ally long duration of the aura symptoms in Patient 2 suggests involvement of early spasm since recovery after CSD/CSD-like depolarizations is energy dependent. The occurrence of DIND despite proper fluid management and nimodipine prophylaxis in our patients is interesting because migraine with aura is a known risk factor for ischemic stroke in young women.[6] A particular link has been proposed between migrainous stroke-related mechanisms and DIND.[7]

In conclusion, we suggest that SAH can be a trigger for migrainous aura; this possibility is consistent with Leão's "spreading depression-theory."

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MRI assessment of spared fibers following callosotomy: A second look

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The development of callosotomy (or "split-brain") surgery for the relief of intractable epilepsy offered the first opportunity to assess the roles of the cortical and subcortical connections in transferring information between the hemispheres. Some of the early research on interhemispheric transfer in these patients produced confusing and conflicting results, partly due to the lack of availability of noninvasive methods to verify that the entire corpus callosum had been resected. The advent of MRI scanning revealed that some patients had residual callosal fibers that had been inadvertently spared during surgery.[1] In 1985 our research group reported such a case.[2] We described MRI assessment of callosotomy in three patients. In one of these, MRI revealed areas of bright signal in the splenium and rostrum of the corpus callosum, which were assumed to reflect spared callosal fibers.

Like most callosotomy patients, our patient fails most tests of interhemispheric information transfer.[2,3] Several studies have shown, however, that she is sometimes able to integrate information between the two hemispheres when the stimuli are visually presented words.[4-6] We have speculated that the spared fibers in her splenium were responsible for the transfer of orthographic word information.[4,5] It is also possible that the spared fibers at the rostral end of the corpus callosum could contribute to the transfer. These fibers connect frontal regions and could support transfer of semantic information.

These speculations rely on the accuracy of the MRI evidence for spared fibers in the splenium of our patient's corpus callosum. The MR images were collected on a first-generation scanner (Technicare 0.5 T, Solon, OH), and are of rather poor image quality by modern standards. This raises the possibility that the regions of apparent callosal sparing may be artifactual. We recently had an opportunity to reexamine our patient using a modern scanner (General Electric Signa 1.5 T, Milwaukee, WI). This allowed us to collect higher resolution images than were previously available, and thus to assess the extent of sparing in her corpus callosum with greater confidence.

Methods. Case history. A 48-year-old woman who underwent a two-stage callosotomy for the relief of pharmacologically intractable epilepsy in 1979. Details of her medical history and neuro-

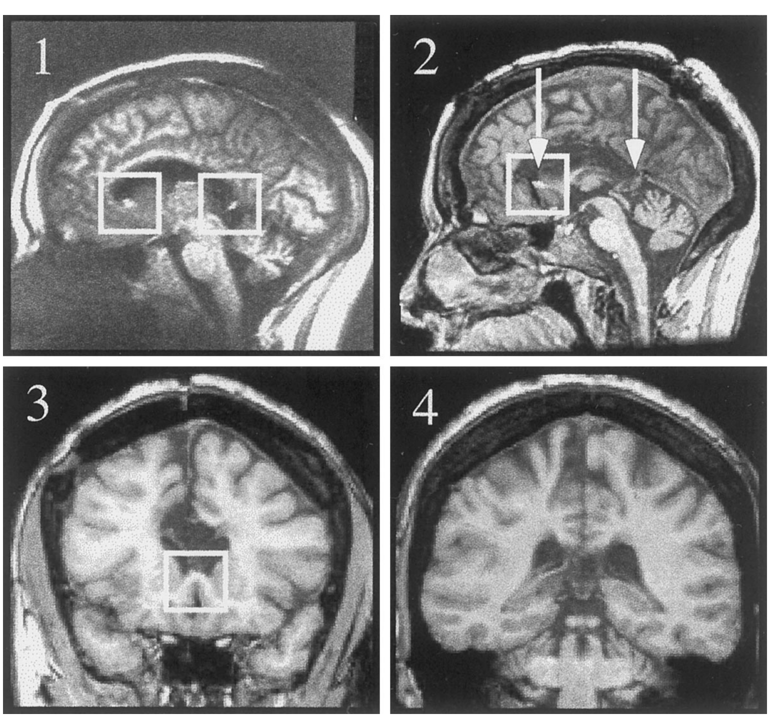

Figure. Images taken from MRI scans of the patient taken in 1984 and 2000. The white squares mark regions of bright signal observed at both ends of the corpus callosum in the 1984 scan (panel 1), and at the rostral end in the 2000 scan (panel 2). The arrows in panel 2 indicate the locations of the coronal slices shown in panels 3 and 4. Panel 3 shows a coronal slice through the region of bright signal found in the anterior corpus callosum in the midsagittal view. The spared callosal fibers can be clearly seen. Panel 4 shows a coronal slice taken from the posterior end of the corpus callosum, in the region where bright signal had been observed in 1984. The callosal fibers in this slice are clearly severed.

logic status are available elsewhere.[7] MR images were acquired in October 2000.

MRI. Three-dimensional images were acquired with a 1.5 T GE Signa Echospeed MRI scanner equipped with high-performance gradients (revision LX 8.3; maximum amplitude 4.0 mT/m; slew rate150 mT/m/s). A T1-weighted scan was acquired using the standard GE birdcage head coil and three-dimensional spoiled gradient recalled pulse sequence (repetition time/echo time = 25/6 ms, flip angle = 25°, bandwidth = 15.6 kHz, voxel size = 0.9375 mm × 1.25 mm ×1.2 mm).

Results and discussion. We found clear evidence of residual fibers at the rostral end of the corpus callosum. The coronal view revealed that these clearly cross between the two hemispheres (figure). In contrast, there was no evidence of spared tissue in the splenium in coronal, transaxial, or sagittal sections.

The new images suggest that the "sparing" observed in the splenium in the original MRI scan was an artifact, despite being similar in intensity and size to the signal from the rostrum. This sounds a cautionary note about the importance of meticulous technique if imaging is to be relied upon in the assessment of surgical procedures. The original MRI evidence was obtained from sagittal slices, and it is possible that head tilt could combine with the relatively poor spatial resolution to create the impression that some fibers had been spared. Because the slice thickness was relatively large, tissue that occupied part of a slice could have generated enough signal so that it appeared to connect the two hemispheres. The new images were acquired three dimensionally, with a small voxel size (0.9375 mm × 1.25 mm ×1.2 mm). This reduces the possibility that such partial-volume effects could cause similar artifacts in our images.

Our failure to find sparing in her splenium suggests that our earlier interpretations[4,5] regarding our patient's ability to transfer word information were incorrect. It now seems clear that this must be supported by the spared rostral fibers, rather than splenial fibers. This may account for the idiosyncratic nature of her ability to transfer word information. In some tasks she exhibits nearly perfect interhemispheric transfer, whereas in others the transfer is sporadic. If the rostral fibers support the transfer of semantic information, rather than visual characteristics, we might expect the quality of transfer to vary with the specific demands of the task.

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