

# BRACHIAL PLEXUS PALSY AND HOARSENESS OF THE VOICE DURING LUMBAR EPIDURAL ANALGESIA FOR LABOR AND DELIVERY: A CAUTIONARY TALE

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**Summary:** The lumbar epidural analgesia is one of better ways of controlling pain during labor but it still can be followed with complications and unintentional side effects. Neurologic complications of epidural analgesia are rare.

We present two cases of healthy women where epidural analgesia was induced during active labor. Repeated intermittent epidural doses of local anesthetics and the left lateral decubitus position of the patients induced the cephalic spread of the anesthetic drug along the epidural space with the appearance of unilateral brachial plexus palsy and hoarseness of the voice. These side effects disappeared spontaneously but caused anxiety in the patients and in all medical staff. Elevated control by anesthesiologists is necessary in case of epidural analgesia during active labor to avoid risky complications like the high sympathetic block.

**Key words:** epidural analgesia in obstetrics, brachial plexus palsy, voice hoarseness, sympathetic block.

## Introduction:

Neurological complications during lumbar epidural analgesia for labor are seldom and with unpredictable occurrence among the obstetric patients. We report a case of unilateral brachial plexus palsy and another case accompanied with the hoarseness of the voice as a rare complication during lumbar epidural analgesia in two different obstetric patients. Although typically a benign side effect which often spontaneously resolves, nerve palsy is likely to cause anxiety in both the patient and the doctor. This article highlights the importance of early recognition of this transient symptom and discusses the various mechanisms of its process.

## Case report 1 #

A healthy, 29-year-old woman, gravida 2 para (ASA physical status I, weight 93 (+28) kg and height 168 cm) was admitted for active labour at 38 weeks gestation. Her past medical history was remarkable only for occasional headaches and experience of cesarean section in previous pregnancy because of breech presentation of fetus. At the cervix dilatation of 4 cm and visual analog scale (VAS) 8 score the patient requested epidural analgesia. After intravenous administration of 500ml of Ringer's solution, the patient was put in sitting position and an 18-gauge blunt-end epidural catheter was placed without difficulty via 17-gauge Tuohy needle through the L2-L3 interspace. The catheter was advanced 2-3 cm in the epidural space with the needle bevel pointing cephalad. A test dose of 4 ml 2% lidocaine (80 mg) with 1:200,000 epinephrine ruled out intrathecal position. After 10 minutes of lookout interval the level of analgesia according to VAS score was 6, and a bolus dose containing 11 ml of 0.25% levobupivacaine and retained analgesia of VAS score 6. Fifteen minutes after the epidural catheter was placed a dose of 5ml 0.25% levobupiva-

caine was administered. This resulted in an adequate symmetric block up to the level of dermatome Th8 that was tested by alcohol sponge test, and the analgesia score of VAS 2. The patient's blood pressure (BP) was 115/75 mmHg, which was not different from the value prior to epidural analgesia, and she was placed on the left lateral decubitus position. After 60-70 minutes after epidural catheter placement the patient complained about „funny weak feeling in the left forearm“. Examination revealed an unchanged level of sensory blockade of the body from dermatome Th8 to L2, and detected partial numbness over the patient's left upper arm and brachial region. Transitory palsy of left brachial plexus from C6 to Th1 was diagnosed. Fetal bradycardia, maternal hypotension and dyspnea were not noted during the labor period.

The plexus palsy resolved spontaneously approximately one hour after its onset in spite of one subsequent epidural dose of 5 ml of 0.25% levobupivacaine and 0.05 mcg of fentanyl followed by the continuous infusion of the same solution was at 7 ml/h. A healthy infant, Apgar score 8/9 was delivered vaginally 265 minutes after epidural block was established. After five hours the onset of symptoms the weakness of the left forearm was resolved.

## Case report 2 #

A healthy 32-year-old woman (ASA physical status I, weight 103 (+30) kg and height 171 cm) was admitted in labour at 40 weeks gestation. During an uneventful first stage of labor, cervix dilatation of 4 cm and VAS 8 score, epidural analgesia was requested. Following the intravenous infusion of 500ml Ringer's solution, with the patient in the left lateral position, an epidural catheter was easily inserted at the L3-4 interspace and directed 4 cm cephalad. A test dose of 3ml 2% lidocaine (60mg) with 1:200,000 epinephrine was admi-

nistered without evidence of either intravascular or intrathecal placement of the catheter. After 10 minutes the VAS score was 7 and additional dose of 10ml of 0.25% levobupivacaine and 0.05mcg of fentanyl was applied.

