



FIGURE 440e-4 Herpes simplex encephalitis in a patient presenting with altered mental status and fever. **A.** and **B.** Coronal (**A**) and axial (**B**) T2-weighted fluid-attenuated inversion recovery images demonstrate expansion and high signal intensity involving the right medial temporal lobe and insular cortex (*arrows*). **C.** Coronal diffusion-weighted image demonstrates high signal intensity indicating restricted diffusion involving the right medial temporal lobe and hippocampus (*arrows*) as well as subtle involvement of the left inferior temporal lobe (*arrowhead*). This is most consistent with neuronal death and can be seen in acute infarction as well as encephalitis and other inflammatory conditions. The suspected diagnosis of herpes simplex encephalitis was confirmed by cerebrospinal fluid polymerase chain reaction analysis.

10 min per sequence, movement of the patient during an MR exam distorts all of the images; therefore, uncooperative patients should either be sedated for the MR study or scanned with CT. Generally, children under the age of 8 years usually require conscious sedation in order to complete the MR examination without motion degradation.

MRI is considered safe for patients, even at very high field strengths. Serious injuries have been caused, however, by attraction of ferromagnetic objects into the magnet, which act as missiles if brought too close to the magnet. Likewise, ferromagnetic implants, such as aneurysm clips, may torque within the magnet, causing damage to vessels and even death. Metallic foreign bodies in the eye have moved and caused intraocular hemorrhage; screening for ocular metallic fragments is indicated in those with a history of metal work or ocular metallic foreign bodies. Implanted cardiac pacemakers are generally a contraindication

to MRI owing to the risk of induced arrhythmias; however, some newer pacemakers have been shown to be safe. All health care personnel and patients must be screened and educated thoroughly to prevent such disasters because the magnet is always “on.” **Table 440e-4** lists common contraindications for MRI.

MAGNETIC RESONANCE ANGIOGRAPHY

MR angiography is a general term describing several MR techniques that result in vascular-weighted images. These provide a vascular flow map rather than the anatomic map shown by conventional angiography. On routine spin echo MR sequences, moving protons (e.g., flowing blood, CSF) exhibit complex MR signals that range from high- to low-signal intensity relative to background stationary tissue.