with recurrent benign lymphocytic meningitis, detection of HSV-2 has been strongly associated with typical cases in patients without symptoms or signs of genital infection.

Spirochetal Meningitis

For the diagnosis of CNS involvement in patients with syphilis, no single routine laboratory test is definitive. The specificity of the CSF Venereal Disease Research Laboratory (VDRL) test for the diagnosis of neurosyphilis is high, but the sensitivity is low (reactive tests in only 30% to 70% of patients). A reactive CSF VDRL test result in the absence of blood contamination is sufficient to diagnose neurosyphilis; a nonreactive result does not exclude the diagnosis. The diagnosis of neurosyphilis is based on elevated CSF concentrations of white blood cells or protein, or both, in the appropriate clinical and serologic setting.

The best currently available laboratory test for the diagnosis of Lyme disease is demonstration of specific serum antibody to *B. burgdorferi*, and this positive test result for a patient with a compatible neurologic abnormality is strong evidence for the diagnosis. However, these tests are not standardized, and marked variations are seen between laboratories.

Tuberculous Meningitis

The identification of tuberculous organisms in CSF by specific stains is difficult because of the small population of organisms. In many series, less than 25% of specimens were smear positive and less than 50% were culture positive. The technique of PCR for detecting fragments of mycobacterial DNA in CSF specimens appears to be a promising tool. The Gen-Probe technique is based on amplification of ribosomal RNA derived from *Mycobacterium tuberculosis* using a labeled DNA probe. A 5-year retrospective study of the performance of this test found a sensitivity and specificity of 94% and 99%, respectively, for patients with positive CSF cultures.

Fungal Meningitis

Conclusive proof that a fungal organism is causing the meningitis rests on identification of the fungus in CSF, although CSF cultures are not always positive in cases of fungal meningitis. The yield of CSF culture in cryptococcal meningitis is excellent for non-AIDS and AIDS patients. For patients with cryptococcal meningitis, CSF India ink examination remains a rapid, effective test that is positive in 50% to 75% of cases; the yield increases up to 88% among patients with AIDS. In contrast, only 25% to 50% of patients with other fungal meningitis have positive CSF cultures.

Because cultures may be negative or require long periods before yielding positive results for patients with fungal meningitis, adjunctive studies (particularly serologic tests) may be helpful for the diagnosis. The latex agglutination test for cryptococcal polysaccharide antigen is sensitive and specific for the diagnosis of cryptococcal meningitis. Cryptococcal polysaccharide antigen also can be found in the serum and CSF, usually in severely immunosuppressed patients such as those with AIDS. Serologic antibody tests (i.e., coccidioidal and histoplasmal antigens) and antigen urine tests (i.e., histoplasmal antigen) may be useful in other cases of fungal meningitis.

Treatment

Initial Treatment of the Patient with Acute Meningitis

Acute bacterial meningitis is a life-threatening illness, and early detection, work-up, and antimicrobial therapy are imperative to reduce morbidity and mortality. The initial management of a patient with presumed bacterial meningitis includes performance of a lumbar puncture to determine whether the CSF formula is consistent with that diagnosis (Fig. 90-1). If meningitis is purulent, institution of antimicrobial therapy should be based on the results of Gram staining (Table 90-4). However, if no etiologic agent can be identified by this means or performance of the lumbar puncture is delayed, institution of empirical antimicrobial therapy after obtaining blood cultures should be based on the patient's age and underlying disease status (Table 90-5).

It is reasonable to proceed with the lumbar puncture without computed tomography (CT) of the head if the patient does not meet any of the following criteria: new-onset seizures, an immunocompromised state, signs that are suspicious for space-occupying lesions (i.e., papilledema or focal neurologic signs, not including cranial nerve palsy), or moderate to severe impairment of consciousness. Patients at risk should undergo CT of the head before lumbar puncture to rule out brain shift (i.e., result of an intracranial mass lesion or generalized brain edema) because of

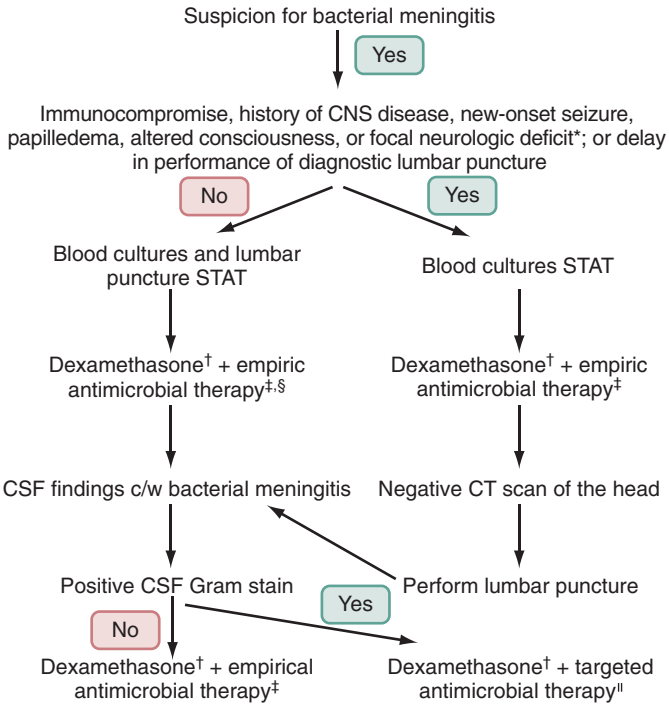

FIGURE 90-1 Management algorithm for adults with suspected bacterial meningitis. *Palsy of cranial nerve VI or VII is not an indication to delay lumbar puncture. †See text for recommendations for use of adjunctive dexamethasone in patients with bacterial meningitis. ‡See Table 90-5. §Dexamethasone and antimicrobial therapy should be administered immediately after CSF is obtained. ‖See Table 90-4. CNS, Central nervous system; CT, computed tomography; c/w, consistent with; STAT, intervention should be done emergently. (From Tunkel AR, Hartman BJ, Kaplan, SL, et al: Practice guidelines for the management of bacterial meningitis, Clin Infect Dis 39:1267–1284, 2004.)