EMERGENCY CASEBOOK

Listerial meningitis in a patient with undiagnosed acquired immunodeficiency syndrome: ampicillin should be added to the empirical antibiotic coverage

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Meningitis is an important differential diagnosis in patients with fever, headache, and/or altered consciousness in the emergency department (ED). With human immunodeficiency virus (HIV) infection becoming increasingly common, patients with acquired immunodeficiency syndrome (AIDS) need to be recognised promptly to facilitate the choice of appropriate antibiotic therapy for potential opportunistic infections. Physicians should be able to recognise a patient with undiagnosed AIDS who presents to the ED and perform further confirmational tests without violating the rights of the patient. Additional tests focusing on discovering potential opportunistic pathogens should be performed. Ampicillin should be added to the empirical regimen for the coverage of *Listeria meningocerebritis*, which should be considered in all potentially immunocompromised hosts with suggestive clinical presentations. Failure to recognise patients with AIDS and provide antibiotics active against *L monocytogenes* in such hosts may lead to a catastrophic outcome.

Meningitis is an important differential diagnosis in patients with fever, headache, and/or altered consciousness in the emergency department (ED). With human immunodeficiency virus (HIV) becoming increasingly common, patients with acquired immunodeficiency syndrome (AIDS) need to be recognised promptly to the choice of appropriate antibiotic therapy for potential opportunistic infections.

CASE REPORT

A 37 year old man was brought to the ED having had altered consciousness for 1 day. He had suffered intermittent fever and headache for 3 days prior to admission. He denied having any systemic illness and any use of tobacco or illicit drugs. On arrival, he appeared acutely ill, with a wasted appearance. His vital signs included: blood pressure 108/78 mmHg, respiratory rate 22 breaths/min, pulse rate 116 beat/min, and body temperature 39.4°C. Physical examination revealed a Glasgow Coma Scale score of 8 (E2M4V2), marked neck stiffness, and bilateral basal rales on auscultation to the chest. No facial palsy or focal neurological deficit was noticed. The laboratory studies are shown in table 1. Empirical antibiotic treatment with ceftriaxone 2.0 g every 12 hours was begun after two sets of blood cultures were obtained. The electrocardiography demonstrated non-specific ST segment and T wave abnormalities, and a paroxysmal supraventricular tachycardia that was successfully terminated by adenosine 12 mg bolus intravenously. Chest radiography showed mild pulmonary congestion. Contrast enhanced computed tomography of brain disclosed meningeal enhancement without focal mass lesion.

Cerebrospinal fluid (CSF) examination revealed leucocytosis, high protein concentration, and low glucose level, which were consistent with bacterial meningitis (table 1). No organisms were seen on gram and India ink staining. Antigens to *Cryptococcus neoformans*, *Haemophilus influenzae*, *Streptococcus pneumoniae*, and *Neisseria meningitidis* were undetectable in the CSF.

The patient required mechanical ventilation; during laryngoscopic examination for orotracheal intubation, oropharyngeal candidiasis was found. On the second day of hospitalisation, norepinephrine and dopamine were administered because of unstable haemodynamic status. HIV infection was confirmed by Western blotting. Blood CD4 cell count was 106/μl. PCR for *Mycobacterium tuberculosis* and cytomegalovirus from the CSF were negative, as was PCR for *Pneumocystis jiroveci* after tracheal aspiration. On the third day hospitalisation, preliminary blood and CSF cultures yielded *Listeria monocytogenes*, which was susceptible to penicillin, ampicillin, and trimethoprim-sulfamethoxazole (TMP-SMX). Ampicillin 2.0 gm every 4 h and TMP-SMX 150 mg every 6 h were started intravenously. Transthoracic echocardiography disclosed mild impairment of left ventricular systolic function, minimal pericardial effusion, and absence of vegetation. From the combination of elevated serum cardiac enzymes and because no underlying cause other than the *L monocytogenes* infection could be found, a diagnosis of *Listeria* myocarditis was made. Despite best supportive care, the patient died of septic shock with multiple organ dysfunction syndrome on the fifth day of hospitalisation. Necropsy was not performed.

