

Peroneal nerve palsy after compression stockings application

ABSTRACT

Peroneal nerve palsy can be caused by various etiology. We report unilateral peroneal nerve palsy after compression stockings application. A 64-year-old man underwent off-pump coronary bypass graft. Surgeon did not use saphenous vein for the bypass graft. Sedation was stopped after 3 h postoperative. After 16 h, for prophylaxis of deep vein thrombosis, knee-high elastic stocking was applied. After 1 h, he took off right stocking because of numbness but left stocking was kept. After 24 h postoperative, (8 h after stocking application) patient complained suddenly left foot drop. Manual muscle test revealed 0/5 of ankle dorsiflexion, ankle eversion, and toe extension. Sensory was decreased to 70% in lower half of anterolateral aspect of tibia, foot dorsum, and toes. Foot drop and sensory abnormality decreased in 3 weeks. Cardiac surgery patients already have many risk factors for peripheral neuropathy. Clinicians should be careful when applying stockings on those patients.

Key words: Compression; coronary artery bypass; off-pump, peroneal neuropathies; stockings

Introduction

Peroneal nerve palsy is a common peripheral neuropathy involving lower extremities, and has various etiologies. Typical feature of peroneal nerve palsy is foot drop accompanied with sensory loss of lateral aspect of shin and foot dorsum.^[1-4] There are few reports of bilateral peroneal nerve palsy after cardiac surgery. Authors herein report an acute unilateral peroneal nerve palsy occurred after thromboembolic deterrent stockings (TEDS) application.

Case Report

A 64-year-old man (height 168.5 cm, weight 83 kg) underwent off-pump coronary bypass graft surgery under a diagnosis of three vessels disease. He had hypertension, diabetes mellitus (DM), dyslipidemia, and non-ST elevation myocardial infarction for 7 years. His saphenous vein was not used as a

graft. The surgeon harvested patient's left and right internal mammary artery and used them as grafts. The blood pressure during operation was kept between 90/45 and 166/55 mmHg. A total of four bolus doses of ephedrine 5 mg and five doses of phenylephrine 50 mcg were used to maintain blood pressure. No continuous drug infusion was used. Total operation time was 8 h 20 min. Sedation was stopped after 3 h, and he was extubated 1 h later. There was no complaint of pain except operation wound, and there was no sensory or motor abnormality in legs.


Sixteen hours after the operation, knee high TEDS (JOBST®, medical legwear, L-size [ankle circumference: 25-29 cm, calf circumference: 32-46 cm], USA) was applied to prevent deep vein thrombosis. One hour after application, the patient complained slight numbness in his right leg and removed right stocking by himself. However, his complained no specific symptoms on his left leg, so the left stocking was kept.

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Twenty-four hours after the operation (8 h after stocking application), the patient complained suddenly left foot drop [Figure 1]. Manual muscle test revealed 0/5 of ankle dorsiflexion, ankle eversion, and toe extension. Sensory was decreased to 70% in lower half of anterolateral aspect of tibia, foot dorsum, and toes. Common peroneal nerve palsy due to direct compression was suspected, and prosthesis was applied for the foot drop. His foot drop and sensory abnormality disappeared in 3 weeks, without any sequelae.

Discussion

Common peroneal nerve is a lateral thinner branch of the sciatic nerve. It branches from tibial nerve at popliteal fossa, winds fibular head and descends lower leg, dividing into deep and superficial peroneal nerve. Peroneal nerve goes along fibula head and shaft, where only skin and a small amount of subcutaneous tissue exists above periosteum. Therefore, these region is vulnerable to pressure or trauma.^[1]

Peroneal nerve palsy is caused by many etiologies, which can be divided into two categories: Ones which are caused by external factors (such as habitual leg crossing, pressure from prolonged positioning, tall boots, casts or braces, and so on), and others which caused by internal factors (such as fractures compressing nerve, neoplasm, vascular abnormality, exercise-induced compartment syndrome, nerve laceration, or postsurgical entrapment by sutures or hardware, and so on).^[1-3] Among those, direct external compression of fibula head is the most common cause.^[1,5]

There are few reports of peroneal nerve palsy caused by TEDS. One case is caused by below-knee TEDS, which ends are rolled around fibula head.^[3] Another case is caused by thigh-length stocking, and those upper knee portion is rolled down to below-knee, fibula head level.^[6] External compression of the peroneal nerve between rolled stocking and fibula head seems to be an evident cause in both cases. Even though patient wore below-knee TEDS in our case, it was not rolled down, so its causality is less clear than those cases.

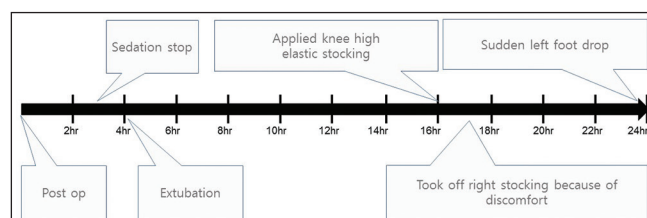


Figure 1: Timeline of events

There are reports of bilateral peroneal nerve palsy after cardiac surgery. Durmaz *et al.*^[7] reported several cases. Their patients underwent surgery in the supine position, legs slightly externally rotated, had knee rolls underneath popliteal fossa. They suspected knee rolls and hypoxia, due to low perfusion pressure and hemodilution for causes of palsies. The patient in Setty *et al.*^[8]'s case was a 5-year-old child who underwent correction of double outlet right ventricle using cardiopulmonary bypass (CPB). Decreased perfusion due to long CPB time, the pressure exerted by blood pressure cuff thought to cause that palsy. Although our patient underwent surgery in supine, externally rotated leg position, palsy was not observed right after the surgery, and it was unilateral. Considering there was no use of CPB, no event of suspected hypoxia due to hypotension or decreased perfusion, there seems to be little possibility that position or the characteristic of surgery caused palsy.

DM increases the vulnerability of nerve to external compression or ischemic damage, so the risk of peripheral neuropathy is high.^[1,9] DM patients tend to have chronic nerve ischemia caused by decreased endoneurial oxygen, decreased nerve perfusion, and epineurial arteriovenous shunting. Preexisting neural ischemia can increase possibilities of focal nerve damage if external pressure is exerted.^[9,10]

In this case, the patient had DM for 7 years, and external pressure might cause nerve damage due to underlying neural ischemia. Moreover, underlying DM neuropathy may decrease sensation, so the warning signs of ischemia such as pain or numbness might have been less clear for the patient to alarm clinicians. Sedated patients might have grove outcome because that patient would not report any symptoms, so the stocking would be on until causing permanent damage. In our hospital, all adult male patient wears the same size compression stocking (L-size). The patient might get higher external pressure due to his obesity (body mass index [BMI]: 29.3, obesity: BMI more than 25).

Peroneal nerve palsy after cardiac surgery may occur because of long surgery time, hypo-perfusion during CPB, and inadequate positioning. If the patient has DM, which is the relatively frequent case for cardiac surgery patients, nerve itself is vulnerable to external compression or ischemic damage, so it increases possibilities of peripheral neuropathy. If a prophylactic method to prevent deep vein thrombosis should be used, the intermittent pneumatic compression device may be a better alternative to compression stocking. Compression stockings should be used with meticulous caution in this population.

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Conflicts of interest

There are no conflicts of interest.

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