

**Editors' Note:** In reference to “Low-frequency stimulation of STN-DBS reduces aspiration and freezing of gait in patients with PD,” Dr. Sidiropoulos suggests several avenues of further investigation including low-frequency stimulation to treat dysarthria, the effects of different stimulation location and parameters, and the duration of clinical benefit. Authors Xie et al. respond. Drs. Lattanzi and Silvestrini and author Anderson discuss intensive blood pressure lowering and blood pressure variability in the acute management of intracerebral hemorrhage.

—Megan Alcauskas, MD, and Robert C. Griggs, MD

#### LOW-FREQUENCY STIMULATION OF STN-DBS REDUCES ASPIRATION AND FREEZING OF GAIT IN PATIENTS WITH PD

**Christos Sidiropoulos, Detroit:** I thank Xie et al.<sup>1</sup> for their study using low-frequency stimulation (LFS) of the subthalamic nucleus to address axial symptoms in advanced Parkinson disease (PD). The authors objectively assessed improvement in dysphagia with surprisingly robust results. It would be interesting to investigate resolution of dysarthria with LFS. In addition, duration as a clinical benefit should have been considered since other studies have indicated loss of improvement over time in LFS.<sup>2,3</sup> Valid, long-term benefits will need to be assessed.

In another study evaluating LFS,<sup>4</sup> the authors used more ventral contacts, which merits further investigation. In most LFS studies, investigators tried to adjust voltage for the same total electrical energy delivered, which the authors did not do. The authors' chart shows that 130 Hz directly worsened freezing of gait and other axial symptoms since the deep brain stimulation (DBS) “off” condition was better than the 130 Hz condition. In addition, their DBS “on” medication scores using 130 Hz were quite high, raising questions about how efficient patients were truly programmed.

The authors also stated that all but one patient were on monopolar stimulation. Did the authors attempt other programming modalities such as bipolar to reduce current spread or interleaving?

**Author Response:** Tao Xie, Julie Vigil, Ellen MacCracken, Peter Warnke, Chicago; Un J. Kang, New York: We thank Dr. Sidiropoulos for raising

important points related to the outcomes of our study.<sup>1</sup> We appreciate the suggestion to examine the outcome of dysarthria with LFS. One study found LFS subthalamic nucleus beneficial for dysarthropneumophonia.<sup>5</sup> We agree that assessing longer-term outcome of LFS on swallowing and freezing of gait is important.

Although other studies reported the loss of improvement over time on LFS,<sup>2,3</sup> they used a different frequency stimulation, patient population, and design, and no radiographic swallowing assessment. However, the persistent benefit of 60 Hz stimulation on freezing of gait at medication “off” state was reported by another group.<sup>6</sup> We are in the process of conducting a long-term follow-up study.

We agree that stimulation location and parameters should be explored further. We had a small proportion of patients with ventral contacts and bipolar stimulation and cannot comment on these variables. We hope these findings stimulate others to explore further optimization of DBS parameters for refractory symptoms.

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#### OPTIMAL ACHIEVED BLOOD PRESSURE IN ACUTE INTRACEREBRAL HEMORRHAGE: INTERACT2

**Simona Lattanzi, Mauro Silvestrini, Ancona, Italy:** Arima et al.<sup>1</sup> addressed the optimal management of

blood pressure (BP) in the acute phase of intracerebral hemorrhage (ICH).<sup>1</sup> First, they showed the benefit of intensive BP lowering on physical function across a wide range of baseline systolic BP (SBP). Although the point-estimated odds ratios favored an intensive regimen across all 5 subgroups identified according to baseline BP, the confidence intervals embraced the values of no difference between per-protocol intensive and guideline-recommended treatments. Further investigation is needed to better define the real effect sizes of the intervention.

Second, a SBP range of 130–139 mm Hg is beneficial. Since lowering BP influences and increases BP variability (BPV) and high variability in BP represents a strong predictor of poor functional outcome after ICH,<sup>2</sup> a combined analysis—which also includes the effects of BPV—may indicate the best strategy to achieve target BP values.

**Author Response: Craig S. Anderson, Camperdown, Australia:** Drs. Lattanzi and Silvestrini highlighted the modest potential benefits of early intensive BP lowering in acute intracerebral hemorrhage, but overlooked the consistency of no harm from the treatment. The consistency of positive outcomes of this treatment according to subgroup analysis in this article—and those of BP variability in the full cohort—adds further weight to the positive findings, which just missed statistical significance on the primary outcome due to reduced power.

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## Optimal achieved blood pressure in acute intracerebral hemorrhage: INTERACT2

Simona Lattanzi, Craig S. Anderson and Mauro Silvestrini

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