รายงานผู้ป่วย

Dumb-bell neuropathy

Sek Aksarnaugraha*
Punwadee Nguarutsamee*

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An over weight 52-year old diabetic female Thai patient had legs pain. She placed a ten pound dumb-bells over the head of fibula of her right leg, while she lied on her left side and her right leg laid over the left. She fell asleep for 5-6 hours. When she woke up, she noticed mumbness in the web between the first & second toes of her right foot and weakness of her ankles. On examination, besides the impaired sensation in the web area, she also had grade III weakness of her right Tibilalis anterior, peroneus longus and extensor hallnus longus. The NCV revealed slow conduction of her right common peroneal nerve (34.7 meters/second) and lower limits of normal range of the rest of the nerves in her lower extremities. The EMG also revealed partial denervation in all 3 muscles mentioned. After 5 weeks of treatment, her clinical symptoms and the NCV returned to normal but the EMG was still abnormal. It is suggested that, the prolonged Dumb-bells compression on the head of Fibula may cause an ischemic neuropathy of the common peroneal nerve (deep branch).

Key words : *Dumb-bells neuropathy.*

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*Department of Orthopedic and Rehabilitation Medicine, Faculty of Medicine, Chulalongkorn University.

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หญิงไทย ค่อนข้างอ้วน อายุ 52 ปี เป็นเบาหวานมานาน ใช้ตุ้มน้ำหนัก 10 ปอนด์ วางทับข้าบริเวณใต้เข่าด้านนอก เพื่อแก้เมื่อยในขณะนอนตะแคงซ้าย ขาขวาทับบนขาซ้าย และหลับไปประมาณ 5-6 ชั่วโมง ตื่นขึ้นมาปรากฏว่าขาบริเวณง่ามนิ้วหัวแม่เท้ากับนิ้วเท้าที่สองข้างขวา และข้อเท้าไม่มีแรง ตรวจพบความรู้สึกลดในบริเวณดังกล่าว และกล้ามเนื้อ Tibials anterior, personeus longus และ extensor hallucis longus ด้านขวาอ่อนแรง วัดได้เกรด III ตรวจการนำกระแสประสาทพบว่าเส้นประสาท Common peroneal ด้านขวาทำงานช้าลง (34.7 เมตร/วินาที) ในขณะเส้นประสาทอื่นของขาทั้ง 2 ข้างอยู่ในเกณฑ์ต่ำสุดของค่าปกติ การตรวจคลื่นไฟฟ้ากล้ามเนื้อ พบมี partial denervation ทั้ง 3 มัด ผู้ป่วยได้รับการรักษาทางเวชศาสตร์ฟื้นฟูและยาวิตามิน $B_{1\text{-}6\text{-}12}$ ขนาดสูง 5 อาทิตย์ อาการดีขึ้นตามลำดับ จนปกติ ความเร็วชักนำกระแสประสาทค่อย ๆ ดีขึ้นจนปกติ เช่นกัน แต่การตรวจคลื่นไฟฟ้ากล้ามเนื้อยังคงผิดปกติต่อไป เพราะต้องใช้เวลานานกว่าในการฟื้นตัว เชื่อว่าการใช้ Dumb-bells ขนาด 10 ปอนด์ วางทับบริเวณหัวกระดูก Fibula เป็นเวลานาน ๆ จะทำให้เกิด ischemic neuropathy ได้ โดยเฉพาะของ deep branch ของเส้นประสาท peroneal.

Common peroneal neuropathy due to compressive lesions has been reported previously. Causes included cuff compression,[1] "turnip-havestor" or squatting position,[2] tumors,[3] neurotoxicity of antineoplastic agents,[3] running,[4] joint hypermobility,[5] weight reduction,[6] ischemia,[7] lump in the calve[8] and various sport injuries.[9] However, no previous report includes prolonged weight compression on the common peroneal nerve as a cause of this neuropathy.

Case report

An over-weight 52-years-old diabetic female Thai patient came to the Chulalongkorn Hospital Out-patient Clinic complaining of numbness over the web of skin between the first and the second toe of her right foot and weakness in her right ankle of two weeks, duration. One day prior to her presentation, she had gone shopping for 3-4 hours and developed aching, tired legs, especially the right one. That night, she could not sleep because of her leg pain. She then placed a 10-pound dumb-bell weight over the latero-proximal aspect of her right leg; she slept on her left side with her right leg over they left one. This procedure the pain reduced so that she was able to sleep for 5-6 hours. When she woke up in the morning, she noticed numbness over the web of skin between the first and second toe of her right foot and weakness in her right ankle when she attempted to walk. On examination, she was found to have impairment of pain sensation over the web of skin between the first and second toe of her right foot and MRC (grade III) on her right tibialis anterior, peroneus longus and extensor hallusis longus muscles. The patellar and achilles tendon reflexes were 2+ in both lower extremities.

Nerve conduction velocity (NCV) and electromyography (EMG) were studied the next day. The tests revealed a significant reduction in motor NCV of the right common peroneal nerve (34.7 meters/second when compared to the left one, which was 42.8 meters/second) while the other nerves of her lower extremities showed normal NCV, but at the lower limits. EMG of the right tibialis anterior, peroneus longus and extensor hallucis longus showed partial denervation.

