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Brain: Ischemia (Part 2)

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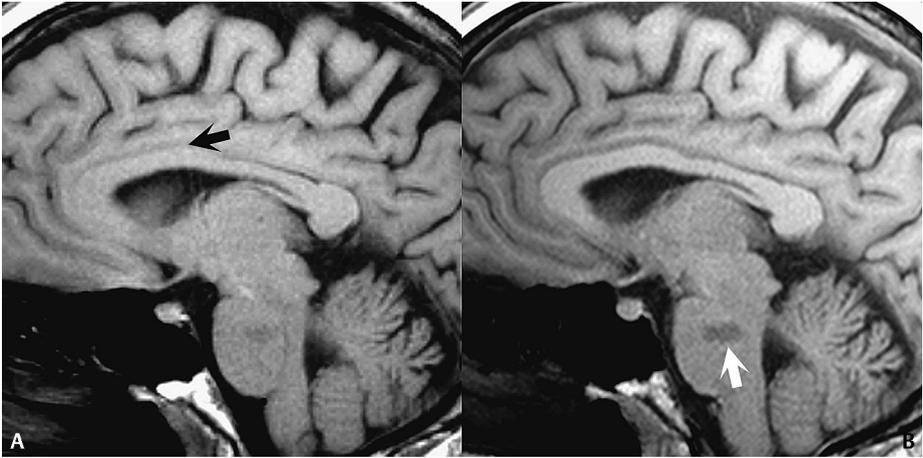


Figure 30-1

The images in **Figs. 30-1** and **30-2** are from a 57-year-old diabetic with a 1-day history of unsteadiness. Midline sagittal T1-weighted images (**Fig. 30-1**) depict an early subacute pontine infarct (white arrow) at (A) 1.5 T and (B) 3 T. Two-dimensional SE technique was employed at 1.5 T with TR/TE = 550/12, a slice thickness of 5 mm, and

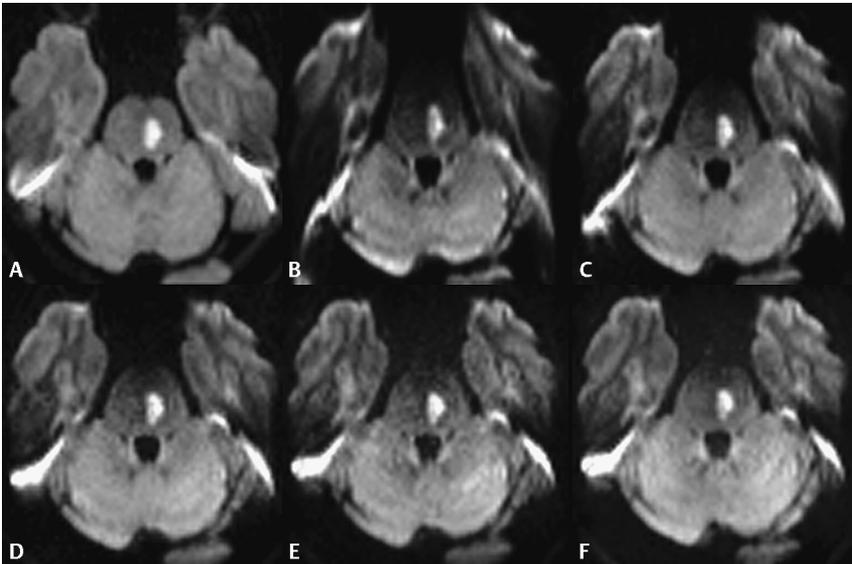


Figure 30-2

a scan time of 2 min 55 sec. Two-dimensional GRE technique was employed at 3 T with TR/TE/tip angle = 440/2.4/90 degrees, a parallel-imaging factor of two, a slice thickness of 3 mm, and a scan time of 1 min 15 sec. Gray-white matter contrast is similar between the two scans. The 1.5 T scan demonstrates a prominent ghost (black arrow), with the 3 T scan artifact-free. The improved depiction of the pontine infarct at 3 T is largely due to less partial volume imaging (3- versus 5-mm slice thickness).

One current negative factor for 3 T is the increase in bulk susceptibility artifact (versus 1.5 T), since the influence of magnetic susceptibility scales linearly with field strength. This is particularly evident in DWI. Parallel imaging currently plays an important role in decreasing the degree of artifact, with other possible solutions including multishot EPI currently in development. **Figure 30-2A** is a diffusion-weighted image at 1.5 T (with a parallel-imaging factor of 2, and 3 averages), whereas the remaining images are from 3 T. **Figure 30-2B** is without parallel imaging, and **Figs. 30-2C to 30-2F** is with parallel-imaging factors and averages of (C) 2, 2, (D) 3, 3, (E) 4, 4, and (F) 4, 8. With each increment in parallel-imaging factor, the depiction of the pons—and specifically the left pontine infarct—is improved. The degree of bulk susceptibility artifact in this region is variable from patient to patient at 3 T, with the example presented being the extreme in degree of distortion that can be seen.

The images in **Fig. 30-3** are from a 54-year-old diabetic with a 1-day history of ataxia. A small, early subacute right lateral medullary infarct is noted (arrows). In **Fig. 30-3**, (A) 5-mm 1.5 T and (B) 3-mm 3 T T2-weighted images are presented together with (C) 1.5 T and (D) high-resolution (256 × 256) 3 T DWI. This small medullary infarct is much better seen on the thin-section T2-weighted image at 3 T and is also more clearly visualized on the high-resolution DWI at 3 T. Clearly illustrated is the improved lesion detectability at 3 T secondary to improved SNR, permitting thinner section imaging with less volume averaging and higher in-plane resolution (on DWI).

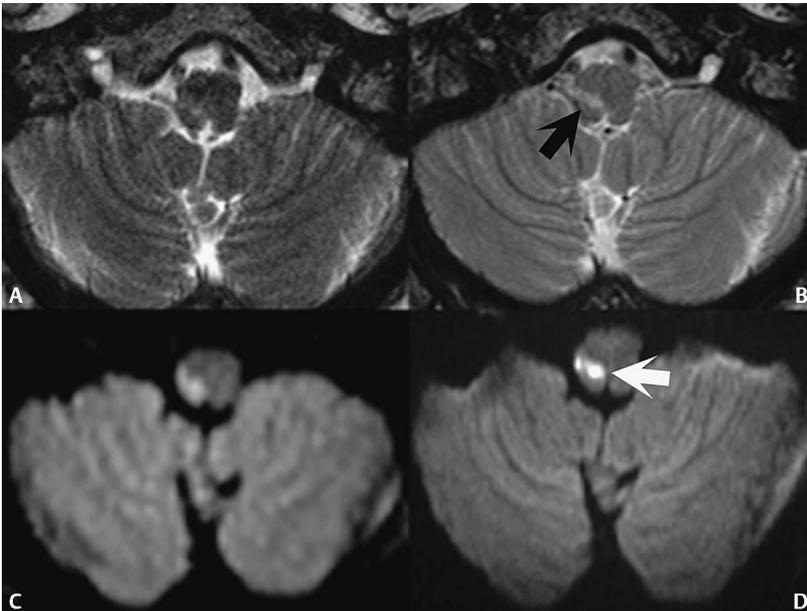


Figure 30-3