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Ulnar Neuropathy as a Complication of Prone Positioning Following Retinal Detachment Surgery

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Abstract

In vitrectomy performed for retinal detachment, a gas bubble tamponade may be placed to ensure adequate approximation and closure of the retina. Although not included in clinical guidelines, maintaining a face-down position for several days or even weeks after surgery may help the gas bubble settle against the retina. The duration of the face-down positioning varies depending on the retinal pathology, the type of gas used, and the surgeon's preference. Maintaining a continuous face-down position is quite difficult for patients. Therefore, they may adopt sitting or lying positions with their heads supported on a table. However, this may lead to certain ischemic and thrombotic complications. Unfortunately, clinicians are often unaware of or tend to overlook these risks. Herein, we report a case of ulnar neuropathy that developed as a result of prolonged prone positioning following retinal detachment surgery, in order to raise awareness of this potential complication.

Keywords: Retinal detachment, Prone positioning, Ulnar neuropathy

Retina Dekolmanı Cerrahisi Sonrası Yüzüstü Pozisyonlamanın Bir Komplikasyonu Olarak Ulnar Nöropati

Özet

Retina dekolmanı için yapılan vitrektomide, retinaya yeterli yakınlaştırma ve kapanma sağlamak için bir gaz kabarcığı tamponadı yerleştirilebilir. Klavuzlarda yer almamasına rağmen ameliyat sonrası günlerce hatta haftalarca yüzüstü pozisyonlandırma, gaz kabarcığı tamponadının retinaya yerleşmesine yardımcı olabilir. Yüzüstü pozisyonun süresi, retina patolojisine, gaz türüne ve cerrahın tercihine göre değişir. Hastalar için sürekli yüzüstü pozisyonu korumak çok zordur ve bu hastalar başları masaya dayalı bir şekilde oturma veya uzanma pozisyonuna geçebilirler. Bu durum birtakım iskemik ve trombotik komplikasyonlara neden olabilmektedir. Malesef klinisyenler bunu yeterince bilmemekte veya göz ardı etmektedirler. Burada, retina dekolmanı ameliyatı sonrası uzun süre yüzüstü pozisyonuna bağlı ortaya çıkan ulnar nöropati vakasını farkındalık oluşturması açısından bildiriyoruz.

Anahtar kelimeler: Retina dekolmanı, Yüz üstü pozisyonlama, Ulnar nöropati

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INTRODUCTION

Retinal detachment is a critical ophthalmologic emergency marked by the separation of the neurosensory retina from the retinal pigment epithelium (1). Standard treatment modalities include several highly effective surgical interventions such as scleral buckling, pars plana vitrectomy, and pneumatic retinopexy (2). Although postoperative prone positioning with the elbows in flexion following the use of intraocular tamponades (gas or silicone oil) is not formally included in clinical guidelines, it remains a widely adopted practice among ophthalmologists. However, this positioning technique may increase the risk of ulnar neuropathy after retinal detachment surgery (3). This potential complication is often under-recognized by clinicians. The present case report aims to highlight this important issue.

CASE REPORT

A 65-year-old male patient underwent vitrectomy with sulfur hexafluoride (SF6) gas tamponade at an external ophthalmology center. Postoperatively, he was instructed to maintain a prone position with the elbows flexed for 10 days until the gas was absorbed (Figure 1). Two weeks after the retinal surgery, he developed numbness and sensory loss in the fourth and fifth digits of the right hand, along with pain along the ulnar aspect of the right forearm. Accordingly, the patient was prescribed medical treatment (non-steroidal anti-inflammatory drugs, local injection) for several months by the initial consulting physicians; however, no clinical improvement was achieved. It was noted that the patient had not participated in any physical therapy program during this period. Due to the progression of symptoms despite the passage of six months since onset, the patient was referred to the neurology outpatient. Neurological examination revealed hypoesthesia predominantly in the fourth and fifth digits of the right upper extremity. Deep tendon reflexes were normal in all extremities. No muscle weakness was observed. Phalen's and Tinel's signs were negative. Sensory and motor nerve conduction studies demonstrated decreased conduction velocities and reduced action potentials of the right ulnar nerve (Table 1). Needle electromyography (EMG) indicated chronic neurogenic changes in the right abductor digiti minimi muscle. Cervical spine magnetic resonance imaging (MRI) was unremarkable.

Extensive laboratory investigations, including complete blood count, erythrocyte sedimentation rate, C-reactive protein, liver and renal function tests, muscle enzymes, folic acid and vitamin B12 levels, thyroid function tests, autoantibody panel were all within normal limits. A diagnosis of right ulnar neuropathy at the elbow was established. Neurosurgical consultation was sought for the patient. Surgical decompression of the right ulnar nerve at the elbow was performed as a treatment. The patient continued to report unilateral hypoesthesia and numbness in the fourth and fifth digits.

