Meningococcal Meningitis in an Adult Woman

By Brady Pregerson, MD [2]

Bacterial meningitis presents with the triad of headache, fever, altered mental status. Stiff neck, vomiting, and photophobia may also be present.

A 35-year-old woman is brought to the ED by ambulance for confusion and syncope. According to medics, the woman’s roommate told them she had been seen earlier that same day in the ED and received a diagnosis of concussion after falling and hitting her head as well as a diagnosis of upper respiratory tract infection. She has a history of bipolar disorder for which she takes valproic acid, has recently had a cold, but is otherwise healthy. The medics describe the patient as “bizarre.” The triage nurse puts her in the area of the ED with the other psychiatric patients. The roommate later arrives and states that he thinks that the first time she fell, she actually fainted, but no one ever asked why she fell. This time he heard a fall while she was in the bathroom and found her on the floor.

On examination, the patient’s behavior is quite odd. She is oriented to name only. When asked if she is in pain she answers “brake light.” When asked the same question again her response is “steak night.” She answers “yes” to all yes or no type questions even when her responses are obviously incorrect, for example, a “yes” reply to the question, “Are you a man?” She is purposeful, but not very cooperative, and keeps pulling the sheets over her head. Vital signs are normal and her exam, though somewhat limited, is unremarkable except for a runny nose and a small occipital contusion. The throat and lungs are clear, and the heart is regular without murmur. An ECG and lab tests are normal except for a urinary white blood cell (WBC) count of $25 \times 10^3/\mu L$; a peripheral WBC count of $14 \times 10^3/\mu L$; serum glucose level of $215 \text{ mg/dL}$; and a toxicology screen positive for opiates. CT scan of the brain is normal. The patient remains confused and bizarre so a psychiatry consult is called. In addition, a diagnostic procedure is performed with results shown in the Figure.

What is the procedure?
What is your diagnosis?

Answers
The procedure was a lumbar puncture (LP). The image is the Gram stain of the cerebrospinal fluid (CSF), which shows intracellular and extracellular gram-negative diplococci, consistent with meningococcal meningitis.

Discussion
Bacterial meningitis classically presents with the triad of headache, fever, and altered mental status. Stiff neck, vomiting, and photophobia are also often present. Seizures and focal neurologic findings are somewhat less common. Often, however, patients will have or report only 1 or 2 symptoms. In this case, delirium and aphasia were the main components. In addition, the fall, which might have been a result of syncope, ataxia, or possibly a seizure, proved more a distraction than an aide to the correct diagnosis.

Physical examination findings may include neck stiffness or an abnormal neurologic exam, but neither of these is very sensitive. Both also can be difficult to assess in an uncooperative patient. The most sensitive exam finding is the jolt test or jolt accentuation test where pain is significantly worse with rapid head rotation. This finding has been reported to be approximately 97% to 100% sensitive.

Evaluation for meningitis is with LP, which should be performed in all patients in whom the disease is suspected. The cell count, differential, glucose and protein levels, and Gram stain are used in ruling the disease in or out and are helpful, but are imperfect in determining the type of microorganism causing an infection. Note that LP should be avoided or at least delayed in a critically ill patient and in those with any type of mass effect seen on CT scan. Most patients do not require CT before LP; those who do are listed in the Table below. It is also important to keep in mind that differential diagnosis of white cells in the CSF includes other CNS diseases, such as abscesses in the orbit, brain,
or spine that may require surgery. Other conditions are listed in the Tables.

Treatment of bacterial meningitis should start with dexamethasone followed by appropriate antibiotics, often at twice the usual dose. All patients should receive a third-generation cephalosporin, but additional antimicrobials such as ampicillin, vancomycin, acyclovir, or doxycycline should be added when the clinical scenario warrants (see Table). Postexposure prophylaxis (PEP) is only recommended for close contacts and only in the case of meningococcal exposure. Ciprofloxacin is the most commonly used agent because of its ease of administration, but rifampin and ceftriaxone are alternatives.

Remember that bacterial meningitis, although fortunately less common than viral meningitis, is a serious disease with potentially disastrous complications, including hearing loss, cranial nerve damage, seizure, stroke, and death. Early identification and treatment with corticosteroids and appropriate antibiotics can significantly lessen both morbidity and mortality.

Cautionary Tale

Although this particular case seems to be an unusual presentation for meningitis, it is important to realize that more severe cases may be more likely to cause altered mental status and possibly less likely to cause a headache. This may be a result of the fact that those without pain tend to present later in the course of the disease or that those who are confused are less likely to report pain.

Regardless, a number of missteps occurred—or almost occurred—with this patient.

When the patient initially presented earlier that same day, it seems as though an assumption was made that she had lost consciousness as a result of the head injury and so testing was likely limited to a head CT. It would have been safer to assume that the patient had fainted and evaluate appropriately, looking for a non-traumatic condition while simultaneously evaluating the head injury.

Even on the second visit, it was assumed by the triage nurse that since the patient had a psychiatric history, her bizarre behavior was likely psychiatric in nature, and not associated with a severe medical illness that causes delirium and some aphasia. Fortunately for all, the physician did not get locked into this narrow thinking.

Remember, a broad differential diagnosis is important in order not to miss rare but serious conditions, especially when patients present atypically, or when, as in this case, they are unable to provide historical details.

MENINGITIS - GENERAL INFORMATION: THE QUICK ESSENTIALS

from Quick Essentials Emergency Medicine pocketbook.

History:
- Prior antibiotics? HIV risk factors?
- Headache: 87%, fever: 77% > stiff neck, AMS, vomiting, pain with eye movement

Exam:
- Jolt sign: 98%/55% > fever > stiff neck: 35%, photophobia, speech trouble, ataxia
- Neck: Meningismus often absent age <2 y, ↓Immunity, encephalitis or viral cause

LP- CT first:
- HIV, age >60y, ↓Immunity, CNS history, seizure, AMS
- Focal exam, papilledema, symptoms >6 days
- Avoid: Hydrocephalus, ↑ICP, mass or shift on CT. Delay LP if severe AMS, even if CT normal

DDx if +:
- Orbital cellulitis, brain or spine abscess, malignancy, multiple sclerosis, Mollaret’s

Labs:
- Antigen panel: do on blood, CSF & urine if recent antibiotics

BACTERIAL MENINGITIS: THE QUICK ESSENTIALS

from Quick Essentials Emergency Medicine pocketbook.

Presentation:
- Fever: 85%, meningoencephalitis: 70%, delirium: 67%, headache: 50%, vomiting: 30%. Focal neuro/seizure: 20%, aphasia: 2%-23%, cranial nerves: 16% (esp. hearing/tinnitus).

CSF:
- WBC differential unreliable, gram stain: + in 50%. Do antigen panel if partially treated.

Steroids:
- Decadron 10 mg IV q6h for 4 days starting before or with antibiotics. Complications halved.

Antibiotics:
- 3rd generation cephalosporin for all at twice the regular dose.
- Ampicillin if pediatric, age >50y, or risk factors for Listeria. Use sulfamethoxazole/trimethoprim if allergic. Vancomycin if VP shunt, suspect resistance or critically ill.
- Acyclovir is suspect HSV or many RBCs in CSF.
- Doxycycline if suspect insect-borne infection.

Complications:
- Death, stroke, hydrocephalus, herniation, seizure, cranial nerve damage, hearing loss.

PEP:
- Post exposure prophylaxis: Only for close contacts in meningococcal meningitis. Rifampicin 600 mg PO bid for 2 days or ciprofloxacin 500 mg PO once.
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Figure. (Click to enlarge)

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