

**FIGURE 35-3 Normal-pressure hydrocephalus.** **A.** Sagittal T1-weighted magnetic resonance image (MRI) demonstrates dilation of the lateral ventricle and stretching of the corpus callosum (arrows), depression of the floor of the third ventricle (single arrowhead), and enlargement of the aqueduct (double arrowheads). Note the diffuse dilation of the lateral, third, and fourth ventricles with a patent aqueduct, typical of communicating hydrocephalus. **B.** Axial T2-weighted MRIs demonstrate dilation of the lateral ventricles. This patient underwent successful ventriculoperitoneal shunting.

candidates before irreversible brain injury has occurred. In the meantime, the significance of detecting brain amyloid in an asymptomatic elder remains a topic of vigorous investigation. Similarly, MRI perfusion and structural/functional connectivity methods are being explored as potential treatment-monitoring strategies.

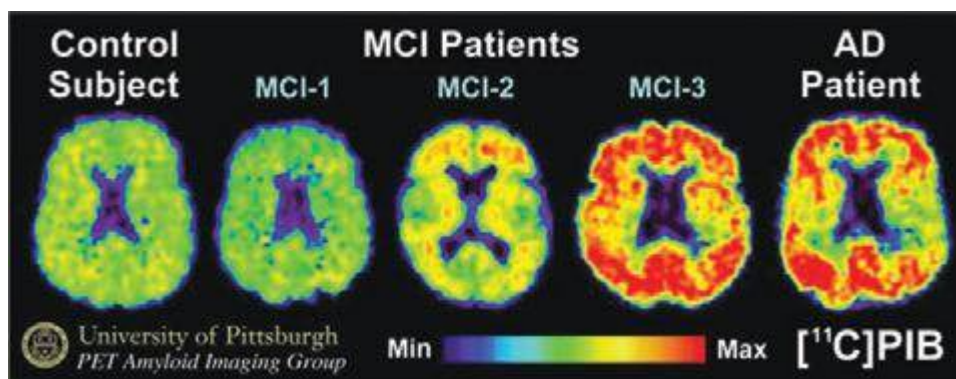
Lumbar puncture need not be done routinely in the evaluation of dementia, but it is indicated when CNS infection or inflammation are credible diagnostic possibilities. Cerebrospinal fluid (CSF) levels of  $A\beta_{42}$  and tau proteins show differing patterns with the various dementias, and the presence of low  $A\beta_{42}$  and mildly elevated CSF tau is highly suggestive of AD. The routine use of lumbar puncture in the diagnosis of dementia is debated, but the sensitivity and specificity of AD diagnostic measures are not yet high enough to warrant routine use. Formal psychometric testing helps to document the severity of cognitive disturbance, suggest psychogenic causes, and provide a more formal method for following the disease course. Electroencephalogram (EEG) is not routinely used but can help to suggest CJD (repetitive bursts of diffuse high-amplitude sharp waves, or “periodic complexes”) or an underlying nonconvulsive seizure disorder (epileptiform discharges). Brain biopsy (including meninges) is not advised except

to diagnose vasculitis, potentially treatable neoplasms, or unusual infections when the diagnosis is uncertain. Systemic disorders with CNS manifestations, such as sarcoidosis, can usually be confirmed through biopsy of lymph node or solid organ rather than brain. MR angiography should be considered when cerebral vasculitis or cerebral venous thrombosis is a possible cause of the dementia.

## TREATMENT DEMENTIA

The major goals of dementia management are to treat reversible causes and to provide comfort and support to the patient and caregivers. Treatment of underlying causes includes thyroid replacement for hypothyroidism; vitamin therapy for thiamine or  $B_{12}$  deficiency or for elevated serum homocysteine; antimicrobials for opportunistic infections or antiretrovirals for HIV; ventricular shunting for NPH; or appropriate surgical, radiation, and/or chemotherapeutic treatment for CNS neoplasms. Removal of cognition-impairing drugs or medications is frequently useful. If the patient’s cognitive complaints stem from a psychiatric disorder, vigorous treatment of this condition should seek to eliminate the cognitive complaint or confirm that it persists despite adequate resolution of the mood or anxiety symptoms. Patients with degenerative diseases may also be depressed or anxious, and those aspects of their condition often respond to therapy. Antidepressants, such as selective serotonin reuptake inhibitors (SSRIs) or serotonin-norepinephrine reuptake inhibitors (SNRIs) (Chap. 465e), which feature anxiolytic properties but few cognitive side effects, provide the mainstay of treatment when necessary. Anticonvulsants are used to control seizures. Levetiracetam may be particularly useful, but there have as yet been no randomized trials for treatment of AD-associated seizures.

Agitation, hallucinations, delusions, and confusion are difficult to treat. These behavioral problems represent major causes for nursing home placement and institutionalization. Before treating these behaviors with medications, the clinician should aggressively seek out modifiable environmental or metabolic factors. Hunger, lack of exercise, toothache, constipation, urinary tract or respiratory infection, electrolyte imbalance, and drug toxicity all represent easily correctable causes that can be remedied without psychoactive drugs. Drugs such as phenothiazines and benzodiazepines may ameliorate the behavior problems but have untoward side effects such as sedation, rigidity, dyskinesia, and occasionally paradoxical disinhibition (benzodiazepines). Despite their unfavorable side effect profile, second-generation antipsychotics such as quetiapine (starting dose, 12.5–25 mg daily) can be used for patients with agitation, aggression, and



**FIGURE 35-4** Positron emission tomography (PET) images obtained with the amyloid-imaging agent Pittsburgh Compound-B ( $[^{11}C]PIB$ ) in a normal control (left); three different patients with mild cognitive impairment (MCI; center); and a patient with mild Alzheimer’s disease (AD; right). Some MCI patients have control-like levels of amyloid, some have AD-like levels of amyloid, and some have intermediate levels. (Images courtesy of William Klunk and Chester Mathis, University of Pittsburgh.)