Charcot Arthropathy of the Wrist Associated with Cervical Spondylotic Myelopathy

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Abstract

Background Charcot arthropathy is a cascade of destructive changes that can effect joints of both the axial and appendicular skeleton. The pathogenesis of this condition centers around the accumulation of minor traumatic events after the loss of normal joint sensation. The most frequently cited cause of Charcot arthropathy of the upper extremity is syringomyelia, and magnetic resonance imaging of the cervical spine should be obtained at presentation.

Case Report A 72-year-old woman presented with a painless right wrist deformity. Radiographs demonstrated advanced destructive changes of the radiocarpal joint. Magnetic resonance imaging of the cervical spine revealed multilevel cervical spondylotic stenosis with cord deformation, but no evidence of syringomyelia. Neurological examination confirmed the presence of myelopathy.

Literature Review The most frequently cited cause of Charcot arthropathy of the upper extremity is syringomyelia, although pathologies such as diabetes mellitus, tabes dorsalis, leprosy, and other disorders affecting the nervous system have been reported to lead to this condition. Neuropathic arthropathy involving the wrist is a rare phenomenon with fewer than 20 published reports in modern literature.

Keywords ► cervical myelopathy ► Charcot arthropathy ► cervical degenerative disease

Clinical Relevance Charcot arthropathy of the wrist is a rare but potentially disabling condition. The diagnosis of spondylotic myelopathy should be considered when evaluating a patient with this presentation. Evaluation consisting of a detailed neurological examination and advanced imaging of the cervical spine is warranted to identify the etiology.

Charcot arthropathy is a pattern of destructive changes that can impair joint function and stability. Since its original description by French physician Jean Marie Charcot, neuropathic arthropathy has been reported to affect nearly every joint in the body. The most accepted theory explaining the changes that occur in Charcot arthropathy centers around the cumulative effects of relatively minor traumatic events in an insensate joint.1–3 As the sum of these events accumulate, the joint surfaces are rapidly destroyed.

Due to their role in weight-bearing activities, the joints of the lower extremity are most commonly involved in this pathology. When neuropathic arthropathy of the upper extremity is observed, the shoulder is most frequently affected. Modern literature detailing cases of wrist involvement is limited to case reports from a myriad of different etiologies. To date, only one previous report of Charcot arthropathy of the wrist as a result of cervical spondylotic myelopathy exists. The purpose of this article is to describe a case of neuropathic arthropathy of the wrist secondary to cervical spondylotic myelopathy.

Case Report

A 72-year-old woman presented for evaluation of a progressive but painless right wrist deformity. The patient stated the
deformity had developed over the preceding 6 months and
denied previous trauma to the extremity. She noted that since
the onset, the deformity had gradually increased despite a
trial of nonsteroidal anti-inflammatory medication and ac-
tivity modification. She denied loss of hand dexterity but had
recently begun treatment with a urologist for bladder incon-
tenience of unknown origin. The patient’s past medical history
included hypertension, chronic obstructive pulmonary dis-
ease, and hyperlipidemia. She reported no known history of
sexually transmitted infection, diabetes mellitus, stroke, spi-
nal pathology, rheumatoid arthritis, or any other autoim-
mune arthropathy.

Examination revealed an obvious deformity of the right
wrist. The carpal bones appeared to be translated dorsal and
ulnar in relation to the distal radius. The skin overlying the
wrist was normal with no erythema. There was full painless
motion of the wrist in flexion, extension, and radial and ulnar
deviation that produced palpable crepitus in all directions.

Examination of the shoulder, elbow, and other joints of
the hand revealed full motion and no obvious deformity.
There was a near full range of cervical motion with negative
Spurling’s test and no Lhermitte’s phenomenon. Neurological
examination revealed diminished sensation to light touch
bilaterally in the upper and lower extremities in all derma-
tomes. She had full strength in all major muscle groups in the
bilateral upper and lower extremities. She demonstrated
hyperreflexia bilaterally in the upper and lower extremities.
A positive Hoffman’s sign and inverted radial reflex were
noted bilaterally. Babinski test revealed down-going toes. Her
gait was widened, and she used a walker outside of the home.