Test	Motor NCV of the right common peroneal nerve (meter/second)	EMG
Fist week	34.7	Partial denervation
Second week	36.84	Partial denervation
Third week	38.19	Partial denervation + increased MUAP
Fourth week	40.96	Partial denervation + more increased MUAP
Fifth week	41.82	Partial denervation + more increased MUAP

A dialy rehabilitation program was initiated and she was given a high dosage of vitamine B1-6-12 orally. The total course of treatment was five weeks, with re-evaluation once a week. She was found to have slow progressive improvement in the strength of those three muscles up to grade V within the third week; in the right common peronel nerve, motor NCV levels were 36.84, 38.19, 40.96 and 41.82 meters per second, respectively, during the second to fifth weeks.

Even though the post treatment EMG still showed signs of partial denervation, the numbers of MUAF increased progressively. Theoretically, it took a longer time than expected for the abnormal EMG to return to normal. In the meantime, the abnormal sensation she initially felt disappeared within the third week of treatment.

Discussion

Lawrence and Locke[10] reported that abnormal NCV might be found indiabetics who do not have clinical neuropathy. Lamontague and Buchthal[11] concluded that these findings indicated diabetic subclinical neuropathy. Schubert[12] suggested the abnormal NCV might be a pre-diabetic finding.

The common peroneal nerve becomes superficial at the lateral aspect of the knee and is most susceptible to trauma.[13] Leg-crossing also causes compression of this nerve against the head of

the fibula.[14] Injury at this level most frequencly affects the deep branch, while involvement of the superficial branch is rare.[15,16]

This over-weight female diabetic patient had already lower limits of normal NCV of the nerves of her lower extremities. She might have had some degree of subclinical polyneuropathy predisposing her to focal injury. The placement of a 10-pound dumb-bell weight over the head of her right fibula for 5-6 hours would have injured her right common peroneal nerve (deep branch); the compression lasted long enough to produce ischemia in this verve. The term "dumb-bell neuropathy" has been coined by us to describe this type of compressive neuropathy. Involvement included both the nerve's myelin and axon (abnormal NCV & EMG). After five weeks of treatment, her clinical symptoms and NCV returned to normal, but EMG was still abnormal since it would take a longer time for electromyographic recovery.

References

1. Dyck PJ, Lais AC, Glannini C, Engelstad JK. Structural alterations of nerve during culf compression. Proc Natl Acad Sci U.S.A. 1990 Dec; 87(24) : 9828-32
2. Schroterc, Braune HJ, Huffmann G. The so-called turnip-harvester palsy a rere differential diagnosis tody. Fortschr Nerrol Psychiatr 1990 Sep; 58(9) : 351-3
3. Mizutani A, Sakata K, Nakajima T, Morimoto A, Tsunamoto K, Shimizu Y, Todo S, Morioks Y, Imashuku S. Neurotibroma associated left peroneal nerve palsy in a patient with acute lymhoblastic leukemia. Rinsho Ketsueki 1989 Jun; 30(6) : 878-81
4. Leach RE, Purnell MB, Saito A. Peroneal nerve entrapment in runners. Am J Sports Med 1989 Mar-Apr; 17(2) : 287-91
5. March LM, Francis H, Webb J. Benign joint hypermobility with neuropathies:documentation and mechanism of median, sciatic, and common peroneal nerve compression. Clin Rheumatiol 1988 Mar; 7(1) : 35-40
6. Cruz MA. Slimmer's paralysis : electrophysiological evidence of compressive lesion. Eur Neurol 1987; 26(3) : 189-92
7. Akimov GA, Mikhilendo AA, Osetrov BA, Nedz' ved' GK, Gerasimenko GA. Compression ischemic peroneal neuropathy (Guillain-de Seze-de Blondin-Water Sysndromel. ZH Neuropatol Psikhiatr 1986; 86(6) : 898-901
8. McAuliffe TB, Fiddian NJ, Browett JP. Entrapment neuropathy of the superficial peroneal nerve. A bilateral case. J Bone Joint Surg Br 1985 Jan; 67(1) : 62-3
9. Hirasawa Y, Sakakide K. Sports and peripheral nerve injury. Am J Sports Med 1983 Nov-Dec; 11(6) : 420-6
10. Lawrence DG, Locke S. Mortor nerve conduction velocity in diabetese. Arch Neurol 1961 Nov; 15 : 483-9
11. Lamontague A, Buchthal F. Electrophysiological studies in diabetic neuropathy. J Neurol Neurosurg Psychiatry 1970 Aug; 33 : 442-52
12. Schubert HA. Peripheral nerve conduction studies. Diagnostic value. Texas J Med 1965 Jan; 61(1): 10-7
13. Aguayo AJ. Neuropathy due to compression and entropment, In : Dyck PJ. Thomas PK, Lambert EH, eds. Peripheral Neuropathy. Vol.1 Philadelphia : W.B. Saunders, 1975.
14. Sidey JD. Weak ankles. A study of common peroneal entragment neuropathy. Br Med J 1969 Sep 13; 3(5671) : 623-6
15. Suderland S. Nerves and Nerves Injaries. 2nd ed. Churchill Livingstone, Edinburgh, 1978.
16. Koller RL, Blank NK. Strawberry picker's palsy. Arch Neurol 1980 May; 37(5) : 302