Informed consent was obtained from the patient and the Institutional Review Board approved the study (approval no: 2025-09/9)

Figure 1. Example of prone positioning with elbows in flexion posture

Table 1. A combination of nerve conductions studies and needle electromyography in the patient with RD

NERVE / RECORDING	Stimulation site	Onset Latency (ms)	Amplitude sensory-µV motor- mV	Distance (mm/sn)	Conduction velocity (m/s)
Right median sensory / index finger	Wrist	2.1	24.1	145	70
Right ulnar sensory / digiti minimi	**Wrist**	**2.7**	**0,8**	**130**	**48**
Right radial sensory / polex finger	Distal dorsal forearm	2.3	14.5	150	64
Right median motor / APB muscle	Wrist - Elbow	3.5/6.6	6.2/6.1	200	63
Right ulnar motor /ADM muscle	Wrist – B Elbow	3.0/6.0	5.6/5.4	180	61
Right ulnar motor /ADM muscle	**B Elbow- A.Elbow**	**6.0/8.5**	**5.4/5.0**	**100**	**40**
Left median sensory / index finger	Wrist	2.4	15	150	63
Left ulnar sensory / digiti minimi	Wrist	2.6	16.5	135	51
Left radial sensory / polex finger	Distal dorsal forearm	2.3	16.4	150	64
Left median motor / APB muscle	Wrist - Elbow	3.4/6.5	7.0/6.3	200	65
Left ulnar motor /ADM muscle	Wrist – B Elbow	2.8/6.0	6.1/6.2	180	56
Left ulnar motor /ADM muscle	B Elbow- A.Elbow	6.0/7.5	6.2/6.4	100	66
Right sural sensory/lateral malleolus	Ankle	1.7	23.5	90	50
Right peroneal motor / EDB muscle	Ankle-fibula head	3.7/9.2	5.0/4.6	320	54
Right tibial motor / AHL muscle	Ankle- poplitea	5.2/12.4	7.1/5.9	395	55

Table 1. A combination of nerve conductions studies and needle electromyography in the patient with RD (continued)

NEEDLE ELECTROMYOGRAPHY												
Muscle	**Spontaneous Activity**					**Motor Unit Action Potentials (MUAPs)**						**Voluntary Activity**
	Fibs	**PSW**	**Fasc**	**CRD**	**Other**	**Nml**	**LongD**	**Hamp**	**Poly**	**ShortD**	**Lamp**	
Right deltoid						++						Normal
Right biceps						++						Normal
Right triceps						++						Normal
Right EİP						++						Normal
Right EDC						++						Normal
Right APB						++						Normal
Right ADM						++	+	+				Submaximal

RD: Retinal Detachment APB: Abductor Pollicis Brevis, ADM: Abductor Digiti Minimi, EİP: Extensor indicis proprius, EDC: Extensor Digitorum Communis,EDB: Extensor Digitorum Brevis, EDB: Extensor Digitorum Brevis, AHL: Abductor Hallucis Longus
Fibs: Fibrillation potentials, PSW:Positive Spike Waveform, Fasc: Fasciculation potentials, CRD: Complex Repetitive Discharges, LongD:Long Duration, Hamp:High amplitude, Poly:Polyphasi, ShortD:Short Duration, Lamp:Low amplitude,
Electrophysiologic studies were performed with a DeyMed EMG machine. Sensory and motor nerve conduction studies were performed with antidromic methods.
Sensory and motor conduction velocity, (upper extremity normal: >50 m/s, lower extremity normal: >40 m/s,),
motor nerve compound muscle action potential (CMAP) amplitudes, (normal: > 4mV, for peroneal motor, normal: > 2mV)
sensory nerve CMAP amplitudes, (normal: > 10μV, for sural sensory, normal: > 7μV)

DISCUSSION

Although uncommon, complications may arise as a consequence of prolonged prone positioning after retinal detachment surgery. Reported adverse events range from life-threatening conditions, including deep vein thrombosis and pulmonary embolism, to morbidities that impair quality of life, such as peripheral neuropathies (4,5). Awareness of these potential risks and the implementation of appropriate preventive strategies are therefore crucial for clinicians.

