Nontyphoidal Salmonella Intracranial Infections in HIV-Infected Patients

Luis Aliaga, Juan D. Mediavilla, Aquilino López de la Osa, Manuel López-Gómez, Marina de Cueto, and Consuelo Miranda

Salmonella focal intracranial infections are unusual in human immunodeficiency virus (HIV)-infected patients. Six such infections have been reported in the world literature. We report a case of salmonella subdural and epidural cerebral empyema with concomitant osteomyelitis of the frontal bone. Such a complication in the course of salmonellosis is reported for the first time. In previously published case reports, four patients had brain abscess and two had subdural empyema. Salmonella typhimurium was isolated from two patients, and different serotypes were recovered from the others. All patients had advanced HIV disease, and all but two had had opportunistic infections before the diagnosis of salmonella intracranial infection. Surgical drainage combined with systemic antibiotic therapy resulted in the recovery of four of five patients. No regression of the lesions occurred in one patient treated only with antibiotics for multiple cerebral abscesses.

Nontyphoidal salmonella infection is a common occurrence among HIV-infected patients, and salmonella bacteremia is a frequent finding. The estimated incidence of salmonellosis among patients with AIDS has been 20- to 100-fold more than that among the general population, and 45%-78% of reported patients have presented with bacteremia [1, 2]. However, localized salmonella infections have rarely been noted in these patients. We report a case of Salmonella enteritidis infection presenting as subdural and epidural cerebral empyema, with concomitant osteomyelitis of the frontal bone. To our knowledge, this is the first time that such a complication of salmonella infection in an individual with AIDS has been reported.

Case Report

A 37-year-old bisexual man was admitted to the hospital because of constant right-frontal headache, rigors, and fever for 7 days. He had remained asymptomatic until 2 months before admission, when he developed varicella with pneumonia. He was found to have HIV infection but refused any further treatment. Since then, he had had diarrhea with 2-3 watery bowel movements a day. At presentation his temperature was 39°C, his blood pressure was 120/60 mm Hg, and his pulse was 90/min. Physical examination revealed a 2 × 3-cm tender subcutaneous swelling over the right frontal region of the cranium; the overlying skin was slightly erythematous. He was obtunded and had right-sided facial weakness and hepatosplenomegaly. There were no other clinical examination findings.

The hemoglobin level was 11 g/dL, and the mean corpuscular volume was 95 fl. The WBC count was 2,300/mm³ (80% neutrophils, 10% lymphocytes, 7% monocytes, 1% basophils, and 2% eosinophils). The CD4 cell count was 18/mm³ (2%). The platelet count was 166,000/mm³ and the erythrocyte sedimentation rate was 102 mm/h. The prothrombin and partial thromboplastin times were normal, as were the values for glucose, creatinine, electrolytes, alanine aminotransferase, aspartate aminotransferase, and alkaline phosphatase. Findings of chest radiography and urinalysis were also normal. A CT scan of the head revealed a subcutaneous fluid collection in the right frontal region, associated with osteolytic lesions in the frontal bone (figure 1). Subdural and epidural fluid was also demonstrated.

Needle aspiration of the subcutaneous collection yielded purulent fluid. The isolate on the culture plates was identified by standard biochemical and serological tests as S. enteritidis. The same microorganism also grew in stool culture and all three blood culture sets. A craniotomy was performed, producing purulent fluid that was drained. Bacterial culture of purulent material from the abscess cavity yielded S. enteritidis. Susceptibility studies with use of a commercial broth microdilution method (PASCO MIC/ID gram-negative panel; Difco Laboratories, Detroit) demonstrated that the organism was susceptible to chloramphenicol, trimethoprim-sulfamethoxazole (TMP-SMZ), ampicillin, ciprofloxacin, and ceftriaxone.

Therapy with iv ciprofloxacin (800 mg/d) was begun, resulting in rapid improvement in the patient’s condition. After 4 weeks of therapy, the patient was discharged in good health and began treatment with TMP-SMZ (1 double-strength tablet per day) and zidovudine. No relapse occurred in 9 months of follow-up.

Discussion

The incidence of nontyphoidal salmonella infection among patients with AIDS exceeds that among the general population.

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Undoubtedly, the defects in both cellular and humoral immunity caused by HIV infection make these patients especially prone to salmonellosis [1, 2].

