QualiCCare

Interprofessional care quality for people with chronic and multiple diseases

Version 2023

Charcot Foot

Osteo-arthropathy

Key issues and actions in initial management of acute diabetic foot syndrome and foot ulcer (DFS/DFU)

Charcot Foot

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Foot
- Mild erythema
- Local warmth
- Swelling
- Painless or little pain
- Initially no wound
- Neuropathy imperative

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Acute Charcot Foot
until proven otherwise

↓

Medical emergency! Referral to Level 2 or 3 strongly recommended.

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Foot
Same as on the left with wound

↓

Does NOT exclude Acute Charcot Foot
(differential diagnosis = ulcer with deep infection or cellulitis)

↓

Medical emergency in any case

Basic premises – Charcot Foot

Issue	Action/background
Available evidence	Larger scale intervention studies will probably remain difficult to perform in the field of Charcot Foot. Clinical practice will therefore continue to rely on small or observational studies, clinical expertise and circumstantial evidence. These limitations highlight the need for an **interprofessional team or network approach** in the care of patients with Charcot Foot, and **consensus-based decision making** for challenging cases.
Classification	• **Eichenholtz:** 3 stages based on radiological features and foot presentation: development (I), coalescence (II), reconstruction and reconstitution (III) • Proposed addition of the prodromal stage 0: x-ray negative, MRI positive (micro-fracture, bone marrow edema, bone bruising) • **Chantelau:** staging approach based on **disease activity** as demonstrated by MRI (active [A] or inactive [B] disease) and presence of **deformity** (present [1] or absent [0]) → Active disease without deformity (A0): equivalent of «stage 0», desirable stage for disease identification, better chance of healing without deformity → Inactive disease without deformity (B0): desirable end result of care → Active disease with deformity (A1): Eichenholtz stages I/II → Inactive disease with deformity (B1): stable end stage with enhanced risk of ulceration (Eichenholtz stage III) • **Sanders and Frykberg: 5 anatomical patterns:** pattern I – metatarsal/ phalangeal joints pattern II – metatarsal/tarsal joints (Lisfranc joints) pattern III – mid-tarsal joints (Chopart joints) pattern IV – ankle and subtalar joint pattern V – calcaneum

ACF – Acute (active) Charcot Foot

Issue	Action/background	Competence & responsibility
Definition	Non-infectious destruction of bone and joint associated with neuropathy, in the acute phase (Stage 0–1) associated with signs of inflammation.	
Diagnosis 	**Early diagnosis and timely treatment is crucial** because of the rapidly progressive nature of ACF with risk of severe and irreversible foot deformity. High risk of missed diagnosis due to lack of perception by the patient and awareness and knowledge among HCP regarding this rare condition.	Level 1 (2 + 3)
Clinical examination	• Signs of peripheral neuropathy (10g monofilament, tuning fork, achilles TR) • Unilateral erythema, swelling following minor trauma, often unnoticed by the patient, initially without ulcer, but may co-exist caused by deformity or swelling • Affected foot usually more than 2°C warmer compared with the non-affected foot. • Often painless, mild pain may be present. • Clinical signs may be subtle especially if localized on the forefoot	Level 1 (2 + 3)
Differential diagnosis	Cellulitis, trauma, acute gout, deep vein thrombosis, osteomyelitis, activated degenerative arthritis.	Level 1 (2 + 3)
Laboratory	CRP/inflammatory parameters: often normal or non-specifically elevated.	Level 1 (2 + 3)
Imaging	Conventional x-ray: for diagnosis confirmation (CAVE x-ray negative in early «stage 0», see appendix) and evaluation of deformity. MRI: mandatory as second line if x-ray negative and clinical signs of ACF. *Others: scintigraphy, PET: no added benefit*	Level 1 (2 + 3)

