

- positive pressure ventilation and high-frequency ventilation with experimental bronchopleural fistulae. *Crit Care Med* 11:598-602, 1983
5. Kuwik RJ, Glass DD, Coombs DW: Evaluation of high frequency positive pressure ventilation for experimental bronchopleural fistulae. *Crit Care Med* 9:164, 1981
 6. Carlon GC, Griffin J, Cole R, Groeger JS, Patrick K: High frequency jet ventilation in experimental airway disruption. *Crit Care Med* 11:353-355, 1983
 7. Carlon GC, Ray C, Klein R, Goldiner PL, Miodownik S: Criteria for selective positive end-expiratory pressure and independent synchronized ventilation of each lung. *Chest* 74:501-507, 1978
 8. Glass DD, Tonnesen AS, Gabel JC, Arens JF: Therapy of unilateral pulmonary insufficiency with a double-lumen endotracheal tube. *Crit Care Med* 4:323-326, 1976
 9. Carlon GC, Kohn R, Howland WS, Baron R, Ramaker J: Acute life-threatening ventilation-perfusion inequality: An indication for independent lung ventilation. *Crit Care Med* 6:380-387, 1978
 10. Benumof JL: One-lung ventilation: Which lung should be PEEPed? *ANESTHESIOLOGY* 56:161-163, 1982
 11. Benjaminsson E, Klain M: Intraoperative dual-mode independent lung ventilation of a patient with bronchopleural fistula. *Anesth Analg* 60:118-119, 1981
 12. Powner DJ, Eross B, Orenvik A: Differential lung ventilation with PEEP in the treatment of unilateral pneumonia. *Crit Care Med* 5:170-172, 1977
 13. Hillman KM, Barber JD: Asynchronous independent lung ventilation (AILV). *Crit Care Med* 8:390-395, 1980
 14. Dodds CP, Hillman KM: Management of massive air leak with asynchronous independent lung ventilation. *Intensive Care Med* 8:287-290, 1982
 15. Albelda SM, Hansen-Flaschon JH, Taylor E, Lanken PN, Wollman H: Evaluation of high frequency jet ventilation in patients with bronchopleural fistulas by quantitation of the air leak. *ANESTHESIOLOGY* 63:551-554, 1985
 16. Bishop MJ, Benson MS, Sato P, Pierson DJ: Comparison of high frequency jet ventilation with conventional mechanical ventilation for bronchopulmonary fistula. *Anesth Analg* 66:833-838, 1987

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Epidural Abscess following Epidural Catheterization in a Chronic Pain Patient: A Diagnostic Dilemma

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Reviews addressing the epidemiology of epidural abscess conclude that infection of the epidural space is an extremely rare condition accounting for, on average, about 1 in 50,000 hospital admissions.¹ Reported cases suggest that most epidural infections result from trauma, surgical procedures, intravenous drug use, or hematogenous spread of infection from elsewhere in the body, rather than as a result of epidural analgesia.²⁻⁴

Clinical recognition of either acute or chronic epidural abscess can be extremely difficult. In patients with underlying painful disorders in whom continuous epidural analgesia or anesthesia is used for evaluative or

therapeutic purposes, this diagnostic dilemma may be compounded. We report a case of a patient who developed an epidural abscess after continuous epidural catheterization for management of a long-standing thoracic neuralgic pain syndrome.

CASE REPORT

A 35-yr-old woman was referred to our Pain Management Center for evaluation and treatment of left-sided parascapular pain of 7 months duration. This pain problem followed an episode of acute bronchitis and had been unresponsive to treatment with non-steroidal anti-inflammatory agents, tricyclic antidepressants, transcutaneous nerve stimulation, massage and ultrasound, and intercostal nerve blocks. The patient was taking up to ten Percocet[®] tablets a day and was organizing her life around the acquisition of analgesics for pain relief.

Her pain was described as sharp and burning with intermittent stabbing sensations in a circumscribed area from the lateral border of the left scapula to the ipsilateral posterior axillary line. It was described as severe and debilitating, keeping her from enjoying an active life and interfering with her work as a realtor. She consumed alcohol moderately, smoked one to two packs of cigarettes a day, frequently used over-the-counter soporifics in order to fall asleep at night, and consumed approximately 12-14 cups of caffeinated beverages each day.

Physical examination was remarkable for a tearful and agitated affect and an area of reproducible dysesthesia in a wedge-like distribution from the left scapular border to the ipsilateral posterior axillary

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line. A computerized tomographic scan of the thoracic spine revealed no abnormality.

