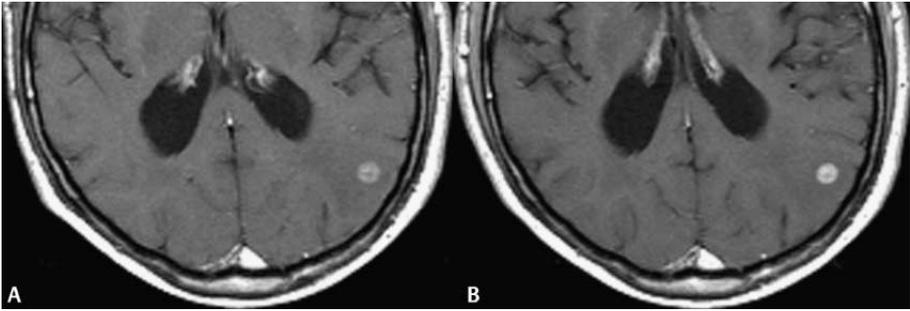
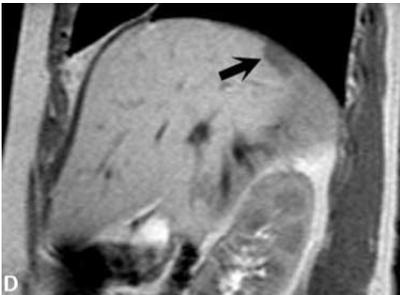
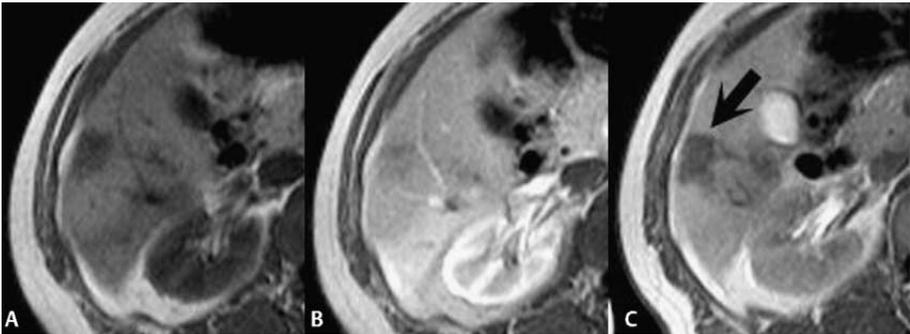


# 87 Contrast Media: Gd Chelates with Protein Binding

By slight changes in structure, agents with improved relaxivity and altered distribution have been developed. MultiHance, which demonstrates transient protein binding, has 40% higher relaxivity (equivalent to double dose) and partial hepatobiliary excretion, due to addition of a phenyl moiety. **Figure 87.1** illustrates the improved enhancement of a brain metastasis at 1.5 T with MultiHance (**Fig. 87.1B**) compared with that of a conventional Gd<sup>3+</sup> chelate (**Fig. 87.1A**). **Figure 87.2** illustrates a liver metastasis prior to



**Fig. 87.1**



**Fig. 87.2**

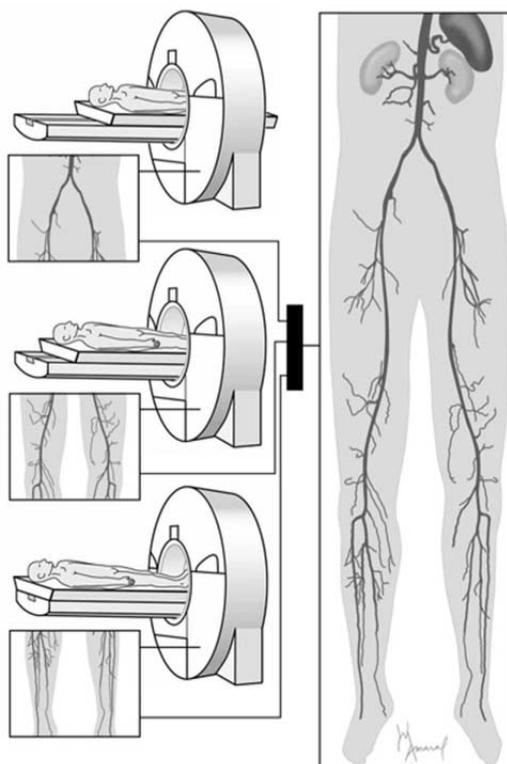
(**Fig. 87.2A**), immediately after (**Fig. 87.2B**), and at 1 hour after (**Fig. 87.2C**) MultiHance injection. Hepatobiliary uptake and excretion of the agent are illustrated, with sustained enhancement of normal liver, opacification of the gallbladder, and slightly improved visualization of a liver metastasis (arrow, **C**) on the delayed image. High-quality breath-hold imaging in all three orthogonal planes is possible in the hepatobiliary phase, providing

improved detection of liver metastases, such as that seen immediately below the dome of the diaphragm (**Fig. 87.2D**, arrow). No cases of nephrogenic systemic sclerosis due to MultiHance administration alone are known to date. Agents with very high hepatobiliary excretion (i.e., Primovist [gadoxetic acid disodium or Gd EOB-DTPA], ~50%) and prolonged residence in the bloodstream (i.e., Vasovist [gadofosveset trisodium], mean half-life 16 hours), due to albumin binding, are approved for use in Europe and elsewhere, but not in the United States.

Some of the newer gadolinium chelates have advantages as well in contrast-enhanced MR angiography. For example, vessel signal intensity has been shown to be 80% higher with MultiHance compared with that of more conventional agents. These improvements, together with technologic advances in equipment design, have made possible high-resolution whole-body 3D contrast-enhanced MR angiography (**Fig. 87.3**, courtesy of Mathias Goyen), with five 3D data sets, slightly overlapping, acquired in immediate succession after a single intravenous contrast dose. **Figure 87.4** illustrates a patient positioning and image acquisition for three such image sets.



**Fig. 87.3**



**Fig. 87.4**