indirect autonomic effects of enflurane, we speculate on the basis of this case report that enflurane may possess antidysrhythmic activity and that this could possibly be related to a depression of cardiac conduction.

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Use of Two Epidural Catheters to Provide Analgesia of Unblocked Segments in a Patient with Lumbar Disc Disease

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The insertion of lumbar and caudal epidural catheters in the same patient to provide pain relief for labor and delivery has been described previously.[1,2] In this case, a second lumbar epidural catheter was inserted to provide adequate analgesia of unblocked segments for labor and delivery in a patient with lumbar intervertebral disc disease.

Report of a Case

A 28-year-old woman (gravida 3, para 0) was admitted in early labor with ruptured membranes. The past medical history included a back injury two years previously resulting in damage to the L4–5 intervertebral disc and a chronic right L5 radiculopathy. She frequently had sharp pain radiating deep to her right hip and down the medial aspect of her right leg, and numbness of the medial aspect of her foot and decreased position sense of her right great toe. The numbness and pain increased as her pregnancy progressed.

Sixteen hours after admission her cervix had dilated to 4–5 cm. At that time she was complaining of abdominal, low back, and right hip and leg pain with contractions. A 20-gauge epidural catheter was inserted into L2–3 interspace and threaded 5 cm cephalad without difficulty. After a test dose of 3 ml 1 per cent lidocaine, the patient was placed in the supine position and 11 ml 0.25 per cent bupivacaine was injected. Anesthesia extended superiorly to T7 bilaterally. Anesthesia extended downward through the sacral segments on the left, but did not extend below L4 on the right. Uterine contractions were not felt on the left, but produced deep pain referred to the right hip. Over the next two hours additional doses of 0.25 per cent bupivacaine were given in an attempt to provide adequate right-sided analgesia. Ten ml of 0.25 per cent bupivacaine were given in the right lateral decubitus position, 12 ml were given in the sitting position, and 14 ml were given in the sitting position after withdrawing the catheter 1–2 cm, without altering the level of analgesia on the right.

At this point a second epidural catheter was threaded up 4 cm through the L4–5 interspace without complication. Eight ml of 0.25 per cent bupivacaine injected through this catheter produced profound analgesia of the unblocked segments including the sacral segments bilaterally. Two subsequent doses (6 and 12 ml) given through the lower catheter over the next 4-h period provided continued complete analgesia with hypesthesia to pinprick extending from T7 through the lower sacral segments bilaterally. Midline episiotomy and outlet forceps delivery of a male infant with an APGAR of 8 and 10 were accomplished without maternal discomfort. The mother's recovery was uneventful with no neurologic sequela.

A follow-up six weeks after delivery revealed a decrease in her symptoms of pain and numbness. These were only present occasionally and appeared to be positional.

Discussion

The presence of unblocked segments during continuous lumbar epidural analgesia has been reported to occur in 6.7 per cent of patients and to be persistant in 1.5 per cent.[3] This presumably occurs because of failure of the local anesthetic to reach the unblocked nerve roots in sufficient concentrations.[2,3] Perhaps epidural adhesions, scarring or fibrous bands, which result from the healing process following intervertebral disc injury,[4] can interfere with the spread of local anesthetics in the epidural space.[2] Unilateral anesthesia or patchy deficits may, however, occur in otherwise normal patients or as a result of catheter malposition.[2]

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Lumbar disc disease can interfere with the spread of contrast material and presumably local anesthetic in the lumbar epidural space. Epidurography performed with metrizamide in our Pain Clinic has demonstrated failure of contrast material to diffuse upward past the level of a bulging lumbar disc, and to run out the foramina just below the level of disc abnormality. Likewise, several authors[5-7] have shown failure of contrast material to reach the area surrounding nerve roots affected by lumbar disc disease. In their series of 600 epidurograms, Luyendyk and van Voorthuisen[7] found that contrast material failed to reach the affected nerve foot in 33 per cent of patients with uncomplicated disc prolapse and that contrast did not rise in the epidural space above the affected disc in 4.9 per cent of cases. If water-soluble contrast material failed to reach these areas we presume that local anesthetics would find a barrier to spread as well.

In our case, we feel that scarring around the right L5 nerve root, perhaps in conjunction with the epidural venous engorgement of pregnancy,[8] prevented downward spread of local anesthetic through the right side of the epidural space. Injection below the level of obstruction allowed bilateral spread of anesthetic through the lower lumbar and sacral segments, producing sensory blockade of all segments, including the damaged L5 root on the right. This phenomenon has been fairly common in our experience with epidural steroid injections for sciatica. When injections of steroid and local anesthetics above the level of disc herniation do not produce analgesia in the affected dermatome, repeating the injection at a lower interspace, or via the caudal route will usually be successful.

In conclusion, our case illustrates that unblocked segments may be due to barriers to epidural diffusion caused by intervertebral disc disease and that the placement of a second catheter on the other side of the unblocked segment can produce adequate analgesia.

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Carotid Sinus Syndrome: Intraoperative Management Facilitated by Temporary Transvenous Demand Pacing

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Carotid sinus syndrome is an uncommon entity in which symptomatic cardiovascular instability results from minimal mechanical stimulation of the carotid sinus baroreceptors. Surgical denervation of these receptors may be undertaken in patients with disabling symptoms; however, cardiovascular instability may be a major intraoperative problem. We report a case in which the elective, preoperative placement of a transvenous demand pacemaker was essential to the management of a patient undergoing surgical denervation of the carotid sinus.

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Key words: Receptors: pressoreceptors; carotid sinus syndrome. Heart: pacemakers, artificial. Complications: hypotension; bradycardia.

Report of a Case

A 64-year-old man was admitted for surgical denervation of his right carotid sinus, after prolonged asystole was documented electrocardiographically during massage of the right carotid sinus. He had a six-month history of progressively more frequent and severe syncopal episodes upon turning his head to the right or raising his right arm. A right carotid endarterectomy had been performed three weeks prior to the onset of his first syncopal symptoms. Noninvasive assessment of the cerebral circulation by oculoplethysmography revealed normal ocular pressures bilaterally. Apart from the syncopal episodes, there were no