A plan was outlined to include controlled discontinuation of narcotic analgesics with evaluation by Behavioral Medicine and Occupational/Physical Therapy and, subsequently, to attempt to further define and treat this neuralgic pain with continuous epidural analgesia. The patient was admitted to the in-patient pain management unit. Unfortunately, she was generally uncooperative with most members of the staff and demonstrated inconsistencies in pain reports and activity. Formal psychological assessment and plans for non-medical interventions for pain management were rejected.

On the eighth hospital day, after informed consent, a thoracic epidural catheter was placed. An initial attempt at the T5 level was unsuccessful, but placement at the T10 level was readily accomplished and the catheter was easily advanced cephalad approximately 6 cm. A loss of resistance technique was employed under sterile conditions with a 19-gauge catheter advanced through a 17-gauge Husted needle. Neither blood nor cerebrospinal fluid was obtained from the epidural needle or catheter with aspiration. A millipore filter was attached to the injection port of the catheter and a waterproof sterile dressing was placed over the entry site. All epidural drugs were administered by anesthesiology house staff or attending staff and were freshly opened preservative-free solutions. The catheter was dosed with either bupivacaine ¼%, fentanyl, or isotonic saline over the subsequent 72 h after a demonstration of good segmental anesthesia in the T3-T8 dermatomal distribution when local anesthetic was injected. The patient's pain reports were inconsistent and difficult to interpret with respect to the various agents injected; however, the neuralgic pain had completely subsided after 72 h and the epidural catheter was removed. The patient reported that her initial pain was replaced by a new pain at the site where the epidural catheter had been placed and requested analgesics. Physical examination was unrevealing except for localized tenderness around the prior epidural entry site, considered to be consistent with needle puncture for catheter placement. As the patient did not desire further pain management approaches, she was discharged from hospital with a plan for outpatient follow-up. She and her mother, who was in attendance, were counselled to observe for fever, chills, or the development of any other new symptoms, and were told that narcotic analgesics would not be presently prescribed. Twenty-four hours after discharge from the hospital, the patient called requesting analgesics and was reassured and told to keep her appointment for 3 days hence. Forty-eight hours after discharge, she came to the emergency department complaining of continued back pain and "funny sensations" all over her body. She was afebrile and examination of her back and neurological system were found to be normal by the emergency room staff. Again, she was denied narcotic analgesics and was told to return if symptoms progressed as previously described. She was seen in follow-up 2 days later complaining of severe back pain and stating that she could not walk. She was brought to the clinic in a wheelchair by her mother. She was afebrile and the back examination was only remarkable for local paraspinal tenderness to palpation. Detailed and repeated neurological examination failed to yield any reproducible abnormalities. At this time, it was felt that there was such an exaggerated response to whatever nociceptive process may have been ongoing that psychiatric referral was warranted, and this was arranged. Again the patient and her mother were told to observe for development of fever, chills, or new progressive symptoms and to stay in contact with us. The patient left the clinic ambulating without assistance.

Forty-eight hours later, the patient went to the emergency department at another hospital presenting with chills, fever, and urinary retention. She was found to have a purulent drainage from her old epidural site and a markedly elevated white blood cell count. A computerized tomographic scan revealed an epidural mass in the midthoracic region. Laminectomy was performed demonstrating a sizable

thoracic epidural abscess extending from T₅ to T₁₀. Recovery from surgery was relatively uneventful. At 6 months follow-up, the patient complained of paresthesias of variable intensity down the right leg in a stocking distribution, as well as "back spasms." The thoracic neuralgic pain has never recurred.

DISCUSSION

Epidural abscess is an extremely rare condition, and only a few cases have been reported as a result of epidural catheterization.¹⁻⁴ Many of the risk factors associated with early case reports, as reviewed by Bromage,⁵ have been eliminated by the use of disposable equipment, adherence to aseptic technique, and single-use preparations of preservative-free injectable drugs. Even with these standards, it appears that there will inevitably be some incidence of infection associated with this invasive procedure. Barreto found a number of catheter tips, as well as the skin surrounding epidural catheter placement sites, to be contaminated with potentially pathogenic organisms, despite a strict aseptic placement technique.⁶ Similarly, Hunt *et al.* found a 22% incidence of contaminated catheter tips in a study of 102 patients who had epidural catheters placed for a variety of indications under rigorously controlled conditions.⁷ With these findings, it is indeed remarkable that, of the tens of thousands of epidural catheters placed annually for labor and delivery, surgical procedures, pain control, and diagnostic evaluation, there are so few clinically apparent infections. This is especially surprising in view of the difficulty in maintaining fastidious conditions in the labor bed, and the risk of infection associated with immunocompromised cancer patients in whom epidural analgesia is provided for long-term pain control. Another group that is logically at risk consists of those patients who receive epidural steroids for chronic low back pain. Factoring out cases where obvious contamination occurred and caused infection, the occurrence of epidural abscess appears to be a more unpredictable event than predicated upon these more obvious potential risk factors.

