Streptococcal Meningismus After CT Myelography in a Patient with HIV

Streptococcal meningitis is a potential complication of myelography. Healthcare personnel and patients should be advised of this risk as well as measures to prevent it.

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Bacterial meningitis is a rare but known complication to lumbar puncture procedures including myelography, with multiple cases reported.[1-9] We present the case of a patient with HIV who was treated for meningitis at our institution following myelography. We also include a review of the relevant literature including the implications for HIV status on the patient's prognosis.

CASE REPORT

PN is a 43-year-old male with a past medical history of HIV and lumbar disc herniation previously requiring several corticosteroid injections who presents complaining of sudden onset "explosive" headache, fever, nausea, vomiting, and neck and back pain one day after having a CT myelogram for planning of spinal surgery. The patient followed all post-procedure instructions and felt well overnight and in the morning until his headache acutely began 24 hours later at breakfast along with the other symptoms. He was immediately brought to the emergency department where he began experiencing increasing confusion, lethargy, and agitation shortly after arrival. PN had no sick contacts, denied any vision abnormalities or sensitivity to light, but had traveled to Haiti and Canada several months prior. His temperature was found to be 105 F and bloodwork revealed a leukocytosis of 13,900 with a neutrophilic predominance. Non-Contrast Head CT was negative for any acute abnormalities. The patient refused lumbar puncture. Blood cultures were obtained, and he was given acetaminophen, ceftriaxone, vancomycin, and dexamethasone.

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Subsequent workup revealed a HIV-1 viral load of 239,000 and a CD4 lymphocyte count of 59/mm^3. Over the course of his admission, blood cultures grew Streptococcus alactolyticus, which was sensitive to ceftriaxone, so vancomycin was discontinued. Spine MRI ruled out abscess and echocardiogram did not reveal any vegetation. Because the patient refused lumbar puncture, no CSF culture was obtained. However, on the basis of his clinical presentation, his bacteremia, and the fact that his fever and meningismus occurred 24 hours after receiving his myelogram, meningitis was considered the likeliest diagnosis.

Over his hospital stay the patient clinically improved. His fever, leukocytosis, and encephalopathy resolved over his

hospital course, and he was discharged to complete a two week course of ceftriaxone.

DISCUSSION

The etiology of lower back pain can be diagnosed using MRI, CT myelography, or both. The ordering physician must consider a variety of factors in choosing one modality over another, including cost, radiation dose, and invasiveness.[10] Furthermore, the surgeon may prefer the myelographic findings in the presence of surgical implants and scoliosis, and myelography permits the surgeon more liberties for patient positioning.[11] Thus, CT myelography remains a viable and relatively safe diagnostic modality.[3]

While Gram-negative bacilli have historically been reported as the most common causative organism of iatrogenic meningitis,[7] streptococci have emerged as an important cause.[4,6,8] The significance of this has not been completely elucidated, as multiple possible routes of contamination have been suggested during lumbar puncture procedures.[3,4]

Nevertheless, the isolation of streptococci in the CSF of patients suffering meningitis after myelography has given rise to concern over mask use by healthcare personnel during lumbar puncture procedures, since these organisms are known to colonize the upper respiratory tract. Concern over this mode of transmission was raised as early as 1982,[7] but it was not until 2007 that the CDC issued an official recommendation on the use of face masks by healthcare personnel while performing lumbar puncture.[12] Despite this recommendation, two outbreaks of streptococcal meningitis in this setting have since been reported,[1,2] and a recent survey found that 48 percent of attending neuroradiologists and 67 percent of neuroradiology fellows always wore a face mask when performing myelograms.[13]

The patient's immune status played an important role. Ample support exists within the literature for the use of corticosteroids to downregulate the host immune response, preventing neuronal injury.[14] Theoretically, if the immune system was in some degree of compromise, the extent of meningitis should not be as devastating.

