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RECOGNITION OF SUBARACHNOID AND SUBDURAL COMPARTMENTS DURING EPIDUROSCOPY: A CASE SERIES

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Epiduroscopy is a minimally invasive percutaneous endoscopic investigation of the epidural space. The visual imagery complements information obtained from epidurography. Development of the flexible fiberoptic endoscope coupled with a few technical modifications has permitted safe visualization of the epidural space. As with any new technique, early recognition of potential complications is imperative.

We report two cases of epiduroscopy, whereby subarachnoid and subdural entry occurred. Practitioners must recognize these spaces, particularly if treatment such as epidural adhesiolysis is planned.

The first patient was a 36 year old man with failed back surgery syndrome (FBSS) who presented with persistent left sided L5 and S1 radicular pain. Physical exam revealed a normal neurologic exam, but a positive left sided straight leg raise. Epiduroscopy via the caudal route was performed. The epiduroscope was advanced slowly, using intermittent fluoroscopy and video capture, along the ventro-lateral sacral canal towards the S2 nerve root. Epidural fat and scar was easily visualized, but a bit hazy. Suddenly the visual field became clearer and a defect in the epidural scar appeared. Three milliliters of Omnipaque™ contrast (iohexol) 240 mg/cc spread from the S2 level to the mid thoracic spine. The contrast was confined to the ventral spinal canal on a lateral fluoroscopic view. The antero-posterior view demonstrated contrast that was confined centrally without significant lateral spread towards the foramina. Vascular uptake was absent and aspiration was negative for blood and cerebrospinal fluid. We concluded that the opening corresponded to the subdural space. Hence, we stopped advancing the epiduroscope, and advanced a Tunl XL-24™ catheter instead. The catheter bypassed the opening and was placed at the ventrolateral aspect of the left L5-S1 intervertebral foramen. After negative aspiration of cerebrospinal fluid and blood, contrast instillation revealed good ventro-lateral epidural spread along the L5 nerve root and upwards to L4. No spread to the subdural rent occurred. We then instilled a test dose of 2 milliliters of 0.2% ropivacaine with 0.4 mg/ml of dexamethasone. The patient had no adverse hemodynamic nor neurologic sequelae. The remaining 8 ml were instilled, and after one half hour the patient continued to remain free of adverse sequelae. Hence, we were confident that the catheter was not intravascular, subarachnoid, nor subdural. He tolerated subsequent decompressive neuroplasty with 10 ml of 10% hypertonic saline without any problems. At one month follow-up, he did not suffer any delayed complications.

The second patient was a 51 year old woman with FBSS and persistent right leg pain. Physical exam confirmed absence of neurologic, bowel, and bladder dysfunction. Straight leg raising was positive. Epiduroscopy via the caudal route demonstrated significant epidural fat and scar; these tissues extended from sacral canal to the right L5 nerve root. Despite slow advancement of the epiduroscope, there was a sudden loss of resistance. The L5 and S1 nerve roots appeared very clear with small blood vessels accompanying the nerve roots. Cerebrospinal fluid was easily aspirated. Contrast instillation demonstrated a myelogram. Our conclusion was that the epiduroscope was intrathecal. The epiduroscope was retracted and advanced away from the hole. We then inserted a Tunl XL-24™ catheter towards the ventrolateral right L4-5 foramen. Contrast instillation revealed ventrolateral epidural spread without connection to the subarachnoid space. We then proceeded with epidural adhesiolysis and decompressive neuroplasty, as with our first patient. This patient had no adverse sequelae at one month follow-up.

Epiduroscopy [1] is a safe, useful technique for diagnosis and treatment of spinal pain syndromes. In a series of 82 patients, we found no complications unique to epiduroscopy. FBSS poses a unique challenge due to development of epidural scar and damage to the normal boundaries of the epidural space. Epiduroscopy should be performed off the midline in these patients. However, even with this cautious approach, inadvertent entry into the subarachnoid and subdural space is possible. Importantly, the fluoroscopic and visual information permitted early recognition and avoidance of complications. As more practitioners become trained in epiduroscopy, awareness of these potential problems is imperative.

1. Geurts JW, Kallewaard JW, Richardson J, Groen GJ. Targeted methylprednisolone acetate/hyaluronidase/clonidine injection after diagnostic epiduroscopy for chronic sciatica: a prospective, 1-year follow-up study. *Regional Anesthesia & Pain Medicine* 2002;27(4):343-52.