

CHARCOT NEUROARTHROPATHY OF THE ELBOW JOINT : A

CASE REPORT

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ABSTRACT

Background : Charcot joint, also known as charcot (neuro/osteo) arthropathy, is a rare conditions with chronic and progressive degenerative arthropathy associated with an underlying neurologic disorder. In modern Western societies by far the most common cause is diabetes mellitus. The joints most frequently affected by charcot pathology are the weight bearing joints, predominantly the mid foot but also the ankle, knee, hip and elbow. Unilateral involvement of charcot neuroarthropathy is much more common than bilateral. Clinically, patient with peripheral neuropathy, presenting with a swollen, and erythematous joint. Infection in the neuropathic joint is rare. Initial radiographic assessment by X-ray and for further scans, CT or MRI are often performed to get a more detailed visualisation of the joint, surrounding soft tissue, vasculature, and guide preoperative surgical planning.

Case Report : A 60 years old female with no previous comorbidities, presented with history progressively enlarging lump, pain, numbness and oedem at right elbow since six months ago, without fever or other joint swelling. There was no history of trauma. Plain films, MR Imaging and needle biopsy were performed. The definitive pathologic diagnosis was cystic lesion with inflammation.

Discussion : Charcot neuroarthropathy is a progressive, destructive inflammatory process of joints associated with a deficit of pain sensation. Diabetes and polyneuropathy are the most frequent causes. It can lead to severe deformities and increased risk of amputation and death. Conventional radiography can help establish the diagnosis. Meanwhile, MRI plays an important role in diagnosing complications, assessing the extent of the disease, and presence of osteomyelitis.

Conclusion : Radiography play an important role in diagnosing charcot neuroarthropathy, not only in diagnostic but also in treatment planning. Initial radiographic assessment by conventional radiography and for further examination can be done with MRI.

Keywords : charcot neuroarthropathy, charcot joint, elbow, septic, infected joint.

Background

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Charcot joint, also known as charcot (neuro/osteo) arthropathy, is a rare conditions with chronic and progressive degenerative arthropathy associated with an underlying neurologic disorder. In modern Western societies by far the most common cause is diabetes mellitus. Data indicating the prevalence and incidence of the condition suggest that it often goes undiagnosed among sufferers of diabetes, with figures ranging from 0,4 to 13% among diabetic. The joints most frequently affected by charcot pathology are the weight bearing joints, predominantly the mid foot but also the ankle, knee, hip and elbow^{1,2}. This disorder is often triggered by trauma to a neuropathic extremity, with the injury subsequently progressing to the bones and joints, resulting in a limb-threatening condition commonly observed as a late complication of diabetes. Two primary theories have been proposed to explain the development of Charcot neuroarthropathy. The neurotraumatic theory suggests that joint destruction occurs due to cumulative trauma, which goes unrecognized by the insensate foot. In contrast, the neurovascular theory posits that bone resorption and ligament laxity are secondary to a neural-controlled vascular reflex. Most experts believe that a combination of both mechanisms contributes to the destruction observed in Charcot foot³. Unilateral involvement of charcot neuroarthropathy is much more common than bilateral. Clinically, patient with peripheral neuropathy, presenting with a swollen, erythematous joint with pain of varying degree, usually in the setting of a sensory neuropathy. Infection in the neuropathic joint is rare. Initial radiographic assessment by X-ray and for further scans, CT or MRI are often performed to get a more detailed visualisation of the joint, surrounding soft tissue, vasculature, and guide preoperative surgical planning^{1,2}.

Case Report

Reporting female, 60 years old with history progressively enlarging lump, pain, numbness and oedem at right elbow since six months ago, without other joint swelling. There was pain on rest and on movement and she was not in prior analgesia. There were no history of fall or trauma, no previous comorbidities and any surgical history in the past. She denied any fever, chills, night sweats or any other constitutional symptoms. Her physical examination indicated right elbow deformity, swelling and pain in joint activity. The tactile, pain and temperature sensation below the right elbow decreased. The patient was examined and treated by the orthopaedics. And then the patient came to our department for underwent plain radiograph, MR Imaging and needle biopsy. Plain radiograph of the right humerus and right elbow joint showed destruction of proximal radius ulna and distal right humerus with surrounding soft tissue swelling representing joint capsule distension and joint effusion. There is infero – medial dislocation of the radiohumeral joint is also identified. MR Imaging of the right elbow showed destruction in the distal 1/3 of the right humerus and the proximal 1/3 of the radius and ulna with a decrease in signal intensity on T1W1. Iso to hyperintense on T2W1 which in the administration of contrast soft tissue and surrounding cartilage gives a picture of rim contrast enhancement. And from the pathologic result was cystic lesions with inflammation.

