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## FreeSurfer is useful for early detection of Rasmussen's encephalitis prior to obvious atrophy

Aaron D Boes<sup>1,2</sup>, Paul Caruso<sup>3</sup>, Ann-Christine Duhaime<sup>4</sup>, and Bruce Fischl<sup>3,5,6</sup>

<sup>1</sup>Berenson-Allen Center for Noninvasive Brain Stimulation, Division of Cognitive Neurology, Department of Neurology, Harvard Medical School and Beth Israel Deaconess Medical Center, Boston, MA

<sup>2</sup>Department of Pediatric Neurology, Massachusetts General Hospital, Harvard Medical School, Boston, MA

<sup>3</sup>Department of Radiology, Massachusetts General Hospital, Harvard Medical School, Boston, MA

<sup>4</sup>Department of Pediatric Neurosurgery, Massachusetts General Hospital, Harvard Medical School, Boston, MA

<sup>5</sup>Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Charlestown, MA

<sup>6</sup>Computer Science and Artificial Intelligence Laboratory, Massachusetts Institute of Technology, Cambridge, MA, USA

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### Case Summary

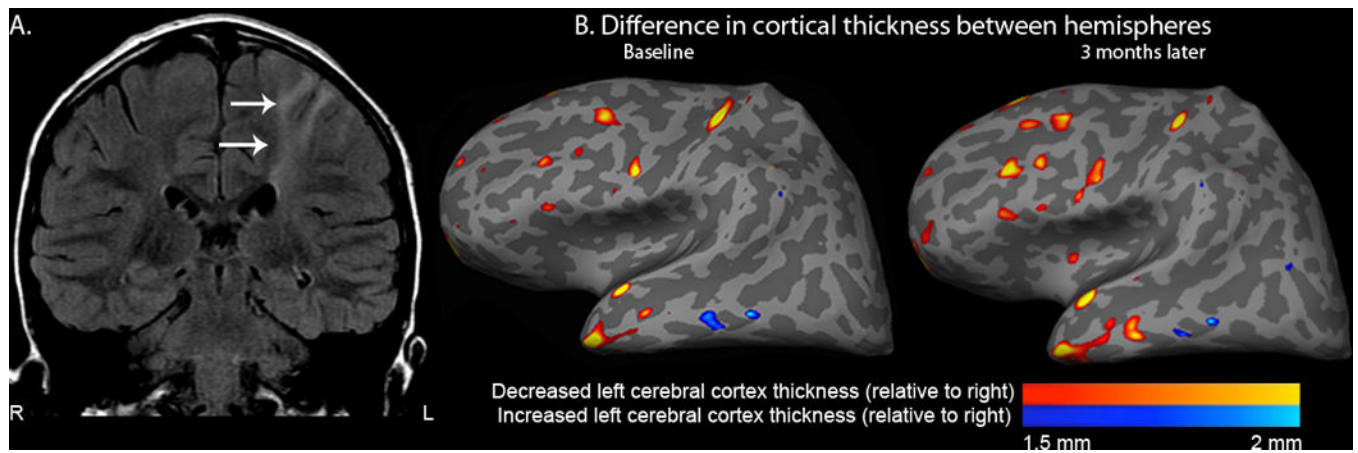
A 7-year-old male developed focal seizures of his right hand and face that progressed to epilepsy partialis continua.<sup>1</sup> Conventional magnetic resonance imaging (MRI) revealed a region of T2 white matter hyperintensity consistent with either focal cortical dysplasia or focal inflammation of Rasmussen's encephalitis (Figure 1a). Distinguishing between these etiologies is critical to guide appropriate surgical intervention, but in this case the lack of obvious hemiatrophy complicated accurate diagnosis. FreeSurfer, an open source software suite for processing and analyzing human MRI, was used to measure cortical thickness differences between homologous locations in the two hemispheres based on folding patterns.<sup>2</sup> FreeSurfer revealed widespread left hemisphere cortical atrophy that progressed within a 3-month period, consistent with Rasmussen's encephalitis (Figure 1b). Pathology subsequently confirmed the diagnosis and the patient is seizure-free following left hemisphere disconnection surgery. This case highlights the potential of advanced imaging to detect progressive unilateral cortical atrophy in early Rasmussen's encephalitis. If confirmed in a larger cohort this information could be considered in conjunction with other clinical data in the diagnosis of Rasmussen's encephalitis.

## ACKNOWLEDGEMENTS

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## REFERENCES

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**Figure 1.**

Magnetic resonance imaging (MRI) findings. (a) T2 hyperintensity extends from the left paracentral cortical ribbon to the lateral ventricle. There was a question of left hemisphere hemiatrophy, but this was equivocal. (b) Cortical thickness was measured in both hemispheres and compared between homologous regions across the entire cerebral cortex. Differences in cortical thickness between the left and right hemisphere are displayed using color scales, such that areas where the left cerebral cortex is thinner are displayed as warm colors, and thicker sites are in cool colors. The image on the left shows the first MRI, which showed widespread left hemisphere cortical atrophy that was more obvious than on conventional MRI. Three months later this imaging was repeated and showed further progression of left cerebral cortex atrophy relative to the right.