

## Unilateral epidural nerve root hematoma in a parturient

K. M. KUCZKOWSKI (\*), J. L. BENUMOF (\*\*), L. S. REISNER (\*\*\*), D. ALFERY (\*\*\*\*) and R. MYERS (\*\*\*\*\*)

**Key words :** Spinal-epidural hematoma ; Epidural anesthesia ; Labor analgesia ; Cesarean section.

Epidural hematoma is a rare but catastrophic complication of neuraxial anesthesia. If the diagnosis and decompressive laminectomy are delayed for more than 8-12 hours, recovery of function is unlikely (3, 4). We herein report the first case of a parturient who developed an epidural hematoma that clinically caused only unilateral nerve root dysfunction at the L 2 – L5 levels. Since the compression of neural tissue by the hematoma was nerve root, rather than spinal cord, complete recovery of neurological function occurred, despite delayed diagnosis and treatment.

### CASE REPORT

A 24 year-old, 158 cm, 55 kg, gravida 1, para 0, previously healthy female at 38 weeks gestation was in labor and requested labor analgesia. The patient had recently immigrated to the United States and spoke no English.

She consented (through her husband as an interpreter) to epidural labor analgesia. The epidural catheter insertion technique consisted of using the sitting position and a median approach at the L3-4 interspace. An 18-GA Hustead epidural needle was introduced with the loss of resistance to saline technique and the epidural space was identified on the first attempt. A 20-GA multi-orifice epidural catheter was inserted 5 cm into the epidural space. Aspiration from the epidural catheter was negative for blood and CSF.

The standard epidural test dose was found to be negative for intravascular and subarachnoid catheter placement. Epidural analgesia consisted of an initial loading dose of 7 mL of 0.25% bupivacaine with fentanyl 50 mcg, followed by maintenance continuous infusion of 0.1% bupivacaine with sufentanil 0.75 mcg/mL (12 mL/hour). However, several rescue boluses of 0.25% bupivacaine with fentanyl were required for breakthrough pain.

Twelve hours later Cesarean section was required for failure to progress. A T4 sensory level of anesthesia was established with 2% lidocaine for a total of 12 mL (240 mg) and 0.5% bupivacaine for a total of 8 mL (45 mg) and fentanyl 100 mcg. However, intraoperatively, the patient complained of abdominal “pulling” and pain. Upon further pinprick testing, an incomplete motor and sensory block of her lower left extremity and left abdomen was detected and supplemental intravenous ketamine for a total of 25 mg was required to complete the surgery. At the conclusion of the surgery a single epidural dose of 1 mg of hydromorphone, followed by continuous infusion of hydromorphone 40 mcg/mL (4 mL/hour) were given for postoperative analgesia. The motor and sensory levels of anesthesia were not tested prior to initiation of continuous infusion of hydromorphone.

Nine hours after the surgery the patient noted numbness and motor block of her left lower extremity. Unfortunately, these symptoms were not communicated to the medical staff due to a language barrier for several hours. When neurological

K. M. KUCZKOWSKI, M.D. ; J. L. BENUMOF, M.D. ; L. S. REISNER, M.D. ; D. ALFERY<sup>o</sup>, M.D. ; R. MYERS, Ph.D., Departments of Anesthesiology, Reproductive Medicine and Neuropathology, University of California, San Diego, California, USA ; <sup>o</sup>Department of Anesthesiology, Centennial Medical Center, Nashville, Tennessee, USA.

(\*) Assistant Clinical Professor of Anesthesiology and Reproductive Medicine, Co-Director Obstetric Anesthesia, University of California, San Diego, CA.

(\*\*) Professor of Anesthesiology, University of California, San Diego, CA.

(\*\*\*) Professor Emeritus of Anesthesiology and Reproductive Medicine, Director Obstetric Anesthesia, University of California, San Diego, CA.

(\*\*\*\*) Staff Anesthesiologist, Centennial Medical Center, Associate Adjunct Professor of Anesthesiology, Vanderbilt Medical Center, Nashville, TN.

(\*\*\*\*\*) Professor of Anesthesiology and Neuropathology, University of California, San Diego, CA.

