Gender Differences in Community-acquired Meningitis in Adults: Clinical Presentations and Prognostic Factors

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Abstract

Community-acquired meningitis is a serious disease that is associ

exact test, Chi square, and Student t-test. SigniŽcant variables on

Vesicular or petechial rash	5/285 (1.8)	6/324 (1.9)	0.928

A head CT was performed on 89.3% of patients, of which males were more likely than females to have an abnormal result (10.1% vs. 4.9%, p=0.021). A brain MRI was performed on 46.8% of patients. Male patients were more likely to receive a brain MRI (51.7% vs. 42.5%, p=0.022), although no signiẐcant diferences were found in the results of the scans between male and female cohorts. Follow up information was available at discharge on all patients. An adverse clinical outcome was found in 11.3% of patients, with no signiẐcant diferences between cohorts.

T e majority of the patients had meningitis of an unknown etiology (407 patients, 65.8%) (Table 3). A diagnostic etiology was identiẐed in 212 patients (34.2%). An urgent treatable etiology was most frequently diagnosed in males (26% vs. 15%, p<0.05) and this diference was driven by a higher proportion of cryptococcal meningitis cases in males (48% vs. 14%). Other urgent treatable etiologies included bacterial meningitis, herpes simplex encephalitis, *M. tuberculosis*, varicella zoster virus, and central nervous system lymphoma or carcinomatosis. A similar proportion of cases of untreatable etiologies (e.g., West Nile virus, enterovirus, St. Louis encephalitis virus, and Epstein-Barr virus), and nonurgent treatable etiologies (e.g., herpes simplex meningitis and acute human immunodeẐciency virus) was seen in males and females. Females with an urgent treatable etiology had worse outcomes than males (40% vs. 21%, p<0.05). T ere were no diferences in adverse clinical outcomes between males and females in the unknown, untreatable and nonurgent treatable etiologies.

(e.g., West NilabÎ Ę ur in

glucose <45 mg/dL) (Table 4). On logistic regression analysis, an abnormal neurological examination (odds ratio (OR): 18.61; 95% conŽdence interval (CI): 4.75-72.86), fever (OR: 7.16; 95% CI: 2.35-21.86), and a CSF glucose <45 mg/dl (CI: 5.07; 95% CI: 1.54-16.68) were validated by bootstrap analysis and still signiŽcantly

Both the male and female cohorts were managed similarly with no signiẐcant diferences in rates of admission, empirical antibiotic or antiviral therapy, or head CT imaging (Table 2). However, male patients were more likely to have an abnormal CT scan, and this could probably be explained by the higher rates of abnormal head CT scans in HIV positive patients (16.3% vs. 6.3%, p=0.006). In addition, the abnormalities on head CT scan prompted further imaging, resulting in more brain MRIs performed on males than females. On microbiology analysis, males were more likely to test positive for *C. neoformans* and have a positive Gram stain. T is higher incidence of *C. neoformans* in males is consistent with previous studies [13], and can be also be explained by the higher prevalence of HIV/AIDS in the male cohort, which causes immune system suppression. Cryptococcal disease is one of the most important opportunistic infections related to AIDS [13,14]. Furthermore, the greater percentage of positive Gram stains is due to a higher proportion of yeast found on the male cohort (Table 3).

Meningitis of an unknown cause accounted for 65.8% of total cases (Table 3). Unknown etiologies are a diagnostic challenge to physicians, as the main beneẐt in recognizing a treatable etiology is early administration of the appropriate therapy [15,16]. Of known causes, male patients were more likely to have urgent treatable etiologies due to a higher rate of *C. neoformans.* No diference was found between male and female patients in regards to untreatable and nonurgent treatable etiologies. Interestingly, female patients with urgent treatable etiologies were found to have worse outcomes than males. T e reason for this is not readily apparent. However, literature has similarly shown disease outcome to be worse in females in cases of measles, toxoplasmosis, dengue, or hantavirus infections. T is could be attributed to elevated humoral responses in women, leading to detrimental efects [17].

We found abnormal neurological examination, fever, and CSF

13. Hasimoto