Salmonellosis in this patient population is frequently complicated by bacteremia. Reviews of cases of bacteremia in patients with AIDS revealed that salmonellae, after staphylococci, were the second most common cause of episodes of bacteremia [3, 4]. Although the rate of salmonella bacteremia appears to be high in this population, suppurative complications have been rarely reported [1, 5], particularly those affecting the CNS. Using the MEDLINE database back to 1984, we found that six cases of localized intracranial salmonella infection in patients with AIDS were reported in the world medical literature [6–12]. Before this date, no patients with salmonella intracranial infection were reported to be HIV-infected [13].

The clinical features of the six patients and the one described herein are summarized in table 1. Four patients had brain abscess, one of whom also had bilateral cerebellar abscess; two had subdural empyema; and our patient had subdural and epidural abscesses. There was no characteristic location of either brain abscess or subdural/epidural empyema. *Salmonella typhi-

Table 1. Data from the seven reported cases of salmonella focal intracranial infections in HIV-infected patients.

<table>
<thead>
<tr>
<th>Case no., reference</th>
<th>Patient’s factor</th>
<th>Risk factor</th>
<th>Previous illnesses</th>
<th>No. of CD4 cells/mm³</th>
<th>Symptom(s) and sign(s)</th>
<th>Brain CT scan findings</th>
<th>Type of infection</th>
<th>Culture isolates (sources)</th>
<th>Treatment</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 [7, 8]</td>
<td>34/F IVDU</td>
<td>NR</td>
<td>Blurred vision, headache, dizziness, lethargy</td>
<td>Left parietal contrast-enhancing multiloculated mass</td>
<td>Brain abscess</td>
<td><em>Nocardia asteroides</em>, <em>Salmonella group B</em> (brain biopsy specimen)</td>
<td>Drainage; nafcillin, chloramphenicol</td>
<td>Died 24 h after surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 [9]</td>
<td>47/M IVDU</td>
<td>Thrush, <em>Salmonella enteritidis</em> meningitis and bacteremia</td>
<td>NR</td>
<td>NR</td>
<td>Right frontal contrast-enhancing mass</td>
<td>Brain abscess</td>
<td><em>S. enteritidis</em> (abscess fluid)</td>
<td>Drainage; ampicillin, TMP-SMZ</td>
<td>No relapse in 7 w but then died of pneumonitis</td>
<td></td>
</tr>
<tr>
<td>4 [10]</td>
<td>63/F Nigerian</td>
<td>None</td>
<td>Weakness, diarrhea, right facial weakness, dysphasia, thrush</td>
<td>Left frontoparietal subdural collection</td>
<td>Subdural empyema</td>
<td><em>Salmonella dublin</em> (blood)</td>
<td>Drainage; cefotaxime, ciprofloxacin</td>
<td>Survived</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 [11]</td>
<td>28/M IVDU</td>
<td>Cerebral toxoplasmosis</td>
<td>18</td>
<td>Fever, headache, left hemianopsia</td>
<td>Right parietal subdural collection</td>
<td>Subdural empyema</td>
<td><em>Salmonella copenhagen</em> (abscess fluid)</td>
<td>Drainage; cefotaxime, chloramphenicol</td>
<td>No relapse in 2 mo</td>
<td></td>
</tr>
<tr>
<td>6 [12]</td>
<td>34/M NR</td>
<td>None</td>
<td>20</td>
<td>Fever, seizures*</td>
<td>Right parietal and cerebellar collections</td>
<td>Brain abscesses</td>
<td><em>S. typhimurium</em> (brain biopsy specimen)</td>
<td>Amoxicillin, TMP-SMZ, thiamphenicol</td>
<td>Alive at 4 mo and no regression of the abscesses</td>
<td></td>
</tr>
<tr>
<td>7 [PR]</td>
<td>37/M Bisexual</td>
<td>Varicella pneumonia</td>
<td>18</td>
<td>Fever, rigors, headache, diarrhea, right subcutaneous swelling, right facial weakness</td>
<td>Right frontal epidural and right frontoparietal collections</td>
<td>Subdural and epidural empyema</td>
<td><em>S. enteritidis</em> (abscess fluid, blood, stool)</td>
<td>Drainage; ciprofloxacin</td>
<td>No relapse in 9 mo</td>
<td></td>
</tr>
</tbody>
</table>

NOTE. IVDU = intravenous drug user; NR = not reported; PCP = *Pneumocystis carinii* pneumonia; PR = present report; TMP-SMZ = trimethoprim-sulfamethoxazole.

* The patient had occipital and parietal focal neurological findings (unspecified).


**References**