**Correspondence address :** Krzysztof M. Kuczkowski, Department of Anesthesiology, UCSD Medical Center, 200 W. Arbor Drive, San Diego, CA 92103-8770. E-mail : [kkuczkowski@ucsd.edu](mailto:kkuczkowski@ucsd.edu).



Fig. 1. — MRI of the thoracolumbar spine showed a large left sided posterior epidural collection of blood extending from the T12 to the L5 level, which was largest posterior to L1 and L2 and caused severe compression of the thecal sac and nerve roots.

examination was conducted, it revealed 0/5 strength to flexion of the left leg, extension of the left knee and dorsiflexion of the left foot. However, plantar flexion of the left foot was totally intact. There were no motor or sensory deficits in the right lower extremity. MRI of the thoracolumbar spine obtained 26 hours after the onset of neurologic deficit showed a large left sided posterior epidural collection of blood extending from the T12 to the L4 level, which caused severe compression of the thecal sac and nerve roots (Fig. 1). There was no clinical evidence of abnormal coagulation and laboratory coagulation studies were normal. Decompressive laminectomy was accomplished shortly thereafter. On the third postoperative day the patient was able to walk, albeit with slight weakness. Following six months of intensive physical therapy, complete recovery of neurological function was reported.

## DISCUSSION

The incidence of neuraxial hematoma causing significant neurologic deficit following neuraxial blocks is uncertain; Horlocker estimates the incidence at less than 1/220,000 in spinal, and at less than 1/150,000 with epidural anesthetics, respectively (1). The most common risk factors for epidural bleeding following neuraxial blocks are preexisting anatomic and vascular abnormalities, impaired hemostasis and technical difficulties at the time of needle or catheter placement (1, 5).

Despite the fact that neuraxial hematoma is rare, minor hemorrhagic complications are quite common (1). HORLOCKER *et al.* found the presence of blood in the epidural needle or catheter during epidural catheter placement in 138 of 575 patients (24%) and at the skin puncture site on the removal of the epidural catheter in 180 of 365 patients (49%) (1).

VANDERMEULEN *et al.* reported that muscle weakness and sensory deficits were the first neurological symptoms of epidural hematoma in 46% and 14% of patients, respectively (5). However, warning signs of spinal cord compression may be very subtle. In our case report, both the need for multiple rescue boluses of local anesthetics with opioids for breakthrough pain in labor and intraoperative complaints of lower abdominal pain/discomfort and incomplete motor and sensory block of her left lower extremity could be explained by increasing size of unilateral hematoma affecting spread of local anesthetics and opioids in the epidural space and subsequently leading to signs of spinal nerve root compression. Thus, we suspect that the development of unilateral epidural nerve root hematoma must have begun shortly after the “uneventful” epidural catheter placement. This unusual clinical presentation was consistent with the MRI-documented epidural hematoma causing unilateral L 2-5 nerve root compression as opposed to spinal cord compression.

We believe that primarily nerve root compression explains full recovery of function after 48 hours of compression. Nerve root axons may be less metabolically active and subsequently less sensitive to injury than nerve cells in the spinal cord (4).

## References

1. Horlocker T. T., Wedel D. J., *Anticoagulation and neuraxial block: Historical perspective, anesthetic implications, and risk management*, REG. ANESTH. PAIN MED., **23**, 129-134, 1998.

2. Myers R. R., Olmarker K., *Anatomy of DRG, intrathecal nerve roots, and epidural nerves with emphasis on mechanisms of neurotoxic injury*. In : Yaksh T., ed., *Spinal Drug Delivery*. Elsevier Science B.V., Amsterdam, pp. 115-131, 1999.
3. Russell N. A., Benoit B. G., *Spinal subdural hematoma*, SURG. NEUROL., **20**, 133-137, 1983.
4. Schmidt A., Nottle H., *Subdural and epidural haematomas following spinal, epidural or caudal anaesthesia*, ANAESTHESIST., **41**, 276-284, 1992.
5. Vandermeulen E. P., Van Aken H., Vermeylen J., *Anti-coagulants and spinal-epidural anesthesia*, ANESTH. ANALG., **79**, 1165-1177, 1994.