

## CLINICAL IMAGE

# Dural Enhancement in a Patient with Sturge-Weber Syndrome Revealed by Double Inversion Recovery Contrast Using Synthetic MRI

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Sturge-Weber Syndrome (SWS) is a rare, sporadic neurocutaneous disorder characterized by leptomeningeal angiomas, most often involving the occipital and posterior parietal lobes.<sup>1</sup> An ipsilateral facial cutaneous vascular malformation usually affects the facial area innervated by the first sensory branch of the trigeminal nerve.

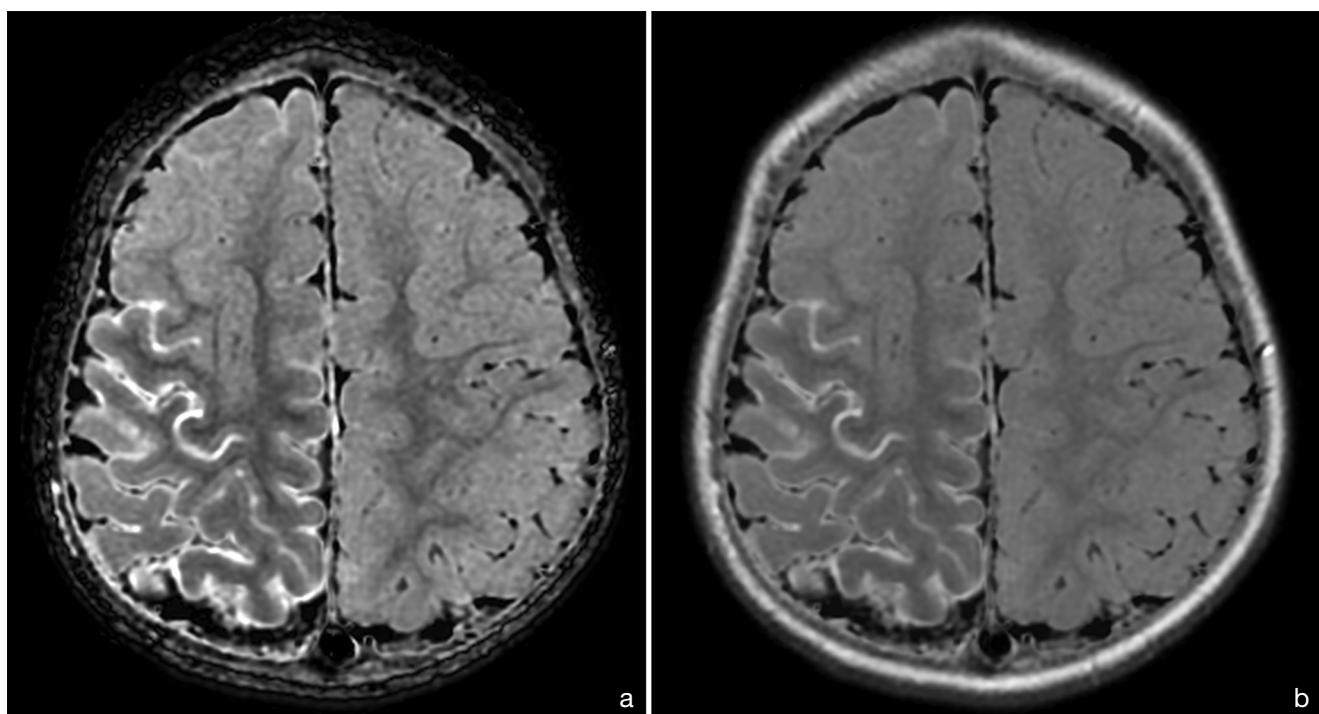
We applied a magnetic resonance imaging (MRI) technique to a patient with SWS. The technique is synthetic MRI utilizing rapid magnetic resonance quantification method.<sup>2</sup> It enables rapid simultaneous quantification of the longitudinal  $T_1$  relaxation, the transverse  $T_2$  relaxation, the proton density, and the amplitude of the local radio frequency coil-induced magnetic fields. All these parameters are measured in one single scan by means of a multislice, multiecho, and multidelay acquisition. It is possible to synthesize any  $T_1$ -weighted or  $T_2$ -weighted contrast image and inversion-recovery image based on these absolute parameters, by calculating the expected pixel intensity as a function of a virtual set of scanner settings.

Here, we present a case of an SWS to which we applied synthetic MRI technique after injection of contrast material. Quantification was performed on a 3T MRI system (Discovery MR750w, GE Healthcare,

Milwaukee, USA). Acquisition time was 7:12. We set double inversion recovery (DIR) to the acquired parameters to null the cerebrospinal fluid and minimize the signal of fat in the bone marrow and subcutaneous tissue [Fig. 1a; repetition time (TR), 4660 ms; echo time (TE), 171 ms; 1<sup>st</sup> inversion time (TI), 1755 ms; 2<sup>nd</sup> TI, 292 ms]. The DIR image shows leptomeningeal and dural enhancement of the right posterior part of the brain. Fluid attenuated inversion recovery image (Fig. 1b; TR, 15,000 ms; TE, 100 ms; TI, 2900 ms) shows leptomeningeal enhancement but dural enhancement is difficult to recognize.

Leptomeningeal enhancement is a well-known radiologic feature of SWS but only a few case reports show dural enhancement. Pathological basis of dural enhancement is not well known but dural angiomas in a real specimen from a patient with SWS has been shown.<sup>3</sup> Dural angiomas are probably the cause of dural enhancement in the DIR image of this current case. Synthetic MRI makes it easier to null any tissue since one can null a specific tissue after acquisition of the absolute parameters instead of obtaining inversion-recovery image with preset TR, TE, and TI. The synthetic MRI technique may contribute to further clarify the dural pathology of SWS.

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**Fig. 1.** (a) Double inversion recovery (DIR) image and (b) fluid attenuated inversion recovery (FLAIR) image of a patient with Sturge-Weber Syndrome (SWS). The DIR image shows leptomeningeal and dural enhancement of the right posterior part of the brain. The FLAIR image shows leptomeningeal enhancement but dural enhancement is only minimal.

## References

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