# Acute carpal tunnel syndrome secondary to radiation treatment: A case report

Johnny Franco MD, Andrew Silver Arthur Kumpf MD, John Scott Ferguson MD

J Franco, ASA Kumpf, JS Ferguson. Acute carpal tunnel syndrome secondary to radiation treatment: A case report. Can J Plast Surg 2009;17(4):e35-e36.

Carpal tunnel syndrome has a prevalence of 1% to 10%, and while acute carpal tunnel syndrome makes up the minority of cases of this compression neuropathy, it is important to recognize as a distinct entity because prompt surgical treatment can decrease long-term morbidity. The most common causes of acute carpal tunnel syndrome are trauma to the hand or wrist, infection, and disorders of rheumatological, hemorrhagic and vascular origin. The present case report demonstrates the role of radiation therapy as a cause for acute carpal tunnel syndrome, a cause that has not been reported previously.

Key Words: Acute; Carpal tunnel syndrome; Radiation

In 1913, French neurologists Pierre Marie and Charles Foix were the first to recommend surgical treatment of median nerve compression syndromes based on anatomical studies. It was not until 1938 that Moersch coined the term 'carpal tunnel syndrome' to encompass the symptom complex brought about by the compression of the median nerve. This term was then further popularized by George Phalen in the 1950s (1). In 1984, Sir James Paget was the first to describe a case of acute carpal tunnel, a case in which compression of the median nerve was secondary to a distal radius fracture (1). The distal radius fracture is now recognized as the most common cause of acute carpal tunnel syndrome (2).

Carpal tunnel syndrome has a prevalence of 1% to 10% of the general population. While the majority of carpal tunnel syndrome is chronic in nature and slowly progressive, acute carpal tunnel syndrome does represent a small but important percentage of cases. Acute carpal tunnel syndrome is distinguishable from its more common counterpart by the sudden onset of unrelenting pain and paresthesia in the distribution of the median nerve (2). Several causes of acute carpal tunnel syndrome have been described, with the most common causes being trauma to the hand or wrist, infection, and disorders of rheumatological, hemorrhagic and vascular origin (2).

The diagnosis and management of acute carpal tunnel syndrome is important because a delay in treatment can lead to permanent nerve damage (3,4). In the setting of prompt operative decompression of acute carpal tunnel syndrome, the pain resolves almost immediately postoperatively and sensation returns to normal with in 96 h. However, in cases where there is a delay in operative decompression, nerve dysfunction may be permanent (4).

# Un syndrome du canal carpien aigu secondaire à une radiothérapie : Un rapport de cas

Le syndrome du canal carpien a une prévalence de 1 % à 10 %, et même si le syndrome du canal carpien aigu représente la minorité des cas de cette neuropathie de compression, il est important de le considérer comme une entité distincte, car un traitement chirurgical rapide peut en réduire la morbidité à long terme. Les principales causes de syndrome du canal carpien aigu sont des traumatismes à la main ou au poignet, une infection et des troubles d'origine rhumatologique, hémorragique ou vasculaire. Le présent rapport de cas démontre le rôle de la radiothérapie comme cause de syndrome du canal carpien aigu, une cause jamais déclarée auparavant.

## CASE PRESENTATION

A 60-year-old man presented to the emergency room with a chief complaint of numbness and pain in his right hand. Two months previously, he underwent excision of a high-grade pleomorphic sarcoma of his right forearm. After the excision of the tumour the patient began localized radiation therapy. The patient had undergone radiation treatment with a total of 5000 Gy two days before his presentation in the emergency department.

During the 24 h period before his presentation, the patient began to have pain and swelling in his right forearm. He also began to experience paresthesia of his thumb, index, long and radial ring finger that was progressively worsening over this time period. On physical examination, the patient had exquisite tenderness to palpation over the wrist and metacarpals and was found to have areas of cellulitis and radiation burns around the wrist and hand (Figures 1 to 4). The patient was also noted to have poorer two-point discrimination in the distribution of the median nerve relative to other parts of the hand.

The patient was taken emergently to the operating room for median nerve decompression. An open approach was used for the carpal tunnel release to ensure adequate decompression and exploration of the carpal tunnel. Upon exploration, 3 mL of cloudy fluid was found in the carpal tunnel. The incision was closed in a single layer of interrupted mattress sutures.

The patient was admitted postoperatively for intravenous antibiotics and occupational therapy. The infectious disease service was also consulted for management of this complex wound. The patient had a peripherally inserted central catheter placed and was discharged home on ceftriaxone and metronidazole for two weeks. At the time of discharge his pain

Saint Louis University Department of Surgery, Division of Plastic Surgery, Saint Louis, Missouri, USA. Correspondence: Dr Johnny Franco, 1010 Charles Street, Apartment 308, Saint Louis, Missouri 68715, USA. Telephone 575-496-3774, e-mail jufranco16@gmail.com



Figure 1) Right hand with radiation burns



Figure 2) Right hand with radiation burns

had improved dramatically and his two-point discrimination had also improved, but was not completely back to baseline.

### DISCUSSION

Carpal tunnel syndrome is extremely common, comprising 90% of all entrapment neuropathies (5). While acute carpal tunnel syndrome makes up only a minority of these compressive neuropathies, delay in diagnosis and treatment can result in severe functional impairment. However, with prompt recognition and operative treatment, the majority of patients are able to regain normal sensation. Therefore, a high index of suspicion is necessary to appropriately treat individuals with this syndrome. The acuity of onset and associated pain help differentiate it from other injuries. Mack et al (4) describe the use carpal tunnel compartment measurements in cases where the diagnosis is not clear.

The above case represents a unique presentation of acute carpal tunnel syndrome involving radiation therapy and subsequent infection of the hand. While articles have described sarcomas and infection as a cause of acute carpal tunnel syndrome, our review of the literature did not find any previous reports associated with radiation treatment (6).

While there are numerous known causes of acute carpal tunnel syndrome, the role of radiation therapy as a potential



Figure 3) Right hand with radiation burns



Figure 4) Right hand with radiation burns

cause needs to be further elucidated. As oncological therapies continue to improve, it will be increasingly possible to perform limb salvage operations for patients with complex tumours of their extremities. Furthermore, the continued awareness of potential complications of any operation or therapeutic modality allows for the timely diagnosis and treatment of such unfortunate events.

#### REFERENCES

- Michelsen H, Posner M. Medical history of carpal tunnel syndrome. Hand Clin 2002;18:257-68.
- Schnetzler K. Acute carpal tunnel syndrome. J Am Acad Orthop Surg 2008;16:276-82.
- 3. Ford DJ, Ali MS. Acute carpal tunnel syndrome, complications of delayed decompression. J Bone Joint Surg Br 1986;68:758-9.
- Mack GR, McPherson SA, Lutz RB. Acute median neuropathy after wrist trauma. The role of emergent carpal tunnel release. Clin Orthop Relat Res 1994;300:141-6.
- Aroori S, Spence RA. Carpal tunnel syndrome. Ulster Med J 2008;77:6-17.
- 6. Batra S, Batra M, Sakamuri R, Sinha AK, Kanvinde R. High-grade infiltrative myxofibrosarcoma in forearm presenting as acute carpal tunnel syndrome. J Hand Surg 2008;33:69-272.