Bilateral Peroneal Nerve Palsy Caused by Intermittent Pneumatic Compression

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Abstract

A 63-year-old man developed bilateral peroneal nerve palsies after a craniotomy for a craniopharyngioma. It is believed that the primary etiology of the nerve palsies was intermittent pneumatic compression, which was used to prevent deep vein thrombosis and pulmonary embolism during the surgery. Physicians should take care to avoid compressing the fibula head when using pneumatic devices.

Key words: intermittent pneumatic compression, peroneal nerve palsy

Introduction

Intermittent pneumatic compression is routinely employed to prevent deep venous thrombosis and pulmonary embolism in surgical patients (1). This report presents a case of bilateral peroneal nerve palsies following intermittent pneumatic compression, and discusses the etiology of nerve palsies and the side effects from using pneumatic compression devices.

Case Report

A 63-year-old man (152 cm, 67.8 kg), who had undergone surgery for prostate cancer seven years previously, was admitted to our hospital for a craniopharyngioma. A preoperative physical examination revealed no neurological abnormalities except for bilateral temporal visual field deficits. He underwent a 10-hour craniotomy in the supine position, and an intermittent pneumatic compression device and tight stockings were applied to both legs from the beginning of the operation until the next morning. The patient became disorientated and restless after the operation and he accidentally withdrew an epidural drainage tube on the day following the operation. Although a brain MRI scan showed a right epidural hematoma, haloperidol was injected for his delirium over several days. On the seventh postoperative day, the volume of the right epidural hematoma decreased, and his consciousness returned to normal. Although he was able to walk without a drop foot gait, he noticed numbness in both toes. At that time, he had lost 4 kg, because his oral intake had been limited for the previous week.

The patient was referred for neurological consultation three weeks after the operation. The neurological examination confirmed that sensation had decreased on the dorsum of his bilateral toes. His bilateral extensor hallucis longus and extensor digitorum longus muscles were weak, and the extensor digitorum brevis (EDB) muscles were atrophic. The bilateral tibialis anterior muscles (TA) were strong and a drop foot gait was not seen. An electrodiagnostic study showed a slow conduction velocity around the right fibula head (15.0 m/s), although the velocity of the distal segment below the knee was 37.4 m/s. Small compound muscle action potentials (CMAPs) from the right EDB (0.16 mV) were observed by both proximal and distal stimulations. The small amplitude of CMAPs following the distal stimulations indicated that Waller degeneration had already occurred. Many positive sharp waves and fibrillation potentials were seen in the right EDB, but few were seen in the right TA, and results from his left side were similar. He was diagnosed with bilateral peroneal nerve palsies. Although motor recovery was complete, sensory deficits were still present one year after the operation.

Discussion

Patients with unilateral peroneal nerve palsy are fre-
quenty encountered in clinical practice. However, peroneal nerve palsies seldom occur bilaterally at the same time (2). Bilateral peroneal nerve palsies following skeletal traction for bilateral femoral fractures (3), prolonged squatting (4), and external compressive wraps for a pelvic injury (5) have all been reported. The common theme is that an external force squeezes both fibula heads in these patients. Some papers (6, 7) have also reported bilateral peroneal nerve palsies following severe weight loss because the thinner subcutaneous tissue over the fibula head carries a risk of injuring the peroneal nerve. Simultaneous compression by the bed, chair, or contralateral knee can easily cause bilateral nerve palsies in weight loss patients. Thus, the development of bilateral peroneal nerve palsies requires simultaneous compression to both legs.

Two cases of unilateral peroneal nerve palsy following total hip arthroplasty with the use of intermittent pneumatic devices have been reported (8). The authors in the report considered the etiology of the nerve palsy to be related to the device, although they did not refer to a weight loss in their patients. Only one case of bilateral peroneal nerve palsies following the use of an intermittent pneumatic compression device has been reported (9). A 65-year-old man with pancreatic cancer, a 9 kg weight loss and diabetes mellitus developed postoperative nerve palsies. The authors of the report considered the etiology to be multifactorial (i.e., weight loss, paraneoplastic effects, nutritional and metabolic deficiencies, and intermittent pneumatic compression). However, one might speculate that the bilateral compression and weight loss were the major factors responsible for bilateral nerve palsies in their patient.

How do bilateral peroneal nerve palsies occur? In the present case, it is uncertain when the nerve palsies occurred, because the patient was delirious for a week. Sudden weight loss is a major risk factor for peroneal nerve palsy. However, the patient was obese and a weight loss of 4 kg is not severe in this case. Therefore, other external factors may have been more important than the weight loss. The possibility of compressing his posture intra-operatively seems to be low, because peroneal nerves are not compressed bilaterally in the supine position. The possibility of compression having taken place while he was bedridden post-operatively also seems to be low, because he was restless for a week. Stockings compressed his legs, but they were not applied to the fibula heads. Essentially nothing else compressed his legs bilaterally except for the intermittent pneumatic device. Therefore, compression by the intermittent pneumatic device may have been the main factor in causing bilateral nerve palsies in this patient.

Peroneal nerve palsy caused by this device is rare, although prolonged use spanning several weeks is often seen in patients with malignancies or diabetes, which are at high risk for nerve palsy. I believe that compressing the fibula head is important, however careful note should be made as to the time of placement of the device.

In conclusion, an intermittent pneumatic device increases the risk of peroneal nerve palsy. Physicians should take care not to compress the fibula head while using this device.

References


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