Bilateral foot drop following lower limb orthopedic surgery under spinal anesthesia

To the Editor:

Neurological complications, though rare, have been documented after spinal anesthesia. The exact etiological factor may not be detected in all patients. Traumatic injury to the spinal cord or nerve roots during spinal anesthesia is an infrequent cause.¹

A 35-yr-old male trauma patient with a fracture of the right femur and compound fractures of both legs was scheduled for open reduction and internal fixation of the right femur. Tibial pins had been inserted under local anesthesia. Preoperative investigations and vital signs were within normal limits. Spinal anesthesia was administered using a 25-G Whitacre needle and 2.6 mL of 0.5% hyperbaric bupivacaine at the L3 to L4 interspace. The patient was found to have bilateral foot drop on the second postoperative day. Dorsiflexion had not been tested preoperatively, and he was unaware of its existence as well. The neurologist recommended electromyography (EMG) and magnetic resonance imaging (MRI) of the spine. The EMG did not reveal intradural pathology. The neurological examination showed normal sensation on the exposed aspects of both thighs and legs except for numbness on the dorsal aspect of right first toe. Ankle and knee reflexes could not be elicited due to bandaging and splinting of the limbs. An MRI scan of the spine showed normal spinal anatomy.

Neurological complications due to spinal anesthesia must be suspected in any patient developing neurological signs or symptoms within eight months after anesthesia.² Incidence of nerve injury related to spinal anesthesia is less than 1:10,000.³ Foot drop can occur due to paralysis of foot flexors (sciatic or common peroneal nerve injury). If an injury is expected at a higher level, then careful testing of the thigh and hip muscles must be performed for localization. There is diffuse muscle involvement and an absent ankle reflex after a central injury. In our patient, localization was limited due to splinting. Needle trauma due to multiple attempts is a rare cause, however, all traumatic lumbar punctures may not be followed by neurological complaints. Paresthesias during lumbar puncture may correlate with neurological sequela but pain should also be present during the injection of a drug.

Reynolds has reported foot drop in six patients, all of whom revealed unilateral neurological deficit and MRI findings of unilateral damage to the conus medullaris.⁴ In contrast, the MRI scan of our patient was normal, ruling out injury to the cauda. Moreover,

the EMG also ruled out intradural pathology. Foot drop has also been reported after passage of steinman pin postoperative during femur surgery, and due to nerve avulsion in compound fractures.⁵ Bilateral lesions after spinal anesthesia are possible only if a lumbar puncture is performed above the second interspace. Even after correct identification of interspaces, dural punctures have a chance of being performed in spaces higher than assumed, leading to possible unilateral lesions of the conus.

We recommend a limited neurological examination of the lower limbs prior to spinal anesthesia.

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Endobronchial metastasis: an anesthetic complication?

To the Editor:

A 55-yr-old man presented with dyspnea and hemoptysis six months after completion of external radiation to the head and neck. Ten months previously he had undergone radical surgery for carcinoma tongue (T4N0M0). Review of his previous records revealed that he had required an awake fiberoptic intubation. Considerable difficulty was encountered in negotiating the tracheal tube due to posterior extension of the tumour. The intraoperative and postoperative periods were uneventful and he made satisfactory recovery. The

patient had no lung pathology (clinically or radiologically) either at the time of surgery or radiation therapy. The plain radiograph of the chest now showed a right hilar opacity. Flexible fiberoptic bronchoscopy revealed a mass in the right main bronchus just beyond the carina, probably an endobronchial metastasis (EBM). Histopathology was confirmed as squamous cell carcinoma. He underwent chemotherapy but subsequently died of pulmonary complications.

EBM from extra-pulmonary solid malignant tumours are rare and virtually unknown in squamous cell carcinoma tongue. The diagnosis of EBM is now increasing because of the regular use of fiberoptic bronchoscopy.¹ Sugarbaker and colleagues² have suggested the tumour cell entrapment hypothesis (dissemination of malignant cells from trauma). Pickhardt and co-workers³ have described the metastatic implantation at the percutaneous endoscopic gastrostomy tract. They further state that evidence points to direct tumour implantation during endoscopic placement as the likely cause rather than hematogenous spread. Airway instrumentation has been known to cause trauma to various soft tissues of the upper airway and aspiration of solid material to the lung has been described.⁴ The right main bronchus is known to be the most common site of aspiration and this was the site of EBM in our patient. Direct tumour implantation during surgical dissection is unlikely to have occurred since the airway was protected with a cuffed tracheal tube.

Our opinion is divided between a second primary (carcinoma lung) and a metastasis (EBM from carcinoma tongue) because it is difficult to distinguish histopathologically or immunohistochemically between these entities. Kawada and others⁵ report a similar case, but they suggested that the single endobronchial lesion was considered to be a second primary tumour. In our patient, a secondary tumour was considered more likely because of the documented trauma to the tumour before surgical excision. We conclude that direct tumour implantation into the lower airways during anesthesia is a possibility that should be investigated and ruled out by further clinical investigations.

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Desflurane costs in ambulatory anesthesia

To the Editor:

The report by Schwarz *et al.*¹ on the comparative costs of isoflurane and desflurane for ambulatory anesthesia prompted me to retrieve a similar but smaller analysis I undertook when desflurane was introduced into our hospital in 1995. The procedures were of comparable duration (mean 29.3 min), mainly for hernias and varicose veins. The inductions were with sevoflurane (shown at the time to be comparable in price to the cost of a propofol induction). Maintenance was with desflurane with minimal supplements of nitrous oxide and alfentanil. The desflurane was titrated to a MAC range of 1.2 to 1.4, and the fresh gas flows were reduced to run a closed circuit as soon as this MAC was achieved. In the absence of a precision balance, my estimates of desflurane consumption came from a record of gas flow and vaporizer settings. The calibrations of the vaporizer were in good agreement with the indications on the vapour analyzer. The mean desflurane consumption came to 9.5 mL per patient, equivalent to \$3.88 using the drug prices in the Schwarz paper (e.g., their values of 18.6 mL for 29 min, costing \$7.61). Out of interest I repeated the costing with isoflurane in a similar cohort of patients. The mean procedure duration was 25.8 min; the mean isoflurane consumption was 3.1 mL per patient, costing \$0.43 (e.g., 6.0 mL for 25 min procedures cost-