Twenty minutes following the epidural top-up dose, a further dose of 6 ml of 0.25% levobupivacaine and 0.05mcg of fentanyl were administered. This resulted in good analgesia and an asymmetric block with a dermatome level of Th12 on the right side and Th8 dermatome on the left tested by sponge test. The patient was placed in the left lateral decubitus position and a continuous infusion of 0.125% bupivacaine was started at the rate of 10 ml/h. Blood pressure remained unchanged at 120/75 mmHg, fetal monitoring was uneventful without deceleration or bradycardia. Approximately half an hour later the husband complained about wife's deep hoarseness of the voice, weakness of her left arm and numbness in the distribution of the ulnar nerve (C8 dermatome). Due to concerns for these neurologic findings, the epidural infusion was stopped and labor allowed to progress. About 30minutes after stopping the epidural infusion the patient's symptoms resolved.

After 215 minute of the onset of the epidural block a healthy infant was delivered vaginally. The patients was discharged from the delivery unit with no neurological deficits.

## Discussion

Epidural analgesia is a commonly employed technique of providing pain relief during labor. The number of parturient's given intrapartum epidural analgesia is reported to be increased at many institutions in the Europe. The procedure has few contraindications such as patient refusal, maternal hemorrhage and coagulopathy. Induction of epidural analgesia in early labor remains controversial. However, many physicians induce analgesia as soon as the diagnosis of active labor has been established and the patient has requested pain relief. The most common complications occurring with epidural analgesia are maternal hypotension and postdural puncture headache.

Neurologic complications of epidural or spinal analgesia/ anesthesia are rare. However, there are some clinical report about occurrence of Horner's syndrome, trigeminal nerve palsy, hoarseness of the voice and brachial plexus anesthesia following epidural analgesia application (1,2,3,4,5).

Brachial plexus palsy or Horner's syndrome complicating epidural anesthesia usually occurs unilaterally, which may be due to a subdural injection, asymmetrical positioning of the catheter in the extradural space or anatomical changes in the extradural space of pregnant women (2,5). The most logical explanation is the cephalic spread of the anesthetic drug along the epidural space while placed in a supine position. Gravity and the posture affect the spread and patient positioning may be the reason for unilateral sympathetic blockade. Lateral positioning tends to increase analgesia concentrations on the side that is lower during injection of the anesthetic solution (6). In postpartum epidurography performed in a patient who developed Horner's syndrome during delivery, Adam et al. have succeeded in showing unusually high uni-

lateral cephalic spread ("channeling") of contrast medium on the affected side(7). Our patients developed left-sided, unilateral brachial plexus palsy, which could be explained by the patient positioning (dependent side) during the epidural injection with left uterine displacement.

Burn has shown that large (40 ml) volumes of radio-opaque media consistently reach thoracic and cervical levels in non-pregnant patients whereas 20 ml volumes fail to do so (8). Bromage has suggested that during intense labor small amounts of local anesthetic may be driven cephalic.(9) During the second stage of labor, initiation of the Valsalva maneuver when the patient "bears down" compresses the epidural space and may also force small amounts of local anesthetic cephalic. It is also well known that, in order to achieve equal levels of anesthesia, parturient's need only one-third to one-half as much anesthetic as non-pregnant patients.(10) In our case the patient did not receive an excessive volume nor was she in active labor. Although the precise mechanism is not clear, a plausible explanation may be that the cervical sympathetic nerve fibers are very sensitive to anesthetic blockade, as probably only a small amount of the original dose reached the C4-C7 level. The fact that the signs reappeared after a second dose one-half the volume of the first may be accounted for by invoking Bromage's concept of epidural spread following "in the wake of the pathfinding dose", (9) in which the tissue planes are spread by the initial volume and a smaller volume later might be able to spread over a large area.

Local anesthetics including levobupivacaine, bupivacaine, lidocaine, or ropivacaine are often used in epidural anesthesia and analgesia.

Levobupivacaine showed a lower risk of cardiovascular and central nervous system

(CNS) toxicity than bupivacaine not only in animal studies, but also in human volunteers:

it has less negative inotropic effect, less effect on the duration of the QRS complex, at intravenous doses >75 mg produces less prolongation of the QTc interval and less

decrease of the stroke index than bupivacaine.(11,12) Because of the low affinity to cerebral tissue, levobupivacaine causes fewer changes indicative of CNS depression on EEG than bupivacaine.(13,14) Based on these data, levobupivacaine seems to be a valid and safe for obstetric epidural analgesia. But even in a diluted solutions, with a relatively low sensory level (Th8) of epidural labor analgesia or a low dose regimen, (13,14) local anesthetics may cause transient neurological complications.(15,16)

In conclusion, this report suggests that even when appropriate volumes of local anesthetic are used during lumbar epidural anesthesia for labor one might encounter an unexpectedly high anesthetic level. The importance of early recognition of transient neurologic complications may prevent unnecessary anxiety for the patient and potential initiation of unnecessary diagnostic workup. Epidural analgesia, as a acceptable method of pain control in the labor setting, is not without risk and awareness among providers is always required.

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