Radiographs of the right wrist revealed advanced destruc-
tive changes of the radiocarpal joint (►Fig. 1). Radiographs of
the cervical spine revealed diffuse subaxial spondylosis as-
sociated with anterior spondylolisthesis of C4 on C5 (►Fig. 2).
Cervical lordosis was maintained, and no gross instability was
noted on lateral flexion-extension radiographs. Magnetic

Figure 1  Posteroanterior and lateral radiographs of the right wrist showing advanced destructive changes of the radiocarpal joint consistent with Charcot arthropathy.

Figure 2  Lateral and swimmer’s views of the cervical spine demonstrating diffuse subaxial spondylosis with anterior spondylolisthesis of the C3 and C4 vertebral bodies.
resonance imaging of the cervical spine demonstrated concomitant spinal cord deformation in the subaxial spine at multiple levels (►Fig. 3). There was no evidence of syringomyelia. White blood cell count and erythrocyte sedimentation rate were normal. The case was presented in grand rounds to the orthopedic teaching staff at our institution. Given the unique presentation of painless radiocarpal joint destruction, most other etiologies were ruled out. There were no other features suggestive of a seropositive joint arthropathy, and given the normal laboratory studies, septic arthropathy was not likely. In the absence of a syrinx, the most common etiology of a neuropathic joint was also ruled out. Given the neurological examination and the presence of spinal cord compression in the subaxial spine secondary to cervical spondylosis, the most likely etiology was myelopathy.

The patient underwent posterior C3–C7 decompressive laminectomies and instrumented posterior spinal fusion without complication (►Fig. 4). Although she was offered a fusion of her wrist joint by our hand surgeon, she declined because her wrist was not painful and her upper-extremity and hand functions were not limited. Her wrist deformity was treated in a removable wrist splint.

At 6-month follow-up, the patient had no progression of her preoperative myelopathic symptoms. In fact, there was moderate improvement in her urinary incontinence with regards to frequency and bladder emptying. She also demonstrated an improved gait, although she continued to use a walker outside the home. All other preoperative long-tract signs remained.

**Discussion**

Charcot arthropathy is a cascade of destructive changes that can affect joints of both the axial and appendicular skeleton. First described in detail by French neurologist Jean Marie Charcot in 1868, the most commonly accepted theory regarding the development of this condition centers around the accumulation of minor traumatic events after the loss of normal joint sensation.1–3 The most frequently cited cause of Charcot arthropathy of the upper extremity is syringomyelia, although pathologies such as diabetes mellitus, tabes dorsalis, leprosy, and other disorders effecting the nervous system have been reported to lead to this condition. Neuropathic arthropathy involving the wrist is a rare phenomenon with fewer than 20 published reports in modern literature. Of these reports, most have been attributed to tabes dorsalis, diabetes mellitus, or leprosy.4–6 In 1983, Mossman and Jestico published a report of two patients with cervical spondylotic myelopathy who presented with disassociated sensory loss.7 Among the subjects presented, one had manifestations of Charcot arthropathy of the wrist. According to the authors’ report, radiographs and myelography obtained in this patient demonstrated retro-listhesis at the level of C4–5 and C5–6 with maximal cord compression occurring at C4–5. Though the other subject presented had no signs of neuropathic arthropathy, the authors did note impaired proprioceptive sensation in the...
wrist and finger joints from compression at C4–6 on cervical myelography. The common location of spinal pathology in these two cases (C4–6), and the one reported here may suggest a predilection for wrist involvement when spondylotic myelopathy preferentially disturbs the spinothalamic tracts at these levels.

Charcot arthropathy of the wrist is rare condition with a broad spectrum of potential causes. To our knowledge, this presentation represents the second reported case of neuropathic arthropathy of the wrist secondary to cervical spondylotic myelopathy. Although the mechanism of this disorder is not completely understood, the similar levels of spinal cord compression in this and the previously reported case may offer valuable insight into further investigations on this topic. Evaluation of the cervical spine should be considered when evaluating new cases of neuropathic arthropathy of any joint in the appendicular skeleton without other obvious etiologies.

Notes
The views expressed in this manuscript are those of the authors and do not reflect the official policy or position of the Department of the Army, Department of Defense, or the U.S. Government.

Disclosures
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