cases. *Acta Orthop Scand* 1996;67:302–304