Another variable to be considered is the duration that a percutaneous catheter remains *in situ*. Certainly, an epidural catheter should only remain in place for specific well-defined indications, but, presently, there is not adequate data to suggest a duration beyond which the risk of infection increases. It has been shown that epidural catheters could remain in place for several days, and even weeks, in a military field hospital to provide analgesia for injuries sustained during the Vietnam war without apparent complications (Petty WC, personal communication).

In patients with an acute or chronic epidural abscess, the diagnosis is often missed initially or may not be made until post-mortem examination. This is due to the

ambiguous nature of symptoms, signs, and specificity of diagnostic tests associated with epidural infections.^{1,2,8} Pain progressing in a radicular pattern and fever are the most common early findings, and, once neurological loss ensues, the diagnosis becomes more obvious. However, at this later stage, progression to irreversible neurological deficit due to localized spinal cord compression and vascular compromise is rapid.⁹

Early diagnosis requires aggressive diagnostic testing for confirmation by myelography, contrast enhanced computerized tomography, or magnetic resonance imaging. Although early diagnosis is of paramount importance so that definitive surgical therapy can prevent permanent neurologic loss, this can be a conundrum in chronic pain patients, exemplified by the case presented. When pain is the only early presenting complaint and the assessment of the pain complaint is confounded by exaggerated responses, one must depend on reproducible clinical findings and support these with corroborating tests.

One of the tenets of management of most chronic (non-malignancy-related) pain syndromes is non-reinforcement; *i.e.*, limiting operant conditioning factors, such as medical interventions, purely for pain complaints, except on a time-contingent "preventative" basis or when clinical signs dictate otherwise. Patients who express painful sensations in a florid and inconsistent fashion may require invasive nerve-blocking procedures for diagnostic and clarification purposes. How-

ever, an additional risk in these patients may be the difficulty in making rapid diagnoses of complications where pain or unusual sensations are premonitory features.

As the practice of chronic pain management grows, these dilemmas are sure to surface with increasing frequency. Those involved in these patients' care must add this unsettling dimension and enhanced risk to an arena already brimming with ambiguity.

REFERENCES

1. Baker AS, Ojemann RG, Swartz MN, Richardson EP: Spinal epidural abscess. *N Engl J Med* 293:463-468, 1975
2. Danner RL, Hartman BJ: Update of spinal epidural abscess: 35 cases and review of the literature. *Rev Infect Dis* 9:265-274, 1987
3. North JB, Brophy BP: Epidural abscess: A hazard of spinal epidural anaesthesia. *Aust N Z J Surg* 49:484-485, 1979
4. Saady A: Epidural abscess complicating thoracic epidural analgesia. *ANESTHESIOLOGY* 44:244-246, 1976
5. Bromage PR: *Epidural Analgesia*. Philadelphia, W.B. Saunders Co., 1978, pp 682-690
6. Barreto RS: Bacteriological cultures of indwelling epidural catheters. *ANESTHESIOLOGY* 23:643-646, 1962
7. Hunt JR, Rigor BM, Collins J: The potential for contamination of continuous epidural catheters. *Anesth Analg* 56:222-225, 1977
8. Verner EF, Musher DM: Spinal epidural abscess. *Med Clin North Am* 69:375-384, 1985
9. Feldenzer JA, McKeever PE, Schaberg DR, Campbell JA, Hoff JT: Experimental spinal epidural abscess: A pathophysiological model in the rabbit. *Neurosurg* 20:859-867, 1987

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Extrapyramidal Reactions to Low-dose Droperidol

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Nausea and vomiting is the most frequently reported postoperative adverse reaction in ambulatory surgery.¹ Low doses of droperidol are used to prevent postoperative nausea and vomiting. It is effective in children undergoing strabismus surgery,²⁻⁴ and in adults undergo-

ing gynecologic⁵⁻⁸ and orthopedic surgery.⁹ In the low doses commonly used (0.6-1.25 mg) in adults, adverse side effects such as extrapyramidal reactions or severe anxiety have not been reported to occur. Phillip states that these side effects are not seen with the above doses.¹⁰ Two cases of severe extrapyramidal reactions, apparently caused by low-dose droperidol, are described, following outpatient anesthesia and surgery.

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CASE REPORTS

Case 1. A 24-yr-old, 58-kg woman, ASA classification I, taking no medications, underwent diagnostic laparoscopy and tubal lavage for evaluation of primary infertility. General anesthesia was given with endotracheal intubation. d-tubocurarine, 3 mg, and droperidol, 0.65