Issue	Action/background	Competence & responsibility
Prevention	No specific measures beyond general preventive recommendations for diabetic foot.	Level 1 (2 + 3)
Treatment *(standard)* 	**ACF is a medical emergency and should be referred directly to an interprofessional footcare team**. → ***Level 1*** **Full and quick off-loading and immobilization at prodromal and development phase (Stage 0 – 1) of the Charcot foot is the most important management strategy to prevent or stop progression of deformity. → *Level 2 + 3*** Initially, emergency hospitalization with temporary bedrest may be required for the calming of the inflammatory process und reducing edema (analogous to complex foot fracture), walking aid (crutches). Immobilization in an irremovable total contact cast (TCC) (alternative: removable TCC or orthotic walker rendered non-removable). → ***Level 2 + 3*** *Requirements:* • *Specific training of plaster technicians to avoid iatrogenic complications* • *Close follow-up with regular check and adaptation of offloading device according to the changing shape of the foot under treatment (reduction of swelling leads to misfit of the initial device which can cause friction or pressure ulcers)* • *Patient education and verification of feasibility in individual outpatient setting* Duration: until resolution of inflammation and swelling, coalescence (Stage 2) (not predictable: often 3–6 months, possibly up to 18 months, longer if hind-foot or ankle involvement). · Thrombosis prophylaxis during treatment with an irremovable device is recommended	
Treatment *(pharmacological)*	• Treatment of (frequent) vitamin D deficiency • Anti-resorptive agents (bisphosphonates, calcitonin, denosumab), anabolic (teriparatide): insufficient data for general recommendations	Level 1 (2 + 3)

CCF – Chronic Charcot Foot

Issue	Action/background	Competence & responsibility
Diagnosis	Usually straightforward in presence of typical deformity in a neuropathic foot (e.g. rocker bottom deformity).	**Level 1 (2 + 3)**
Clinical examination	• Signs of peripheral neuropathy (10g monofilament, tuning fork, achilles TR) • **Deformities** associated with ankle/hind-foot charcot neuroarthropathy (CN) often multi-planar (sagittal: procurvatum/recurvatum; frontal: varus/valgus; rotational: internal/external malalignment). Shortening of the limb from collapse of the distal tibia, talus and calcaneus. No or mild temperature difference (< 2°), no swelling (Stage 3 = Reconstruction). • Screen for ulcers/pre-ulcerative lesions +/– infection • Assess vascular status • Inspect footwear	**Level 1 (2 + 3)**
Laboratory	No role except → DFU infection (diabetic foot ulcer)	**Level (1) 2 + 3**
Imaging	According to clinical context	**Level (1) 2 + 3**

Issue	Action/background	Competence & responsibility
Conservative Treatment	• Orthopedic footwear: → **Minor deformity** and affection of the forefoot (Sanders / Frykberg pattern I – II, see appendix) > semi-orthopedic shoes, orthopedic shoe with modification (orthotic insole, roller bar). → **Major deformity** and affection of the mid- and hind-foot (Sanders / Frykberg pattern II – V, see appendix) > orthopedic shoe made to measure. • Close follow-up, repeatedly stressing the compelling necessity of continuous wearing of the shoes in- and outdoor.	**Level 2 + 3**
Surgical Treatment	• Primary indication: Severe deformity and instability, not cast-able, brace-able or shoe-able. • Other indications: impending ulceration/recurrent ulcers despite optimal offloading, inability to heal an ulcer, presence of osteomyelitis and/or significant pain. • Possible Procedures: realignment osteotomy of prominent bone, realignment arthrodesis of the affected and deformed joints. Cave: internal fixation is not recommended in the presence of infection and ulcer. *Surgical intervention in the absence of ulceration or unstable deformity may not be advisable, as it is not without risk.* • Defining of indications as well as practical implementation require a multi-disciplinary approach of a dedicated team with experience in the field in order to achieve satisfactory results.	**Level 3**
Follow-up	Monitor ulcer risk, verify realization of preventive measures (e.g. wearing of orthopedic footwear).	***Level 1 + 3**

** Level 1 at least every 3 months – Level 3 at least once a year*

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[10] Swiss Society of Vascular and Interventional Radiology
[11] Swiss Interest Group of Diabetes Nurses
[12] Swica Insurances
[13] Swiss orthopaedics
[14] Foot and Shoe Association

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References

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