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## Tracheostomy Performed under Cervical Epidural Blockade

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Patients who present for neck or chest surgery with severe cardiovascular disease or chronic obstructive pulmonary disease (COPD) may be appropriate candidates for cervical epidural anesthesia.<sup>1</sup> Reports in the literature have demonstrated the utility of cervical epidural anesthesia in patients undergoing carotid endarterectomy,<sup>2</sup> breast and upper thoracic surgery, and neck dissection.<sup>3</sup> Cervical epidural block has been used alone or combined with a light general anesthetic. We present the case of a 77-yr-old man with end stage lung disease, severe peripheral vascular disease (PVD), and coronary artery disease who underwent a tracheostomy performed solely under cervical epidural blockade.

### CASE REPORT

A 77-yr-old white man weighing 46 kg was admitted in July 1988 with bilateral draining groin abscesses. He had previously undergone an aortobifemoral bypass graft in June 1980. His past medical history was remarkable for severe PVD, a 62 pack-year smoking history, and coronary artery disease. He suffered an inferior wall myocardial infarction in August 1980, complicated with mild congestive heart failure controlled with furosemide.

On admission he reported severe dyspnea upon exertion but denied angina. Admission vital signs included blood pressure (BP) 128/70 mmHg, heart rate (HR) 70 beats/min irregularly irregular, respiratory rate (RR) 30 breaths/min, and temperature 38.6° C. Auscultation of the lungs revealed markedly diminished breath sounds with diffuse wheezing. Laboratory data included an arterial blood gas (ABG) with pH 7.42, pCO<sub>2</sub> 50 mmHg, pO<sub>2</sub> 50 mmHg, HCO<sub>3</sub><sup>-</sup> 31 mEq/l, and oxygen saturation 86%. Electrocardiogram (ECG) showed atrial fibrillation with a ventricular response of 66 beats/min and delayed R-wave progression.

On hospital day 2 he underwent bilateral groin exploration and debridement under local anesthesia. Attempts to provide supplemental iv sedation using 0.25 mg midazolam or 12.5 µg fentanyl resulted in a reduction in BP from 154/70 mmHg to 80/39 mmHg, requiring immediate treatment with 10.0 mg ephedrine and 100 µg neosynephrine. Physical examination and chest x-ray failed to reveal changes consistent with congestive heart failure (CHF).

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On hospital day 3 placement of bilateral axillofemoral Gore-tex bypass grafts and excision of the infected aortobifemoral graft was performed successfully under continuous epidural anesthesia with local anesthesia for the axillary anastomoses. Attempted sedation with 12.5 mg diphenhydramine resulted in hypotension requiring ephedrine. Subsequently, sedation was provided with an iv infusion of 10 µg · kg<sup>-1</sup> · min<sup>-1</sup> ketamine without hemodynamic change. Data obtained from intraoperative pulmonary artery catheterization revealed mildly elevated mean pulmonary artery pressures with normal cardiac outputs, wedge pressures, and central venous pressures. Intraoperative urine output averaged 2 ml · kg<sup>-1</sup> · h<sup>-1</sup>, and chest x-ray revealed no evidence of CHF.

On hospital day 6 the patient developed biventricular heart failure documented by chest x-ray and data obtained from a pulmonary artery catheter. This was treated with iv furosemide. On hospital day 7 he suffered a respiratory arrest and his trachea was intubated. He became unresponsive with a systolic BP of less than 40 mmHg and was successfully resuscitated with dopamine. After resuscitation he required 3 mg/min lidocaine, 6 µg · kg<sup>-1</sup> · min<sup>-1</sup> dopamine (to maintain a systolic BP 90–100 mmHg) and an aminophylline infusion.

Between hospital days 7 and 15, he remained alert and oriented but required mechanical ventilation and an aminophylline infusion to maintain adequate gas exchange. On hospital day 14 the patient developed bilateral pulmonary infiltrates, oliguria, and intermittent periods of hypotension to 70 mmHg requiring 3 µg · kg<sup>-1</sup> · min<sup>-1</sup> dopamine and continued iv lidocaine to suppress ectopy. Cefazadime and amikacin therapy was initiated for positive cultures of *Pseudomonas aeruginosa* and *Pseudomonas maltophilia*.