DISCUSSION

Although the patient was not known to be HIV positive, the presence of oropharyngeal candidiasis and his wasted appearance should have suggested an underlying immunocompromised condition. Early recognition of the immunocompromised state (AIDS in this patient) by ED physicians may lead to prompt treatment and a change in the strategy of choosing suitable antibiotics.

L monocytogenes is an intracellular pathogen, known to cause meningitis or septicaemia in neonates and in adults with immunosuppressive conditions. Central nervous system diseases caused by *Listeria* include meningitis, diffuse encephalitis, and well localised abscess.¹ An unique syndrome of brain stem encephalitis and rhombencephalitis characterised by cranial nerve palsies or pontomedullary signs may be observed.² Patients with *Listeria* meningitis may have the following particular features: movement disorders (ataxia, tremors, and myoclonus), fluctuating mental status,

Abbreviations: AIDS, acquired immunodeficiency syndrome; CSF, cerebrospinal fluid; ED, emergency department; HIV, human immunodeficiency virus, TMP-SMX, trimethoprim-sulfamethoxazole

Table 1 Laboratory studies and cerebrospinal fluid (CSF) examinations obtained on admission

Laboratory parameters		Normal values
WBC ($10^3/\mu\text{l}$)	13.53	4.5 to 11.00
Hgb (g/dl)	15.9	13.5 to 18
Platelets ($10^3/\mu\text{l}$)	89	150 to 400
BUN(mg/dl)	23	7 to 20
Cr (mg/dl)	1.3	0.8
AST (U/l)	67	<31
Glucose (mg/dl)	123	75 to 115
CK (U/l)	4428	38 to 174
(U/l)	256	7 to 25
Troponin-I (ng/ml)	4.21	<0.5
CRP		
pH	7.33	7.35 to 7.45
PaO ₂ (mmHg)	192.8	75 to 100
PaCO ₂ (mmHg)	29.9	35 to 45
HCO ₃ (mmol/l)	17.2	20 to 28
Lactic acid (mmol/l)	5.4	0.7 to 2.1
CSF		
WBC (/μl)	880	
RBC (/μl)	660	
Poly/mononuclear (%)	45/55	
Glucose (mg/dl)	10	
Protein (mg/dl)	825	

WBC, white blood cell; Hgb, hemoglobin; BUN, blood urea nitrogen; Cr, creatinine; AST, aspartate aminotransferase; CK, creatine kinase.

and seizures, and blood cultures are more likely to be positive. Myocarditis caused by *Listeria* has been rarely reported.³ Ampicillin plus gentamicin have generally been recommended as the treatment of choice.⁴ Ampicillin combined with TMP-SMX has been reported to have a lower failure rate and few neurological sequelae than ampicillin combined with an aminoglycoside.⁵ Third generation cephalosporin and vancomycin are advocated as empirical therapy for community acquired bacterial meningitis in children and adults, owing to the emergence of penicillin and cephalosporin resistant *S pneumoniae*. Vancomycin is a second line therapy for *L monocytogenes*, but the emergence of resistant strains has been documented and is suboptimum for listeriosis.⁶ *L monocytogenes* is inherent resistance to cephalosporin and these agents should not be used alone for empirical treatment of immunocompromised hosts and elderly patients. Ampicillin should be added to the empirical regimen

for the coverage of *L monocytogenes* in adult patients with suspected impaired cell mediated immunity.

In conclusion, physicians should be able to recognise a patient with undiagnosed AIDS if they present to the ED, and provide further confirmation tests without violating the rights of the patient. Additional tests focusing on discovering potential opportunistic pathogens should be performed. *Listeria meningocerebritis* should be considered in all potentially immunocompromised hosts with suggestive clinical presentations, and ampicillin should be added to the empirical regimen for the coverage of this pathogen. Failure to recognise patients with AIDS and provide antibiotics active against *L monocytogenes* in such hosts may lead to a catastrophic outcome.

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