Rheumatology Quiz

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A 65-year-old female with a medical history poorly controlled Type 2 diabetes mellitus with diabetic retinopathy and hypertension for the past 8 years presented with a two-day history of right foot edema, which developed subsequent to long-distance walking. She is currently taking metformin, glipizide, and pioglitazone. Her most recent hemoglobin A1C was 10.6%. She has no prior history of arthritis. Examination revealed a body temperature of 37.0 C, erythema, edema, and warmth of the right ankle without tenderness. A diabetic ulcer was present on the plantar surface of the foot. She also had symmetrically decreased pinprick sensation and a negative response on the monofilament test.
The X-ray findings are shown in Figures 1. and 2.

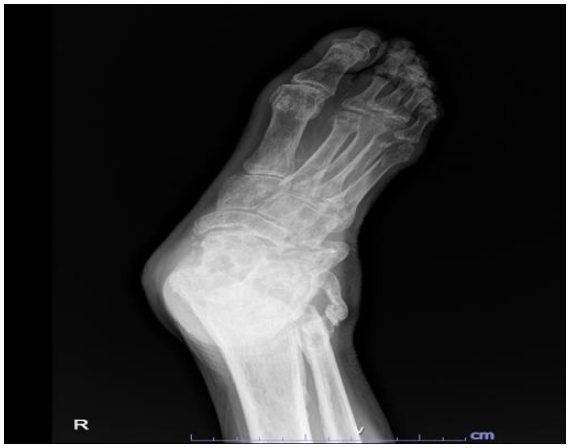

Figure 1 Film right ankle AP view

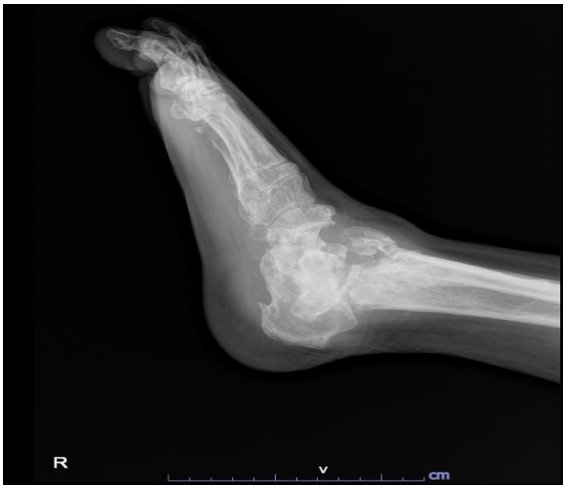

Figure 2 Film right ankle lateral view

Questions:

1. What are the X-ray findings?
2. What is the diagnosis?

Answers

1. **Plain X-ray findings:**

Film right ankle (AP and lateral views) shows soft tissue swelling of the ankle joint, distended joint capsule, joint disorganization, increase density of bony fragment of ankle joint, loss articular surface of distal tibia and distal fibula with sharp margin and sclerosis margin (destruction/ density change), intraarticular loose body of ankle joint (debris), collapsed talus, and dislocation and subluxation of ankle joint.

2. **Diagnosis:** Charcot neuropathic osteoarthropathy of right ankle

Short Review

Charcot neuropathic osteoarthropathy is a destructive joint disorder associated with neuropathy, most commonly affecting the midfoot and ankle.[1,2] It occurs annually in about 0.30%-0.85% of individuals with type 2 diabetes, and its prevalence ranges from 0.10%-7.50%.[3,4] Risk factors include neuropathy, trauma, and metabolic bone abnormalities, which result in an acute localized inflammatory condition and can permanently disrupt the bony architecture of the foot. Other associated conditions include spinal cord injury, leprosy, syphilis, syringomyelia, and chronic alcoholism.[5]

Charcot typically presents as a red, hot, swollen foot, often unilateral and affecting the lower extremity following macro-trauma or repetitive micro-trauma (e.g., walking).[6] It may initially be misdiagnosed as a deep venous thrombosis, cellulitis, or osteomyelitis. Diagnosis relies on clinical evaluation and radiographic imaging (e.g., X-ray, MRI, CT scan, FDG-PET CT).[3,7,8] The stages of Charcot include Stage 0 (prodromal phase, no deformity), Stage I (bone fragmentation and joint subluxation), Stage II (reduced inflammation, absorbtion of bony debris with new bone formation), and Stage III (resolution of inflammation, bone remodeling).[1]

Radiographic features of a Charcot joint can be remembered using the mnemonics as 5 Ds or 6 Ds (separating Disorganization and Dislocation);

- Density change (subchondral osteopenia or sclerosis)
- Destruction (osseous fragmentation and resorption)
- Debris (intra-articular loose bodies)
- Distension (joint effusion)
- Disorganization and Dislocation (joint malalignment due to ligamentous laxity)

To differentiate pseudo-Charcot joint from true Charcot joint: pseudo-Charcot typically presents with a history of recurrent intermittent arthritis, calcium pyrophosphate crystals on arthrocentesis, and chondrocalcinosis along the joint line on plain X-ray. In contrast, true Charcot joint usually has a chronic progressive onset, no crystals detected, no chondrocalcinosis, and demonstrates the “5 Ds” on imaging.

Treatment focuses on minimizing foot deformity through immobilization and protective weight-bearing. Medical optimizaton, inluding HbA1C control, is crucial. Bisphosphonates or calcitonin may help control bone resorption. Surgery is considered for severe deformities.[9] Complications of Charcot include foot ulceration, infection, deformities such as flatfoot or rocker-bottom foot, and, in some cases eventual amputation.[3,10]

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