On hospital day 16 the patient underwent a tracheostomy. Upon arrival in the operating room, the patient was alert; BP monitored via a radial artery catheter was 95–104/50–55 mmHg, ECG displayed atrial fibrillation with a ventricular response of 90 beats/min, and central venous pressure (CVP) via a right internal jugular catheter was 7 mmHg. Intravenous infusions consisted of 2 mg/min lidocaine, 5 µg · kg<sup>-1</sup> · min<sup>-1</sup> dopamine, and 9 µg · kg<sup>-1</sup> · min<sup>-1</sup> aminophylline. The patient was placed in the left lateral decubitus position and a number 17 Huestead needle was advanced into the epidural space at the C6–7 interspace. A Teflon catheter was advanced 4.5 cm into the space without paresthesias, blood, or cerebrospinal fluid. A test dose of 3 ml lidocaine 1.5% with epinephrine 1:200,000 was injected after careful aspiration of the catheter. No hemodynamic changes occurred over the next 2 min. An additional 2 ml of lidocaine 1.5% was injected through the catheter. After 5 min systolic BP decreased from 100 to 85 mmHg. This was immediately treated with 1 µg/kg neosynephrine, which returned systolic blood pressure to preanesthetic baseline.

Seven minutes after the initial dose, the patient reported no sensation to pinprick in the distribution of C2–6 bilaterally. Hand grip strength was well preserved bilaterally. Surgery proceeded uneventfully and the patient required a total of 6 µg/kg neosynephrine during the 60-min procedure to maintain his systolic BP at preanesthetic levels. Diaphragmatic function was not evaluated because respiration was mechanically controlled.

### DISCUSSION

Cervical epidural anesthesia represents an alternative to general anesthesia in some patients requiring surgery

of the neck and upper thorax.<sup>2,3</sup> Previous studies have reported encouraging results regarding the low incidence of side effects. In one retrospective study of 100 patients, no severe complications were reported.<sup>2</sup> Others have found the incidence of phrenic nerve blockade to be low and report unimpaired spontaneous ventilation with C2 blocks utilizing 0.5% bupivacaine or 1% mepivacaine.<sup>3</sup>

The presence of inadequately treated congestive heart disease could explain the current patient's sensitivity to sedative/opiate administration. This seems unlikely because there was no evidence to support the existence of CHF during his first two procedures based upon physical examination, chest x-ray, and data obtained from a pulmonary artery catheter. During this hospitalization his CHF first developed on the third postoperative day following removal of the infected aortobifemoral graft.

In our experience, sedation with opioid or hypnotic drugs is commonly required during local infiltration anesthesia for tracheostomy. We elected not to proceed with a local infiltration block for several reasons: 1) the patient had two previous adverse experiences with anesthetics consisting of local infiltration and small doses of supplementary medication; 2) the desire to avoid larger doses of local anesthetic required for bilateral deep and superficial cervical plexus blocks; and 3) the recognition that any surgical pain from incomplete anesthesia might precipitate angina or congestive failure in this patient with extremely limited cardiac reserve. We utilized approximately 1 ml of local anesthetic per segment, which is within the reported range of dose requirements for cervical epidural anesthesia.<sup>3,4</sup>

We noted a decrease in BP from 100/60 to 85/54 mmHg easily treated with neosynephrine. Although the

patient had suffered preoperative periods of more severe hypotension, we cannot rule out the cervical sympathetic blockade as a causative factor intraoperatively. One study suggested that anesthetic-induced sympathectomy is strictly segmental.<sup>3</sup> Certainly, more controlled studies are needed to further evaluate the hemodynamic effects of cervical epidural blockade. We failed to observe any significant upper extremity motor block as assessed by hand grip strength. This is consistent with the findings of others who noted satisfactory surgical anesthesia with minimal motor blockade utilizing 0.5% bupivacaine or 1% mepivacaine.<sup>3</sup>

In summary, we present a case of a patient undergoing a tracheostomy successfully performed under segmental cervical epidural blockade. We believe cervical epidural anesthesia/analgesia should be considered a viable alternative to other anesthetic techniques for tracheostomy.

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## Bleeding after Intercostal Nerve Block in a Patient Anticoagulated with Heparin

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Multiple intercostal nerve blocks repeated every 8-12 h provide analgesia after abdominal operations.<sup>1</sup> The

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blocks are particularly helpful for patients with muscle spasms in and around the incision. Parental opioid analgesics are only able to decrease the pain, whereas an intercostal nerve block will eliminate the discomfort. Reduced postoperative pain leads to better respiratory performance, provided ventilation is not depressed by opioids.<sup>2</sup>

Anticoagulation is a contraindication for some types of regional anesthesia,<sup>3</sup> although in selected instances it may be considered only a relative contraindication.<sup>4</sup>

The following case report describes a patient who re-