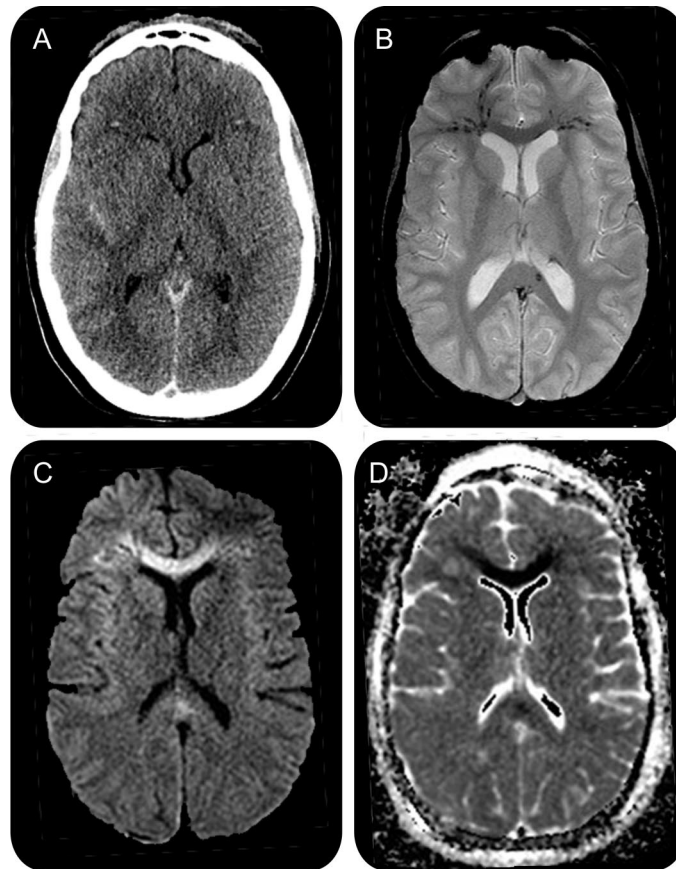


# Teaching NeuroImages: Restricted diffusion in the corpus callosum after traumatic diffuse axonal injury

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**Figure** Restricted diffusion associated with hemorrhagic diffuse axonal injury



Bifrontal traumatic microbleeds (TMBs) are identified on head CT (A). Gradient-echo MRI (B) reveals additional TMBs involving the forceps minor fibers and the splenium of the corpus callosum. Diffusion-weighted MRI (C) and apparent diffusion coefficient map (D) demonstrate restricted diffusion in the genu of the corpus callosum extending into the bifrontal white matter.

A 19-year-old woman was hit by a car and found to be somnolent and inattentive on neurologic examination. Head CT demonstrated bifrontal traumatic microbleeds (figure), suggesting hemorrhagic diffuse axonal injury (DAI). MRI performed 7 days later showed extensive diffusion restriction in the genu of the corpus callosum. Follow-up MRI on day 27 confirmed resolution of these signal changes. The time course for diffusion restriction in DAI is variable, persisting up to 18 days post-trauma.<sup>1</sup> Its pathogenesis has yet to be fully elucidated, with potential

etiologies including swelling of sheared axons, Wallerian degeneration of interhemispheric neurons, and microvascular injury causing ischemia.<sup>2</sup>

## REFERENCES

1. Liu AY, Maldjian JA, Bagley LJ, Sinson GP, Grossman RI. Traumatic brain injury: diffusion-weighted MR imaging findings. *AM J Neuroradiol* 1999;20:1636–1641.
2. Maxwell WL, Irvine A, Adams JH, Graham DI, Gennarelli TA. Response of cerebral microvasculature to brain injury. *J Pathol* 1988;155:327–335.

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