

# Guyon's Canal Syndrome Due to Tortuous Ulnar Artery: A Case Report

Tortuoz Ulnar Artere Baęlı Guyon Kanalı Sendromu: Vaka Takdimi

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**Abstract: Aims:** To report of a case with Guyon's canal syndrome due to tortuous distal ulnar artery. Although ulnar nerve entrapment has been quite frequently reported due to posttraumatic false aneurysms, thrombosis, or true aneurysms of the distal ulnar artery in Guyon's canal, only one case has been reported due to tortuous distal ulnar artery in literature by now.

**Methods:** A 62 year-old woman with intermittent pain, intermittent burning sensation and continuous numbness on the ulnar side of her left hand was admitted. Electromyographic examination showed an ulnar neuropathy in the Guyon's canal and an ipsilateral carpal tunnel syndrome.

**Results:** Exploration of the ulnar nerve in the Guyon's canal at the wrist showed that an S shaped tortuous ulnar artery compressed the ulnar nerve. Ulnar nerve decompression by ulnar artery transposition was performed and carpal ligament was partially excised. After the operation, pain and burning sensation were improved completely in a few hours, but numbness was continued.

**Conclusion:** Tortuous peripheral arteries are too rare causes of peripheral nerve entrapment syndromes. Resolution of intermittent pain and burning sensation by ulnar artery transposition in the presented case was suggested that the symptoms might be due to pulsatile pressure like in vascular compression of cranial nerves.

**Key Words:** peripheral nerve compression, ulnar nerve, Guyon's canal

**Özet: Amaçlar:** Kıvrımlı ulnar arter tarafından basıya baęlı Guyon kanalı sendromu olan bir olgunun sunulması. Ulnar arterde travma sonrası yalancı anevrizma, tromboz ya da gerçek anevrizma tarafından basıya baęlı ulnar sinir tuzaklanması oldukça sık bildirilmiş olmasına rağmen, kıvrımlı ulnar arter tarafından basıya baęlı Guyon kanalı sendromu literatürde sadece bir olguda yayımlanmıştır.

**Yöntemler:** Sol elinde aralıklı ağrı, aralıklı yanma hissi ve uyuşma yakınmaları olan 62 yaşında bir kadın hasta sunuldu. Elektromiyografi incelemesinde Guyon kanalında ulnar nöropati ve aynı tarafta karpal tünel sendromu ile uyumlu bulgular saptandı.

**Bulgular:** Ameliyatta ulnar sinirin Guyon kanalı içinde S şeklindeki kıvrımlı ulnar arter tarafından basıldığı izlendi. Arterin yeri değiştirilerek sinire olan bası kaldırıldı ve karpal baę kesildi. Girişim sonrası eldeki ağrı ve yanma hissi birkaç saat içinde tamamen düzeldi, ancak uyuşma yakınması devam etti.

**Sonuç:** Kıvrımlı periferik arterler nadiren periferik sinir tuzaklanması sendromlarına neden olur. Sunulan olguda aralıklı ağrı ve yanma hissinin ulnar arterin yerinin değiştirilmesi ile düzelmesi, bu belirtilerin, kafa çiftlerinin damarsal basılarına benzer şekilde, pulsatile basıya baęlı olabileceğini düşündürdü.

**Anahtar Kelimeler:** Periferik sinir basısı, ulnar sinir, Guyon kanalı

## INTRODUCTION

The distal ulnar tunnel (Guyon's canal) is a fibroosseous tunnel along the anteromedial portion of the wrist that contains the ulnar nerve, ulnar artery and veins. As with the adjacent carpal tunnel, its main clinical significance is that it may cause nerve compression. A variety of causes of ulnar nerve compression in the Guyon's canal have been determined, including trauma, lipoma, ganglion cysts, and normal anatomic variants such as presence of abductor digiti minimi muscles coursing through the canal, or existence of a fibrous arch overlying the deep motor branch of the ulnar nerve (3,4,5,6,8,9,11). Ulnar entrapment may be due to arterial compression also. Although segmental ulnar neuropathy has been quite frequently reported as a result of ulnar nerve compression due to posttraumatic false aneurysms, thrombosis, or true aneurysms of the distal ulnar artery (1,4,5,7,12), only one case has been reported due to tortuous distal ulnar artery in Guyon's canal by now (10).

The authors present a 62-year-old case of segmental ulnar neuropathy in the wrist due to tortuous ulnar artery.

## CASE REPORT

A 62-year-old woman was admitted with a 6 months history of intermittent pain, intermittent burning sensation and continuous numbness along the hypothenar eminence and the fourth and fifth digits of her left hand. The intermittent pain and burning sensation were lasting about ten to fifteen minutes. On examination, there was a slight diminution of the hypothenar eminence muscle mass, with mild weakness of the fourth and fifth digits abduction. Sensation to touch and pinprick was diminished in the ulnar distribution of the hand.