One study prospectively investigated the use of dexamethasone as a treatment for meningitis in a population comprised 90 percent of HIV positive patients. Subjects were randomly selected to receive dexamethasone or placebo. The investigators found no statistically significant difference in mortality at 40 days in this population. While they were unable to infer a relationship between immune status and the outcome of meningitis, the authors did attribute the finding that dexamethasone was of no statistically significant benefit to the high prevalence of HIV in the study population.[14]

Furthermore, in another study, 12 HIV positive patients diagnosed with meningitis were followed. The average CD4 lymphocyte count was <200/mm^3 in 10 of these patients. While the estimated incidence of bacterial meningitis was approximately 150-times greater than for the HIV negative population, the reported acute phase mortality rate was 8.3 percent, markedly lower than the 18 percent morality rate for HIV negative patients with bacterial meningitis. The authors concluded that the prognosis of meningitis is better for patients with HIV.[15]

The preceding case illustrates streptococcal meningitis as a potential complication of myelography. Healthcare personnel and patients alike should be advised of this risk as well as measures to prevent its occurrence. When treating streptococcal meningitis, consideration must be given to the patient's immune status, as immune modulation has an important role in mitigating the inflammatory effects of the disease process on the central nervous system. ■

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1. Bacterial meningitis after intrapartum spinal anesthesia—New York and Ohio, 2008-2009. MMWR Morb Mortal Wkly Rep. 2010;59(3):65-9. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5903a1.htm
2. Chitnis AS, Guh AY, Benowitz I, et al. Outbreak of bacterial meningitis among patients undergoing myelography at an outpatient radiology clinic. J Am Coll Radiol. 2012;9:185-90. doi 10.1016/j.jacr.2011.09.018
3. Gelfland MS, Abolnik IZ. Streptococcal meningitis complicating diagnostic myelography: Three cases and review. Clin Infect Dis. 1995;20(3):582-7.
4. Hsu J, Jensen B, Arduino M, et al. Streptococcal meningitis following myelogram procedures. Infection Control and Hospital Epidemiology. 2007;28(5):614-617.
5. Pandian JD, Sarada C, Radhakrishnan VV, Kishore A. Iatrogenic meningitis after lumbar puncture—a preventable health hazard. J Hospital Infection. 2004;56:119-24. doi:10.1016/j.jhin.2003.09.023
6. Risi FR, Spangler CA. Capnocytophaga canimorsus meningitis after routine myelography: A sentinel event identifies multiple opportunities for improvement of standard practices in radiology. Am J Infection Control. 2006; 34:540-2.
7. Schlesinger JJ, Salit IE, McCormack G. Streptococcal meningitis after myelography. Arch Neurol. 1982;39:576-7.
8. Schneeberger PM, Janssen M, Voss A. Alpha-Hemolytic Streptococci: A major pathogen of iatrogenic meningitis following lumbar puncture. Case reports and review of the literature. Infection. 1996;24(1):29-34.
9. Smith SW, Truwit C. Images in emergency medicine. Iatrogenic postmyelogram bacterial meningitis. Ann Emerg Med. 2006; 48(1):17,20.
10. Thornbury JR, Fryback DG, Turski PA. Disk-caused nerve compression in patients with acute low-back pain: Diagnosis with MR, CT myelography, and plain CT. Radiology: 1993;186:731-8.
11. Wildermuth S, Zanetti M, Duewell S, et al. Lumbar Spine: Quantitative and qualitative assessment of positional (upright flexion and extension) MR imaging and myelography. Radiology: 1998;207:391-8.
12. Siegel J, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee. 2007 guideline for isolation precautions: preventing transmission of infectious agents in healthcare settings. Available at http://www.cdc.gov/hicpac/2007IP/2007isolationPrecautions.html. Accessed November 10, 2014.
13. Zhang YC, Chandler AJ, Kagetsu NJ. Technical compliance to standard guidelines for lumbar puncture and myelography: Survey of academic neuroradiology attendings and fellows. Acad Radiology. 2014;21:612-6. http://dx.doi.org/10.1016/j.acra.2014.01.021
14. Scarborough M, Gordon SB, Whitty CJM, et al. Corticosteroids for bacterial meningitis in adults in Sub-Saharan Africa. N Engl J Med. 2007;357:2441-50.
15. Almirante B, Saballs M, Ribera E, et al. Favorable prognosis of purulent meningitis in patients infected with human immunodeficiency virus. Clin Infect Dis. 1998;27:176-80.