



*Actinomyces*, *Nocardia*, and *Candida* are found even less often. In immunosuppressed individuals, *Cryptococcus* (i.e., microabscesses) and *Toxoplasma* are common causes of abscesses. Surgical specimens are culture positive for 70% of antibiotic-treated patients and 95% of patients undergoing surgery before antibiotic administration.

### Clinical Presentation

The classic clinical picture is composed of elements reflecting the infectious nature of the lesion (e.g., fever), those related to focal brain involvement, and those due to an increasing intracranial mass effect. Elements of one or two categories are often absent in a given case, particularly early in the disease course. For example, almost one half of patients may not have a fever or leukocytosis. Recent onset of a headache is the most common symptom, which may increase in severity associated with focal signs related to the location of the abscess (e.g., hemiparesis, aphasia), followed by obtundation and coma. Seizures precede the diagnosis in 30% of cases. *Toxoplasma* abscesses are often associated with movement disorders due to their propensity for the basal ganglia. The period of evolution may be as brief as hours or as long as days to weeks with more indolent organisms.

### Diagnosis

CSF examination should be avoided; it is seldom diagnostic, and results can be normal. Lumbar puncture in the setting of a mass lesion carries the risk of transtentorial herniation. Because the brain abscess is seeded from a peripheral site of infection, a search for other sites of infection can help to identify the causative organisms and determine adequate treatment.

MRI with intravenous gadolinium provides better soft tissue contrast than CT and is particularly useful for detecting multiple

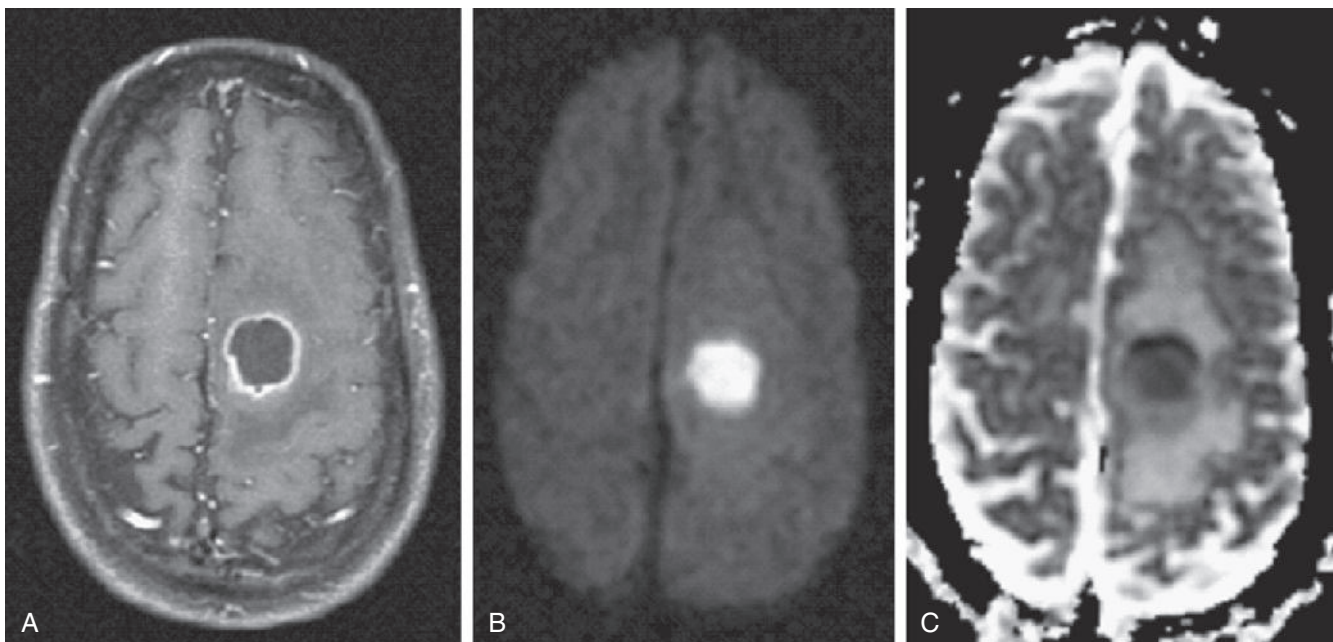
abscesses and posterior fossa abscesses or for demonstrating cerebritis, the extent of a mass effect, associated venous thrombosis, and the response to therapy. In the early cerebritis stage, CT results may be normal, but the MRI FLAIR sequence is very sensitive for visualization of brain edema. On T1-weighted images, the area of cerebritis is seen initially as a low-signal-intensity, ill-defined area. T1-weighted images in the later stages of infection show the formation of a rim of slightly higher signal intensity and central necrosis. Contrast administration typically shows ring enhancement with central necrosis. This area of central necrosis appears bright on diffusion-weighted images and dark on apparent diffusion coefficient (ADC) images (Fig. 90-2). MRI of tumors shows the opposite features. Differentiating a brain abscess from tumor is important for the stereotactic approach to ring-enhancing lesions before biopsy or surgical excision. An abscess should be drained centrally, whereas a tumor should be biopsied along its rim.

*Nocardia* brain abscesses are often multilobulated. *Listeria* brain abscesses are often located in the brain stem.

### Treatment

A suspected brain abscess requires urgent intervention. Unless the surgical procedure poses a substantial risk, aspiration of the lesion is needed for microbial diagnosis. If treatment of cerebral edema is necessary, high-dose intravenous dexamethasone (16 to 24 mg/day in four divided doses) may be used for short periods until surgical intervention is possible. Corticosteroids may retard formation of a capsule around the brain abscess and the immune response to infection.

Seizures should be controlled because the tonic phase of a generalized seizure may increase intracranial pressure. In a patient with a large abscess, seizures may trigger a brain herniation. Seizure prophylaxis should be initiated in all patients with



**FIGURE 90-2** Magnetic resonance imaging features of a brain abscess. **A**, Contrast-enhanced scan shows a ring-enhancing lesion in the left frontal lobe. **B**, The diffusion-weighted image shows restricted diffusion in the cavity due to viscous pus and cellular material. **C**, Corresponding apparent diffusion coefficient map shows dark, viscous material in the cavity and surrounding edema.