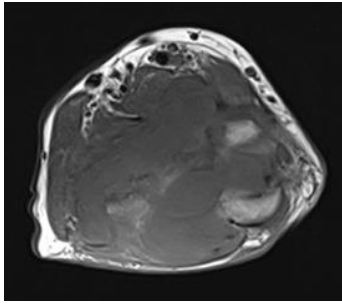


Figure 1 (a). Right Humerus AP/ Lateral Projection

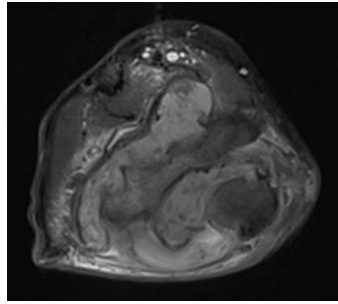


Figure 1 (b). Right Elbow AP/ Lateral Projection

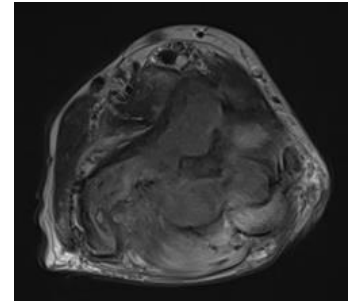
Figure 1 (a,b). Plain radiograph showed destruction of proximal radius ulna and distal right humerus and infero-medial dislocation of the radiohumeral joint.



(a)

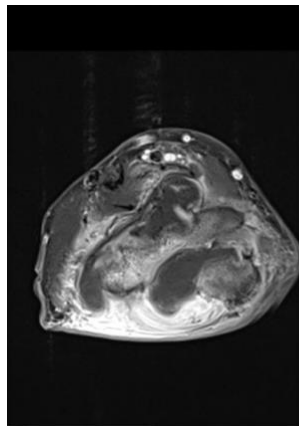


(b)

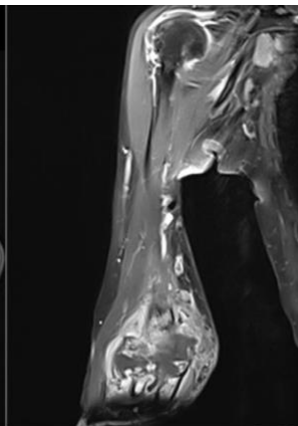


(c)

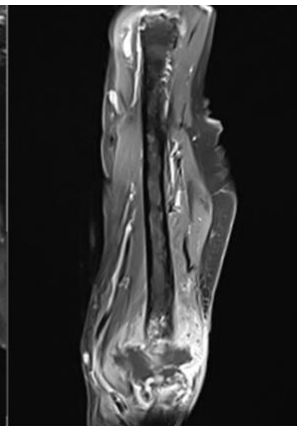
Figure 2



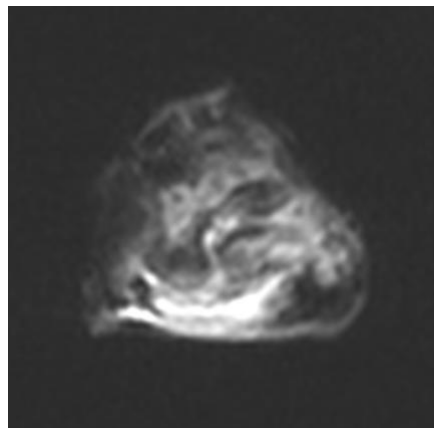
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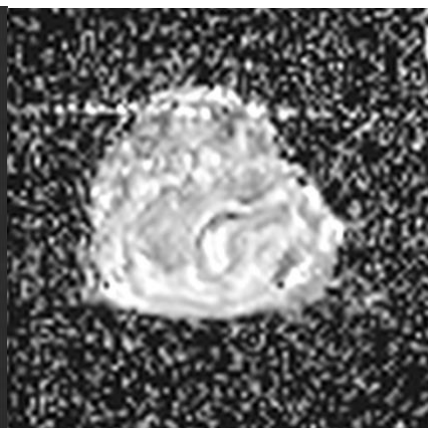
(e)



