

Clinical case

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Open fracture of the distal radius with complete laceration of the median nerve

*Fractura abierta de radio distal con sección completa del nervio mediano*Jiménez I,^{*,‡,§} Aniel-Quiroga-Bilbao M,^{*} García-Toledo A,^{*} Marcos-García A,^{*} Caballero J,^{*,§} Medina J^{§,¶}

Hospital Universitario Insular de Gran Canaria. Las Palmas de Gran Canaria, España.

ABSTRACT. Introduction: median nerve neuropathy accompanying a distal radius fracture is common. Differential diagnosis includes nerve contusion, acute carpal tunnel syndrome, forearm compartment syndrome or exacerbation of an idiopathic carpal tunnel syndrome. **Case report:** a 44-year-old male presented with a right distal radius fracture after a motorcycle accident. He presented a 1.3 cm blunt wound situated proximal to the radiocarpal flexion crease and complained of well-defined numbness in the median nerve territory. The fracture was reduced and fixed using a volar plate and the median nerve was explored finding a complete section with a 2.0 cm defect. The carpal tunnel was released and a sural nerve fascicular graft was interposed presenting good results at final follow-up. **Conclusion:** a median nerve transection after a radius fracture is an exceedingly rare injury. This case report emphasizes the importance of an accurate physical examination including the initial neurological assessment.

Keywords: distal radius fracture, median nerve, nerve injury, nerve section, open fracture.

RESUMEN. Introducción: las fracturas desplazadas de extremo distal del radio se acompañan frecuentemente de manifestaciones clínicas sugestivas de neuropatía del nervio mediano. El diagnóstico diferencial debe incluir la contusión o lesión nerviosa directa, el síndrome del túnel carpiano agudo, el síndrome compartimental del antebrazo o la exacerbación de un síndrome del túnel carpiano idiopático. **Caso clínico:** un varón de 44 años presentó una fractura del radio distal derecho tras un accidente de motocicleta. Presentaba una herida contusa de 1.3 cm situada proximalmente al pliegue de flexión radiocarpiana y refería disestesias bien definidas en el territorio sensitivo del nervio mediano. La fractura se trató mediante reducción abierta y osteosíntesis con placa volar y, por los hallazgos en la exploración inicial, se exploró el nervio mediano encontrando una sección completa con un defecto de 2.0 cm. Se liberó el túnel carpiano y se interpuso un injerto fascicular de nervio sural que presentó buenos resultados en el seguimiento final. **Conclusión:** la sección del nervio mediano tras una fractura de muñeca es una lesión extremadamente rara. Este caso clínico subraya la importancia de una exploración física inicial minuciosa incluyendo la evaluación neurológica inicial.

Palabras clave: fractura distal del radio, nervio mediano, lesión nerviosa, sección nerviosa, fractura abierta.

* Orthopedic Surgery and Traumatology Service. Insular University Hospital of Gran Canaria. Las Palmas de Gran Canaria, Spain.

‡ ORCID: 0000-0001-9922-5805.

§ San Roque University Hospital. Las Palmas de Gran Canaria, Spain.

¶ Mutua de Accidentes de Canarias. Las Palmas de Gran Canaria, Spain.

Correspondence:

Isidro Jiménez MD, PhD

Servicio de Cirugía Ortopédica y Traumatología.

Hospital Universitario Insular de Gran Canaria.

Avenida Marítima del Sur s/n, Las Palmas de Gran Canaria, 35016, Las Palmas, España.

E-mail: isidro_jimenez@hotmail.com

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Introduction

Median nerve neuropathy accompanying a distal radius fracture is common with varying levels of nerve compromise. It can be caused by blunt contusion, stretch of the nerve over the angulated distal radius, swollen pronator quadratus muscle, fracture hematoma in the carpal tunnel or from bony fractured edges (Wolfe, 2011).¹ It often resolves after reduction of the fracture but, when nerve symptoms persist after reduction, the differential diagnosis should include nerve contusion, acute carpal tunnel syndrome, forearm compartment syndrome or exacerbation of an underlying idiopathic carpal tunnel syndrome (Floyd et al. 2015).²

A median nerve transection in association with a distal radius fracture is an exceedingly rare injury that has been exceptionally reported in the available literature.³

Case report

A 44-year-old right-handed male presented at the emergency department with pain and deformity at his wrist after a low-speed motorcycle accident. He had no injuries to other level except in his right wrist where he presented a dinner fork deformity, great soft tissue attrition in the volar aspect and a blunt wound measuring 1.3 cm from radial to ulnar situated 3 cm proximal to the radiocarpal flexion crease. Thumb and fingers active motion were unaffected. There were no vascular issues but in the neurological assessment he complained of well-defined numbness in the volar aspect of his thumb, index, middle and radial aspect of his ring fingers.