Peripheral nerves are susceptible to pressure-related injuries as they traverse various anatomical structures, which subsequently leads to entrapment neuropathy. Such pressure-induced injuries may result from mechanical compression, constriction, excessive traction, or edema (5,6). The etiology of compression may be classified as either exogenous (derived from external devices or extrinsic structures) or endogenous (originating within the patient's body). In endogenous cases, the compression may occur extrinsically or intrinsically to the nerve, as the compressive structure may arise from one of the neural components. Entrapment can occur at various anatomical sites, including between muscles or bones, around blood vessels, along joints, and within tunnels or areas of fascial penetration. The etiology of right elbow ulnar neuropathy in our patient was considered to be secondary to mechanical compression and overstretching of the nerve due to long-term prone positioning. Nerve compression can impair sensory and motor functions, leading to neuropathic pain, discomfort, and muscular weakness. This compression compromises the integrity of the blood-nerve barrier, resulting in dysfunctional intraneural microcirculation and the formation of intraneural edema. The subsequent segmental intraneural ischemia induces ectopic impulse generation in both mechanosensitive and nociceptive neurons, manifesting as neuropathic pain of varying intensities. Furthermore, activated C-fibers synthesize and release algogenic and degenerative neuropeptides, such as substance P and calcitonin gene-related peptide (CGRP), thereby triggering a cascade of chronic neurogenic inflammation.

Ulnar neuropathy at the elbow (UNE) represents the second most prevalent entrapment neuropathy following carpal tunnel syndrome, most frequently arising at the elbow as a result of mechanical forces that induce traction or ischemia of the nerve (6). The hallmark clinical manifestation of UNE is reduced sensation or dysesthesias in the fourth and fifth digits, commonly accompanied by pain localized to the proximal medial aspect of the elbow (7). Diagnosis is typically established through electromyography and ultrasonography. In the early stages, conservative management including patient education and avoidance of sustained flexion postures or repetitive elbow flexion may provide symptomatic relief. When such measures prove ineffective, or when sensory and/or motor deficits are evident, surgical intervention is indicated (6,7).

Postoperative ulnar neuropathy, defined as injury to the sensory or motor distribution of the ulnar nerve following anesthesia or surgical procedures, remains a clinically significant complication (8). Despite heightened awareness, it continues to occur frequently, often as a consequence of inadequate intraoperative vigilance. Preventive strategies, such as maintaining the upper limb in a neutral anatomical position and applying appropriate padding during both surgery and the postoperative period, are essential to mitigating this risk (9).

Reports of ulnar neuropathy as an extraocular complication following retinal detachment surgery and postoperative face-down positioning remain scarce in the literature. In 1996, Ciulla et al. documented two cases of ulnar nerve palsy that developed after 2–4 weeks of prone positioning following vitrectomy with intraocular perfluorooctane (10), one of which required surgical decompression of the ulnar nerve at the elbow. Subsequently, in 1999, Holekamp et al. described seven cases of ulnar neuropathy occurring in the immediate postoperative period after vitrectomy with fluid-gas exchange, where patients were instructed to maintain a face-down position for at least one week for macular hole repair (11). All affected individuals reported persistent symptoms during follow-up periods ranging from 3 to 24 months. In 2004, Salam et al. presented a case of bilateral ulnar neuropathy at the elbow, confirmed by reduced conduction velocities on nerve conduction studies, with only minimal clinical recovery after 10 months of follow-up (12). In our case, the patient maintained a face-down position for 10 days postoperatively, with symptoms emerging approximately two weeks after surgery. Notably, the patient was mildly overweight and exhibited impaired glucose tolerance, both of which may have predisposed to increased mechanical stress on the flexed elbow during prone positioning.

CONCLUSION

Finally, ulnar neuropathy represents an extraocular complication of retinal detachment surgery, potentially arising from arm positioning during the postoperative prone position. To mitigate this risk, ophthalmologists should limit the duration of elbow flexion while patients remain prone following retinal detachment repair. Moreover, educating patients about the early manifestations of ulnar nerve injury such as hypoesthesia and burning sensations in the fourth and fifth digits is essential to facilitate timely recognition and intervention, thereby reducing the likelihood of permanent nerve damage.

Ethics Committee Approval

Ethics committee approval was not required for this case report. The manuscript does not include any personally identifiable patient information, and written informed consent was obtained from the patient.

Author Contributions

Conception - Serkan Kırbaş, Ersin Özeren; Design - Serkan Kırbaş; Supervision - Serkan Kırbaş, Ersin Özeren; Data Collection and/or Processing - Serkan Kırbaş; Analysis and/or Interpretation - Serkan Kırbaş, Ersin Özeren; Literature Search - Serkan Kırbaş, Ersin Özeren; Writing - Serkan Kırbaş; Critical Review - Serkan Kırbaş, Ersin Özeren.

Conflict of Interest

The author declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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