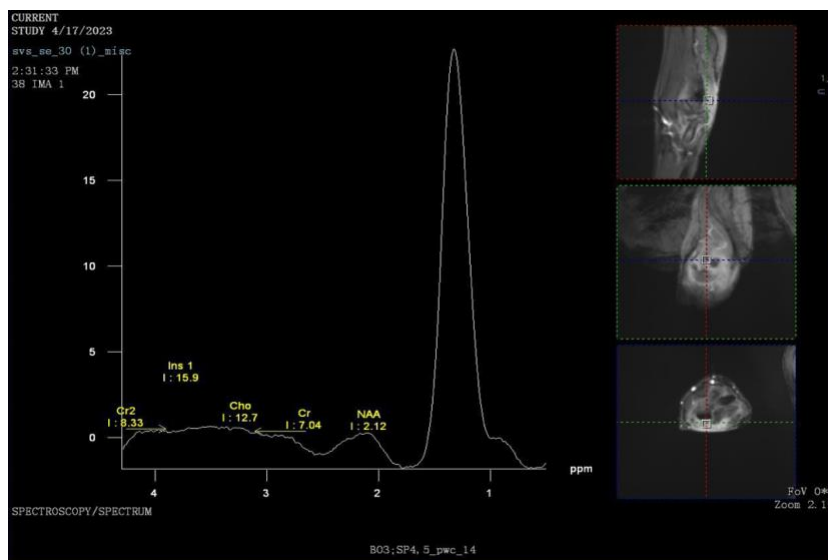
(f)



(g)



(h)



(i)

Figure 2. MR Imaging of the right elbow showed destruction in the distal 1/3 of the right humerus and the proximal 1/3 of the radius and ulna (a,b) show decrease in signal intensity on T1W1 and T1FatSat, (c) show iso to hyperintense signal intensity on T2W, (d, e, f) gives a features of rim contrast enhancement, (g, h) unrestricted diffusion area on DWI and ADC Value : $1,8-1,9 \times 10^{-3} \text{ mm}^2/\text{s}$, (i) MR Spectroscopy show no increase in Ch/Cr or Ch/NAA ratio.

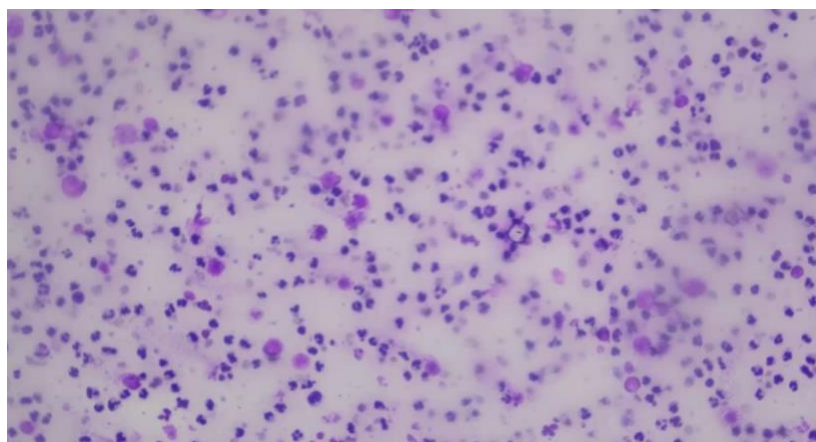


Figure 3. From the histopathologic we found lymphocytes, histiocytes and macrophage cells with cystic lesions concluded with inflammation.