After local cleansing, wound irrigation and temporary stabilization in plaster; intravenous broad-spectrum antibiotics was administered. Fracture aligning and splinting improved the pain but did not change the digital paresthesia.

Plain radiographs were taken showing a displaced intra-articular distal radius fracture (Figure 1).



Figure 1: Anteroposterior and lateral radiographs of the right wrist: displaced intra-articular distal radius fracture with radius shortening, metaphyseal dorsal comminution and 30° of dorsal angulation.

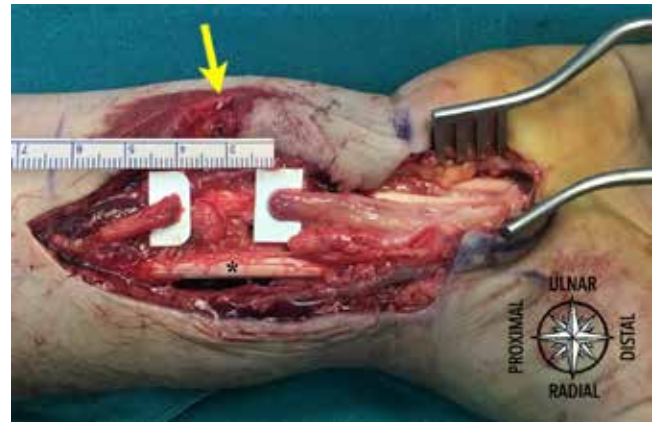


Figure 2: Intraoperative photograph showing the cutaneous attrition at the volar-ulnar aspect of distal forearm, the traumatic wound (arrow), integrity of the *flexor carpi radialis* tendon (*) and a blunt complete section of the median nerve with a 2.0 cm gap.

He was diagnosed of an open and displaced distal radius fracture of the right wrist type 2 of the Gustilo & Anderson classification with suspected median nerve injury and surgical treatment was recommended.

The extended flexor carpi radialis approach was carried out; the fracture was reduced and fixed using a volar plate. As the patient presented well-defined paresthesias in the median nerve distribution, the nerve was explored and a complete section with a 2.0 cm defect was found (Figure 2). The carpal tunnel was released and a sural nerve fascicular graft was interposed. He had a complete motor recovery at six months after the repair. At one-year follow-up, he reported a slightly diminished sensitivity compared to the other hand but he had no limitations in his daily-living activities.

Discussion

Median nerve dysfunction may accompany distal radius fractures and its treatment. Such nerve disorders can be further classified as primary or secondary, and may occur either acutely, subacutely, or late. An understanding of the factors associated with nerve dysfunction and appropriate detection of abnormalities on physical examination, coupled with directed intervention, are the key points in achieving optimal outcome.

Direct injury (laceration or transection) of the median nerve in association with a distal radius fracture is extremely uncommon and, to the best of our knowledge, it has been previously published only in one case report.³ Factors such as hematoma, fracture displacement, swelling and the position of the wrist are more likely the cause of acute or subacute median nerve dysfunction.⁴

There is no consensus in the treatment of acute median neuropathy associated with fractures of the distal radius.²

In patients presenting closed injuries, if neurologic symptoms worsen or show no improvement over the first 24 to

48 hours, the reduction cannot be obtained or maintained in the presence of median nerve compression symptoms or those that have higher energy injuries where it may be difficult to monitor the neurological status, carpal tunnel release and operative stabilization of the fracture seems to be a rational choice.

In open injuries as in this case report, we believe that the median nerve status should be routinely assessed when addressing the distal radius fracture since, in the exceptional case of a median nerve section, the result might be devastating if the proper diagnosis and treatment is not carried out.

We believe that this report emphasizes the importance of an adequate medical record and an accurate physical examination including the initial neurological assessment.

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Informed consent statement: written informed consent was obtained from all subjects prior to inclusion in the study.

Statement of Human and Animal Rights: all procedures were performed in accordance with ethical standards and the 1975 Declaration of Helsinki, revised in 2008.

Ethics committee: our institution does not require ethics committee approval for the reporting of individual cases or case series.