

Case Report

Epidural abscess and meningitis, a complication of spinal anesthesia in a bacteraemic patient

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Abstract

Meningitis can be caused in experimental animals by performing a lumbar puncture (LP) after first inducing bacteraemia. Several authors have speculated that an LP in a bacteraemic patient without having meningitis at the time of LP might actually cause meningitis. We report a case of meningitis and epidural abscess after spinal anaesthesia in a bacteraemic patient. A 57-year-old male, known diabetic was admitted for below knee amputation, with a diagnosis of infection and gangrene of the left foot. Intravenous antibiotics were started and a below knee amputation was done on the date of admission under spinal anaesthesia. The patient started having backache, fever and became confused post operatively. A cerebrospinal fluid examination showed meningitis. Patient had seizures and developed respiratory failure. Cerebrospinal fluid smear showed the same organism ie, *Streptococcus agalactiae* that grew on blood culture and wound culture, sent at the time of admission. Magnetic Resonance Imaging of LS spine showed an epidural abscess and was managed successfully with antibiotics. Epidural abscess and/or meningitis should be suspected in a bacteraemic patient who has undergone spinal anaesthesia. Post spinal backache may indicate spinal epidural abscess. If diagnosed early and without signs of cord compression

epidural abscess can be managed successfully with antibiotics.

Introduction

Meningitis can be caused in experimental animals by performing a lumbar puncture (LP) after first inducing bacteraemia.^{1,2} Several authors have speculated that an LP in a bacteraemic patient not previously having meningitis might actually cause meningitis.³ We report a case of meningitis and epidural abscess in a bacteraemic patient associated with spinal anaesthesia.

Case Report

A 57-year-old male, known diabetic for 10 years, on insulin was admitted with complaints of swelling, blackish discoloration and gangrenous changes of left foot and ankle. He had weakness and difficulty in walking (because of pain in the foot) for several days. Past medical history was significant for amputation of the left second toe two years back secondary to peripheral vascular disease presumably secondary to diabetes mellitus.

On physical examination the patient was a middle aged man, alert and oriented with temperature: 99°F, blood pressure (BP): 130/74; pulse rate: 114/min; respiratory rate (RR): 20/min; oxygen saturation (SaO₂): 98% in room air and

finger stick blood sugar level: 203mg/dl. Systemic examination was significant for swelling, tenderness, blackish discolouration of the left foot, positive crepitus and purulent foul smelling discharge from the same foot. The rest of the physical examination was essentially normal.

White cell count (WBC) was 29,800/cmm with 87% neutrophils. The haemoglobin (Hb) was 12 gm/dL and platelets were 626,000/cmm. The chest x-ray was normal.

The patient was admitted with a diagnosis of infection and gangrene of the left foot for a below knee amputation. Intravenous antibiotics piperacillin-tazobactam 4.5 G stat and Q 6 hourly, Metronidazole 500mg stat and Q 6 hourly, Vancomycin 1 G stat and Q 12 hourly) were started and below knee amputation was performed on the date of admission under spinal anaesthesia. The patient developed backache after the spinal anaesthesia and started having fever from postoperative day (POD) 2 and became confused on POD 3.



Figure: T2 weighted non-contrast MRI of the lumbar spine showing well-defined loculation in the epidural space starting from the lower part of L3 to the upper part of L5.

The patient continued to deteriorate and was then shifted to Intensive Care Unit (ICU) on the 4th POD for the management of altered mental status and fever.

On POD 4, the patient was confused and toxic looking with a temperature of 102°F, BP140/80 mm of Hg, Pulse 126/min and RR 21/min. He had dry oral mucosa, poor dental hygiene, neck rigidity, positive kernig's and brudzinski's sign. Laboratory analysis showed a WBC count of 24,700/cmm with 89% neutrophils, Hb of 9.7 g/dl and platelets 666,000/cmm. Blood culture at time of admission was positive for *Streptococcus agalactiae*. Wound culture sent earlier was also positive for *S. agalactiae*. Chest x-ray was normal. The patient was diagnosed as a case of suspected meningitis and Ceftriaxone 2 gram Q 12 hourly was added. Later on antibiotic treatment was reviewed and piperacillin-tazobactam was replaced with Benzyle Penicillin 4 million units Q 4 hourly. Computerized Axial Tomography (CAT) scan of the brain showed no infarct or bleed. A cerebrospinal fluid (CSF) smear showed the same organism that grew on blood culture and wound culture (*S. agalactiae*). Magnetic Resonance Imaging (MRI) showed an epidural abscess (Figure). Neurosurgeon was consulted and he suggested that the patient was not a surgical candidate at that time because there was no compression of spinal cord. Subsequently patient developed respiratory failure and was intubated and placed on mechanical ventilation. Intravenous antibiotics were continued and the patient gradually improved and was successfully extubated.

