Bilateral Footdrop after Craniotomy in the Sitting Position

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Injury to the common peroneal nerve is a recognized hazard of surgical procedures performed with the patients in certain positions." Pressure on the nerve as it wraps around the fibula, or stretch of the nerve, may produce transient or permanent neural damage, which is usually manifest as footdrop. In the present case bilateral footdrop and numbness of the feet occurred after a 14-hour craniotomy with the patient in the sitting position. This complication had not been previously reported as a complication of prolonged surgical procedures with the patient in the sitting position. We hypothesize that the symptoms resulted from pressure on and stretch of the sciatic nerves.

REPORT OF A CASE

A 23-year-old white man was admitted to the Philadelphia Veterans Administration Hospital with chief complaints of tinnitus, dizziness, numbness of the face, headaches, and difficulty looking to the left, which had begun four months prior to admission. Pertinent physical findings were confined to the neurologic examination, which showed decreased sensation on the left side of the face over the distribution of all three branches of the fifth nerve, a slight sixth-nerve palsy, a slight left-sided seventh-nerve palsy, decreased hearing in the left ear, hyperreflexia in the left arm and leg, but no weakness or sensory change. The patient also had 2+ bilateral papilledema. Roentgenograms revealed a large cerebellar-pontine angle tumor with encroachment into the pons. The patient's habitus was remarkable in that he weighed 62 kg and was 188 cm tall.

The patient was brought to the operating room for surgical removal of the tumor. After central venous and arterial lines were placed, anesthesia was induced with droperidol, 4 ml, and thiopental, 700 mg. The trachea was intubated after relaxation was achieved with pancuronium bromide. Anesthesia was maintained with 70 per cent nitrous oxide–30 per cent oxygen, morphine and fentanyl. A Foley catheter was placed and the patient was positioned in a sitting position without difficulty (fig. 1). Care was taken to prevent extrinsic pressure on the arms or the legs. Anesthesia and operation lasted approximately 14 hours, during which time 60 per cent of the tumor was removed. During the operative procedure the patient received mannitol, 100 g, and dexamethasone, 80 mg. Anesthesia was completely uneventful. Following completion of the surgical procedure we elected to ventilate the patient mechanically until the next morning, when his trachea was extubated without difficulty.

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Fig. 1. Position of the patient during the first operation.

The results of neurologic examination at that time were essentially the same as preoperative results except for the new findings of bilateral footdrop and numbness on the dorsum and lateral aspects of the feet; this was more profound on the right than on the left. Electromyography revealed lack of recruitment in the peroneus longus and extensor digitorum brevis on the right side and in the extensor digitorum brevis on the left side. Nerve-conduction velocities were compatible with bilateral peroneal palsy. Over the course of the next three months the patient had gradual resolution of the paralysis and hypesthesias in both feet, but a significant footdrop still remained on the right. He was readmitted to have a second-stage posterior-fossa exploration. Anesthetic management was essentially the same as for the first surgical procedure. However, during positioning, we made sure that there was only minimal flexion of the hips. The second procedure lasted approximately 12 hours, but because of the proximity of the tumor to the brain stem, the tumor was not removed completely. The patient was awake and responsive 24 hours after completion of the operation, and the endotracheal tube was removed. There was no further progression of the nerve palsy at that time. After discharge from the hospital, 60 days following the second procedure, the patient continued to have treatment of the footdrop by muscle re-education and galvanic stimulation. Over the course of one and a half years the footdrop resolved completely.

DISCUSSION

The common peroneal nerve is a branch of the sciatic nerve. Common-peroneal-nerve palsy is characterized by footdrop, steppe gait, inability to extend the toes at the metatarsal phalangeal joints, and inability to abduct and evert the foot. Associated sensory
changes are numbness and hypesthesia on the lateral surface of the leg and dorsum of the foot.\textsuperscript{2} The most common cause of injury to the common peroneal nerve is pressure on the nerve as it crosses the fibula.\textsuperscript{1} However, Burkhart and Daly\textsuperscript{3} have shown that stretching of the sciatic nerve may also cause damage to the sciatic nerve or to its peroneal branch. These investigators reported that, of five cases of neural injury following surgical procedures done with patients in the lithotomy position, peroneal-nerve injury was demonstrated in three and sciatic-nerve injury in two. In all cases recovery was complete three to eight months after operative procedures lasting as long as 125 min. Other evidence that stretch of the sciatic nerve can lead to footdrop has been documented by Garland and Moorehouse,\textsuperscript{3} who reported five cases of transient footdrop and peroneal nerve palsy after nonanesthetized patients had been in the squatting position for periods as long as an hour.

The peroneal division of the sciatic nerve seems to be more susceptible to stretch injury than is the tibial division of the sciatic nerve. This may be related to the lesser amount of supporting connective tissue in the peroneal as compared with the tibial division of the sciatic nerve. Also, since the peroneal division of the sciatic nerve is fixed at two points, the sciatic notch as well as the neck of the fibula, it may be more subject to stretch injury than the tibial division.\textsuperscript{4}

By chance, in this particular case pictures were taken of the patient's position. A sketch drawn from these pictures is shown in figure 1. There was no evidence of external pressure on either leg during the operative period. It is evident, however, that the patient's hips were in extreme flexion, and his position was such that the weight of his torso was concentrated over the gluteal area. We hypothesize that in this very thin individual prolonged pressure on the sciatic nerve, as well as stretch of the nerve from hyperflexion of the hips, produced the nerve palsy. Proper flexion of the hip joints, as well as proper recumbency during the course of the second surgical procedure, avoided exacerbation of the neural injury.

Trauma to the sciatic nerves from pressure and stretch should be added to the list of problems related to operations done with the patient in the sitting position. Avoiding excessive hip flexion, particularly in asthenic individuals, should prevent this complication.

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Alteration of Pulmonary Blood Flow by Pulmonary-artery Occluded Pressure Measurement

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Swan-Ganz balloon-tipped, flow-directed pulmonary-artery catheters are widely used to measure pulmonary-artery occluded pressure (PAOP) as an estimate of left atrial pressure (LAP).\textsuperscript{1,2} In most instances, occlusion of a small portion of the pulmonary vasculature by the inflated catheter balloon has no effect on cardiac output or systemic and pulmonary venous and arterial pressures. However, when a significant portion of the pulmonary vasculature has been eliminated by disease or surgery, then inflation of a pulmonary-artery catheter balloon might be expected to decrease pulmonary blood flow and hence alter intravascular pressures. The above-mentioned mechanisms appear to account for changes in vascular pressures and cardiac output following inflation of a Swan-Ganz pulmonary-artery catheter balloon in two patients studied after right pneumonectomies.

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