

Phantom Limb Pain and Epidural Anesthesia for Cesarean Section

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Although spinal anesthesia can exacerbate phantom limb pain in amputees,¹⁻³ the effect of epidural analgesia in these cases has not been described. We describe the management of an amputee who underwent epidural anesthesia for elective cesarean section.

REPORT OF A CASE

A 28-yr-old primigravid had undergone a right hindquarter amputation for chondrosarcoma 10 yr previously. She could remember only one severe attack of phantom pain, which had occurred approximately 10 days after that operation. Apart from that, she had continued to have occasional episodes of shooting pain in the phantom limb, nearly always referred to the region of the toes. These episodes were neither severe nor long-lasting enough to be incapacitating.

Because of instability of the pelvic wall, an elective cesarean section was scheduled, and the patient expressed a keen desire to be awake for this. Bearing in mind the reports of severe phantom pain brought on in amputees by spinal analgesia,¹⁻³ the patient was advised that the epidural might precipitate an exacerbation of her phantom pain, necessitating general anesthesia.

Surgery was performed under epidural analgesia with a total dose of 26 ml of 0.5% bupivacaine given in incremental doses over a 1-h period. This gave excellent anesthesia for the operation with no trace of phantom limb pain. However, as the epidural block began to wear off and sensation returned to the intact left lower limb, phantom pain began to appear on the right. This pain was different from her usual shooting pain, being reported as a dull ache referred to the calf and more severe than the wound pain from the cesarean section.

Both the phantom and wound pain were completely relieved by 75 µg fentanyl in 7.5 ml normal saline given through the epidural catheter. This was effective for more than 4 h, after which a second dose of fentanyl was given. This second dose was less effective than the first but provided adequate pain relief for 3 h. Thereafter, the patient's pains were effectively treated by two injections of im papaveretum and then oral analgesics, the usual routine for treatment of postepidural cesarean section in this hospital. The phantom pain was never severe after the early postoperative hours and steadily disappeared over the next 24-48 h.

DISCUSSION

Not all patients have phantom pain following amputation; the reported incidence varies between 0.4-50%^{4,5}

and, in addition, amputees commonly have other non-painful phantom sensations. After transection of a peripheral nerve, not only are there permanent neurophysiologic changes peripherally, but they may also occur centrally in the dorsal horn of the spinal cord related to that nerve.⁶ Presumably, in those amputees who do not have phantom pain, these peripheral or central changes do not occur, or if they are present, they do not result in pain.

There are two neurophysiologic theories for the mechanisms of phantom pain: 1) peripheral—pain is not dependent on activity in nociceptors or nociceptor fibers; and 2) central—a) pain involves changes in central neurones following loss of afferents due to lesions in the peripheral nervous system; and b) the central changes due to loss of afferents might involve either or both excitatory and inhibitory mechanisms of the central neurones.⁷

Most phantom pain is chronic in nature, and treatment is based on identifying whether the site of origin is peripheral or central. Epidural anesthesia has been used for this purpose, because if the procedure leads to relief of pain, it is assumed that the pain is arising from a site more peripheral than the epidural space. These patients with phantom pain of peripheral origin may also be helped by lumbar sympathectomy (unpublished observations), by transcutaneous nerve stimulation,⁸ and by injection of a local anesthetic around the neuroma.⁹

If epidural anesthesia does not relieve a chronic phantom limb pain, the site of origin is thought to be more central than the epidural space. In these patients the most effective forms of treatment are centrally acting drugs such as anticonvulsants or antidepressants, either separately or in combination.¹⁰ In chronic phantom pain, narcotics are seldom effective.

In this patient, the clinical problem was not one of chronic phantom pain, but whether the use of epidural anesthesia for her operation would induce severe acute phantom pain as has been described with spinal anesthesia.¹⁻³ Fortunately this did not occur, but the appearance of phantom pain as the epidural block was wearing off may have been due to upset of the "delicate neuronal balance" at a central level, which in her case normally ensured that she had little or no phantom pain. Perhaps had more local anesthetic been given postoperatively to relieve either wound or phantom pain, the latter would have recurred as the local anesthetic was wearing off, although the use of a different local anesthetic would have indicated whether the phantom pain was due to an idio-

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syncratic reaction to the bupivacaine. Another possible method of treating the phantom pain in this case might have been the use of general anesthesia as described when it occurred under spinal anesthesia^{2,3}; however, this would have been inappropriate in this case as the patient was already in the recovery room by the time the phantom pain appeared. Other possible forms of treatment might have been the use of anticonvulsants or antidepressants as described previously for the treatment of chronic phantom pain, but such extrapolation from chronic to acute pain is unreliable because of the great psychologic and possibly physiologic differences between chronic and acute pain.

Spinal narcotics are thought to provide analgesia by neuronal blockade in the substantia gelatinosa of the spinal cord¹¹ and so do not cause anesthesia. We consider that this makes spinal narcotics the treatment of choice in cases such as this where acute phantom pain is associated with epidural anesthesia, and possibly in similar cases associated with spinal anesthesia.

We conclude that epidural anesthesia did not produce phantom pain during its period of action as has been reported under spinal anesthesia.¹⁻³ Because of these reports we had felt some reluctance in agreeing to this patient's request for epidural blockade. Yet, perhaps by the mechanism described previously, the epidural anesthesia did seem to cause phantom limb pain as the block wore off, because a pain appeared which was both more severe and in a different site to the patient's usual phantom pain. This was readily relieved by the epidural opiate and no

doubt would also have been temporarily relieved by further epidural local anesthetic. Faced with a similar request again, not only would we be prepared to use an epidural block for the operation, but we would ensure that the epidural catheter was retained into the postoperative period as a means of providing pain relief, preferably by use of a narcotic.

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Increased Perioperative Risk Following Repair of Congenital Heart Disease in Down's Syndrome

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Patients with Down's syndrome (DS) have an incidence of congenital heart disease (CHD) of approximately 40%.¹ Early surgical intervention can prevent associated congestive heart failure, pulmonary hypertension, and pulmonary vascular obstruction.^{1,2} Children with DS may have a propensity for early development of pulmonary

vascular obstruction,^{3,4} although this conclusion has been disputed.^{5,6} Perioperative mortality is a function of both age at the time of surgery and complexity of the cardiac defect. In one series of DS patients with complete atrioventricular canal (AVC), mortality was 50% for patients less than 3 months of age, and 17% for patients at 12 months.⁷ Another series reported a mortality rate of 52% for all patients with DS with AVC, compared with 20%

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