Left ulnar nerve conduction velocity did not demonstrate ulnar nerve segmental delay across the elbow. Left ulnar nerve united muscle action potential revealed a significantly decreased amplitude of 1,3 mV (normal 15 to 50 mV) and a

prolonged distal latency of 4,2 ms (normal 1,5-3,1). Electromyography (EMG) showed that there were sparse (only one MUP), prolonged and polyphasic motor unite potentials and abundant denervation potentials in the intrinsic hand muscles innervated by the ulnar nerve. In addition to these ulnar nerve findings, there was also a minimal ipsilateral carpal tunnel syndrome findings.

Exploration of the ulnar nerve in the Guyon's canal at the wrist showed an S shaped tortuous ulnar artery compressing the ulnar nerve (Figure 1). Ulnar nerve decompression by ulnar artery transposition was performed. To provide transposition, ulnar artery was dissected from underlying nerve, and was pulled to radial side of the nerve. Then, the artery was fixed to soft tissue by a nonabsorbable suture wrapping around but not compressing the artery. Then the carpal ligament was incised.



Figure 1: Operative photograph of the case. Note the vascular loop on the radial side of the ulnar nerve.

After the operation, intermittent pain and burning sensation were improved completely in a few hours, but numbness and weakness were continued. On 6-month follow-up, numbness was present, and hypoesthesia on ulnar side of left hand and weakness of the fourth and fifth digits abduction were continued on neurological examination. On EMG examination after 6 months, a minimal improvement was observed in the lesion causing excessive axonal loss on the left ulnar nerve.

## DISCUSSION

The clinical importance of the distal ulnar tunnel is that it may become the site of ulnar nerve compression. Although most commonly idiopathic, ulnar entrapment can result from compression of the nerve by osteoarthritic processes, soft tissue tumours, synovial cysts, bursal enlargement, anomalous muscles, ganglions, calcinosis, and atypical fibrous band (3,4,5,6,8,9,11). It may also be due to arterial pathologies. Unlike cranial nerves, which have been reported to be compressed by aneurysmal or elongated, tortuous, and dilated arteries, peripheral nerve compression syndromes may be rarely due to arterial pathologies. Only aneurysmal or thrombosed ulnar arteries have been identified as impinging on ulnar nerve among peripheral nerves (2). A good number of reports describe compression of the ulnar nerve due to posttraumatic false aneurysms of the ulnar artery at the wrist and hand (1,5). This pathology has also been reported with thrombosis of the ulnar artery as it emerges from the Guyon's canal, usually due to repetitive trauma (4), or anomalous arterial anatomy (7). Infrequently, compression by true ulnar artery aneurysms has been described (12). However, the only case with ulnar nerve compression caused by tortuous ulnar artery has been reported by Segal et al. in literature (10). In our case, it was also determined ulnar nerve compression by a tortuous ulnar artery in the Guyon's canal as that case.

Segal et al. (10) have reported in their case that, paresthesia, tingling and burning had been the prominent symptoms, and they have stated with immediate resolution of these symptoms by simply moving aside the pulsatile pressure that might have triggered ectopic activation of sensory nerve fibers as the cases with pulsatile vascular compression of cranial nerves. In our case, the prominent symptoms were an intermittent burning pain as the one of Segal et al. (10) and numbness in addition. Burning pain was completely resolved in a few hours after the operation. Therefore, it was stated that this symptom may be due to pulsatile compression by the tortuous ulnar artery. On the other hand, numbness and hypoesthesia on ulnar side of the hand and mild weakness of the fourth

and fifth digits were not improved. On 6-month follow-up, EMG findings were improved only minimally. So, it was stated that, pulsatile compression of the peripheral nerves may be due to permanent deficits.

The specific internal topography of the ulnar nerve in relation to the structures comprising the distal ulnar tunnel into three zones (5). Each zones consists of both a specific portion of the ulnar nerve and the structures surrounding it. Zone I is that portion of the tunnel proximal to the bifurcation of the nerve. In Zone I, the nerve has both motor and sensory fibers. Cross sections of the nerve in this zone showed two distinct group of fascicules. The palmar-radial fibers became the superficial branch, while the dorsal-ulnar fibers became the deep motor branch. Zone II encompasses the deep motor branch of the nerve, and Zone III surrounds the superficial branch.

Gross and Gelberman (5) have reported in a review that, most of the ulnar nerve entrapment cases in Zone I had combined motor and sensory deficits. Ulnar artery is located lateral side of the nerve through the Zone I of the canal (5). Therefore, it is expected that nerve compression due to arterial pathology must cause principally sensorial symptoms and signs as in the case of Segal et al (5). However, unlike that case, there were both sensorial and motor deficits, and also permanent deficits in our case whose compression was in Zone I. Therefore, it may be stated that pulsatile compression of the nerve due to arterial loop in Zone I may affect both lateral-sensorial and medial-motor fascicules, and may also cause to permanent sensorial and motor deficits, if it is long-lasting sufficiently.

## CONCLUSIONS

Tortuous peripheral arteries are too rare causes of peripheral nerve entrapment syndromes. Resolution of pain and burning sensation by ulnar artery transposition in the case presented here suggests that the symptoms may be due to pulsatile pressure like in vascular compression of cranial nerves. But some of the symptoms and signs may be permanent after decompression as in our case if compression is long-lasting sufficiently.

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