LETTER TO THE EDITOR

The “Morning Glory Sign” Should Be Evaluated Using Thinly Sliced Axial Images

In a previous study, we found that the “morning glory sign” would be useful for diagnosing progressive supranuclear palsy (PSP), which is abnormal atrophy of the midbrain characterized by a concavity of the lateral margin of its tegmentum. In a previous “Letter to the Editor” from Dr. Mori’s group and our reply, we contended that thinly sliced images would be useful in evaluating the “morning glory sign”.

Recently, we examined a 57-year-old woman with PSP diagnosed by a neurologist. She had a two-year history of symmetrical rigidity and bradykinesia of the legs that failed to respond to treatment with levodopa and that gradually worsened, and for seven months, she also had postural instability with falls and vertical supranuclear-gaze palsy with infrequent blinking.

Although conventional T2-weighted images (slice thickness, 7 mm; slice gap, 2 mm) did not show the “morning glory sign,” a thinly sliced image (slice thickness, 3 mm; slice gap, 0 mm) parallel to the line running through the nasion and pontomedullary junction that included the mammillary body showed the sign clearly (Fig. 1). This PSP case suggests that the “morning glory sign” should be evaluated with a thinly sliced axial image that is precisely located.

Slice angle, for example, parallel to the line running through the nasion and pontomedullary junction or the anterior commissure and posterior commissure, is important when evaluating the

![Fig. 1. A 57-year-old woman with progressive supranuclear palsy (PSP). A thinly sliced (3-mm thickness) axial T2-weighted image at the level of the mammillary body shows a concave shape of the lateral margin of the posterior tegmentum (morning glory sign, arrows).](image)

![Fig. 2. A 20-year-old woman (healthy volunteer). “Fig. A” and “Fig. B” were re-formed to slices of 3-mm thickness using 3-dimensional fast imaging employing steady-state acquisition (FIESTA) sequence. Figure A is an axial image parallel to the line running through the nasion and pontomedullary junction. Figure B is an axial image parallel to the line running through the anterior commissure and posterior commissure. Both slices show concave aspects of the tegmentum of the midbrain (arrows).](image)
“morning glory sign” because it may influence the appearance of the sign. We observed the surface of the tegmentum of the midbrain with 3-dimensional fast imaging employing steady-state acquisition (FIESTA) in 5 healthy volunteers. Although part of the upper aspect of the tegmentum of the midbrain appeared flat, as mentioned in the previous letter, the other parts appeared convex in all volunteers. Therefore, theoretically, axial images of healthy brain taken with any slice angle would never show a concave aspect of the surface of the tegmentum (Figs. 2A, 2B). Thus, if the tegmentum appears concave on an axial image, the midbrain most likely has an abnormal atrophy, at the very least. This “morning glory sign,” a concave aspect of the midbrain tegmentum, is an excellent indicator of abnormal midbrain atrophy. Although the sign may appear in other deficits, we have only recognized it in PSP.

References

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