Discussion

Acute bacterial meningitis is an acute purulent infection within the subarachnoid space. Almost any bacterium gaining entrance to the body may produce meningitis but by far the most common bacteria are *Haemophilus influenzae*, *Neisseria meningitidis* and *Streptococcus pneumoniae*.⁴ Spinal epidural abscess is a suppurative infection occurring in the potential space between the vertebral bone and dura matter. Most often this is due to staphylococcus infection. Meningitis, epidural abscess and vertebral osteomyelitis are known complications of lumbar puncture, done for diagnostic purposes and for spinal anesthesia and these may occur with a seemingly flawless technique. Poor antiseptic techniques and contamination with chemical antiseptics, starch powder from gloves, detergents, higher concentrations of the drug and variations in pH have all been blamed.⁵ Several reports of iatrogenic streptococcal meningitis following LP or spinal myelography have suggested that post-LP meningitis could arise from aerosolized oropharyngeal secretions from personnel present during the procedure.^{6,7} Several authors have recommended the routine use of facemasks during diagnostic lumbar puncture including neuroradiologic

imaging procedures involving LP.^{8,9} Epidural abscess can also occur after administration of epidural anesthesia though incidence is quite low.¹⁰

Beside direct inoculation of the organisms to the epidural/subarachnoid space due to poor antiseptic technique, another source of infection is bacteraemia at the time of lumbar puncture.¹ Rupture of the capillaries/small vessels is inevitable at the time of puncture and in the presence of bacteraemia, extravasation of blood can act as definite source of infection. Theoretically both epidural abscess and meningitis can be caused at the same time by the same procedure.

Spinal epidural space anatomy offers little resistance to the longitudinal spread of the infection. The frequency of the leading bacterial causes of spinal epidural abscess (SEA) is as follows. *Staphylococcus aureus*-63%, Aerobic gram-negative bacilli-16%, aerobic streptococci-9%, *Staphylococcus epidermidis*-3%, anaerobes-2%, others-1%, and Unknown-6%.⁸

Reported incidence of SEA is 1.96 to 2.8 per 10,000 hospital admissions with clear male predominance. Approximately one-third of the patients with SEA have no identifiable source of infection. If there is bacteremia at the time of the spinal invasive procedure the same organism should be suspected as a potential pathogen.⁸ Predisposing factors include immunodeficiency, AIDS, alcoholism, chronic renal failure, diabetes mellitus, intravenous drug abuse, malignancy and spinal procedure/surgery/trauma. Symptoms and signs of epidural infection include severe back pain usually within 24 hours, severe headache with marked nuchal rigidity, local tenderness, fever and paraplegia. Blood picture shows leukocytosis while CSF shows elevated proteins. Backache can be confused with local injury secondary to puncture, existing arthritis, faulty positioning during surgical operation or sleep. Fever and leukocytosis has many causes, however, the key to diagnosis is suspicion. Similarly, altered mental status has many causes but meningitis should not be ignored especially in a scenario like in this patient with fever and high WBC count. Also, retrospectively if blood cultures (done due to any reason at the time of puncture) are found positive or if symptoms allude to generalized sepsis at the time of LP, this infection should be considered as a possible cause.

This patient was treated successfully with antibiotics after the neurosurgeon indicated that the patient was not a candidate for surgery at that time. However, traditional teaching, that epidural abscess is a neurosurgical emergency, may be an exaggeration and some of the cases may be treated successfully with medical management, e.g. patients with no cord compression signs and diagnosed in early stages, as in this patient. Theoretically keeping in view the general principles of treatment of abscess if antibiotics are given and

epidural space is aspirated by an expert (preferably using an epidural set) at one or multiple intervertebral levels can avert a major neurosurgical procedure. This requires further research. *S. agalactiae* is the representative species of group B Streptococci and is the leading cause of bacterial sepsis and meningitis in newborns. It is a major cause of endometritis and fever in parturient female patients. Infections in adults that are not associated with peripartum period generally involve individuals who are elderly or have underlying chronic illness, such as diabetes mellitus or a malignancy.⁴ Our case is the first case of *S. agalactiae* causing epidural abscess and meningitis in an adult patient.

Conclusion

Post lumbar puncture backache may well be an indication of spinal epidural abscess especially if bacteremia or fever with high WBC count is present. The key to diagnosis is high index of suspicion. Epidural abscess and meningitis both can happen as a complication of single procedure and should be suspected in a bacteraemic patient who has undergone spinal anaesthesia and has altered mental status. If diagnosed early and without signs of cord compression epidural abscess can be managed successfully with antibiotics.

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