Dumb-bell neuropathy

Sek Aksarnaugraha*
Punwadee Nguarutsamee*


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 numbness 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 Tibialis anterior, peroneus longus and extensor hallinus 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.

Reprint request: Aksaranugraha S. Department of Orthopedic and Rehabilitation Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok 10330, Thailand. Received for publication. October 10, 1992.

*Department of Orthopedic and Rehabilitation Medicine, Faculty of Medicine, Chulalongkorn University.
เทคนิค ค่อนข้างฉาบ อายุ 52 ปี เป็นเบาหวานมีงาน ใช้ทุกม้าหนัก 10 ปอนด์ วางหัวขับราวแนว ไฟฉากด้านนอก เพื่อแก้ไขในขณะนอนจะแขวนขา จากทำกับบ้านขา และพลิกไปประมาณ 5-6 ชั่วโมง คือขึ้นมาปรากฏว่าขา่นิวแขวนมีหัวแล้วกับมักมีมากที่สุดอย่างข้างขวา และข้อเท้าไม่มีแรง ทำให้เห็นความรู้สึกดีในนิวภาพแลกยาว และกล้าเนื้อ Tibialis anterior, peroneus longus และ extensor hallucis longus ค่อนข้างเอื้อแรง วัดได้การ III คว้าการน้ำกระแสเหล่ายาวว่าสิ้นสุด Common peroneal ค่าหน้า ห่างจากข้าง (34.7 เซนติเมตรพื้น) ในขณะเดินประมาณหนึ่งหน่วย cazzo 2 ข้างอยู่ในแกนที่ลำตัวของข้อต้น การตรวจยืนไฟลักข้ามเนื้อ พบมี partial denervation ที่ 3 มี ผู้ป่วยได้รับการรักษาเฉพาะครั้งเพียงๆ บรรทัด B1412 ขนาดสูง 5 อาทิตย์ อาการขัดข้องตามลำตัว อนเพ็กตี ความรู้สึกขา่นิวกระแสเหล่ายาวว่าสิ้นสุด ๆ คือขั้น อนเพ็กตี เนื่องจาก แต่การตรวจยืนไฟลักข้ามเนื้อ อัคคีภัยติดต่อไป เพราะคือใช้เวลาสถั่วในภาพพื้นด้วย เข้าสู่การใช้ Dumb-bells ขนาด 10 ปอนด์ วางหัวขับราวหัวกระชูก Fibula เป็นเวลานาน ๆ จะทำให้เกิด ischemic neuropathy ได้ โดยเฉพาะของ deep branch ข้อเดียวประสบ peroneal.
Common peroneal neuropathy due to compressive lesions has been reported previously. Causes included cuff compression, \(^{(1)}\) "turnip-harvestor" or squatting position, \(^{(2)}\) tumors, \(^{(3)}\) neurotoxicity of antineoplastic agents, \(^{(4)}\) running, \(^{(5)}\) joint hyper-mobility, \(^{(6)}\) weight reduction, \(^{(7)}\) ischemia, \(^{(8)}\) lump in the calf, \(^{(9)}\) and various sport injuries. \(^{(10)}\) 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 hallucis 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.

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

A dialysis 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 peroneal 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 in diabetics who do not have clinical neuropathy. Lamontagne 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.\textsuperscript{(14)} Injury at this level most frequently affects the deep branch, while involvement of the superficial branch is rare.\textsuperscript{(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 nerve. 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.

\textbf{References}

2. Schrotec, Braune HJ, Huffmann G. The so-called turnip-harvester palsy a rare differential diagnosis today. Fortschr Nerrol Psychiatr 1990 Sep; 58(9) : 351-3
7. Akimov GA, Mikhilendo AA, Osnotov BA, Nedz' ved' GK, Gerasimenko GA. Compression ischismic peroneal neuropathy (Guillain-de Seze-de Blondin-Water Syndromel. ZH Neurupatol Psikhiatr 1986; 86(6) : 898-901