Discussion

Charcot neuroarthropathy of the elbow joint is a rare condition. From reviewing the literature, there are approximately 3-8% elbow neuropathic arthropathy out of all the cases of neuropathic joints^{4,5}. The incident and prevalence of charcot neuroarthropathy varies from 0,1 to 0,4% in people with diabetes. This prevalence increase to 35% in patients with peripheral neuropathy. People with Charcot neuroarthropathy typically have a history of diabetes for at least 10 years. Unilateral involvement of charcot neuroarthropathy is much more common than bilateral^{6,7}. The pathologic and radiographic features of advanced neuropathic

arthropathy are indeed characteristic, the “5Ds” which come from debris, density (sclerosis), destruction, disorganization and 133 dislocation. The radiographic findings can be divided into two forms, hypertrophic or productive and atrophic or destructive. Hypertrophic changes are commonly associated with central spinal cord lesions such as trauma, tumor or congenital malformation whereas atrophic changes are associated with peripheral nerve injuries and are related to trauma, alcoholism and diabetes melitus⁸. Although the radiographic and pathologic features of this condition are generally similar in these various disorders, the distribution of the abnormalities varies among the disorders and can provide an important clue for a proper specific diagnosis as shown in Table 1.

Table 1. Common sites of involvement in neuroarthropathy⁹

Diseases	Sites of Involvement
Tabes dorsalis	Knee, hip, ankle, spine
Syringomyelia	Glenohumeral joint, elbow, wrist, spine
Diabetes mellitus	Metatarsophalangeal, tarsometatarsal, intertarsal joints
Alcoholism	Metatarsophalangeal, interphalangeal joints
Amyloidosis	Knee, ankle
Meningomyelocele	Ankle, intertarsal joints
Congenital sensory neuropathy, hereditary sensory radicular neuropathy	Knee, ankle, intertarsal, metatarsophalangeal, interphalangeal joints
Idiopathic	Elbow, shoulder

Specifically focused on neuroarthropathy of the elbow, a variety of diseases has been reported in the literature as shown in Table 2.

Table 2. Some causes of neuroarthropathy of the elbow⁸

Syringomyelia
Tabes dorsalis
Peripheral neuropathy
Diabetes mellitus
Syringohydromyelia
Charcot-Marie-Tooth disease
Congenital insensitivity to pain
Systemic sclerosis
Surgical denervation
Idiopathic

The differential diagnosis of charcot neuroarthropathy is septic arthritis, usually seen in weight-bearing joints, such as the ankle, knee and hip. Central (upper motor neuron) and peripheral (lower motor neuron) lesions may lead to arthropathy¹. Neuroarthropathy of the elbow is most commonly linked to conditions such as syringomyelia and tabes dorsalis. On the other hand, the primary cause of septic arthritis is typically the hematogenous spread of bacteria from concurrent bacteremia¹⁰.

Clinically, patient with septic arthritis including fever, joint pain, refusal to walk or limited range of motion in the affected joint. Radiographs are often obtained of the affected joint and may demonstrate soft tissue swelling or a joint effusion. Ultrasound, computed tomography, and MR imaging may be more accurate for identifying the effusion but are unable to confirm or exclude the diagnosis of septic arthritis¹⁰. The treatment of choice for charcot neuroarthropathy has not been very clearly described in literature. The treatment can be divided into conservative and surgical treatment. Generally, surgery is considered only after all

conservative measure have failed and the integrity of the soft tissue surrounding the joint is threatened. Additionally, surgery **134** should be undertaken only when late stage of deformity is evident and conservative measures are inevitably useless. Reported succesful treatment of mobilization instead of immobilization in neuropathic arthropathy of the shoulder. From Carl et al. series, four out of five patients with neuropathic arthropathy of the elbow were successfully treated without immobilization of the elbow, but instead they were encouraged to use it. Our patient was treated with immobilization only until the pain subsided. Surgical Arthrodesis with external or internal fixation has resulted in variable surgical outcomes to some researches. Reported a case series of 6 neuropathic elbows, out of which 3 cases were managed surgically developed post operative complications which required additional surgery. A septic neuropathic elbow was managed with surgical debridement and external fixation resulted in instability in further follow ups. Elbow arthrodesis which was a treatment of choice after tubercular elbow is rarely performed. Arthrodesis is suggested only when there is no other reasonably reconstructive option available. Meanwhile succesful treatment of patients with septic arthritis including those with infected neuropathic joints requires appropriate parenteral antibiotic therapy and drainage of the joint. The most common organisms found in the infected neuropathic joint are gram-positive cocci.

Conclusion

Radiography play an important role in diagnosing charcot neuroarthropathy, not only in diagnostic but also in treatment planning. Initial radiographic assessment by conventional radiography and for further examination can be done with MRI.

Reference

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