

## LETTERS TO THE EDITOR

### Stroke Telemedicine: State of Affairs

*To the Editor:* We read with great interest the recent article by Demaerschalk et al<sup>1</sup> and the editorial by Meschia<sup>2</sup> about stroke telemedicine. It is a pleasure to see that an increasing number of stroke centers are transferring their expertise to rural areas through telemedicine worldwide.

Indeed, the process has been developed much further than described in those articles. For example, studies associated with the Telemedic Project for Integrative Stroke Care (TEMPiS) in Germany demonstrated almost identical long-term mortality and functional outcome after telemedically guided thrombolysis in 170 patients at district hospitals compared with 132 patients with intravenous thrombolysis at 2 stroke centers.<sup>3</sup> In another study associated with TEMPiS,<sup>4</sup> 1971 patients at telemedicine-supported hospitals with newly established stroke wards were compared with those at matched control hospitals not taking part in the network. Significantly fewer patients at in-network hospitals had a poor outcome after 3 months. In a multivariate regression analysis, specialized stroke treatment in telemedicine network hospitals independently reduced the probability of a poor outcome (odds ratio, 0.62; 95% confidence interval, 0.52-0.74;  $P < .0001$ ). At 12- and 30-month follow-up, death and dependency were significantly lower in TEMPiS hospitals.<sup>5</sup> During the almost first 4 years of the project, more than 8000 patients were examined via teleconsultation, and for the vast majority, treatment could be continued at the district hospitals without interhospital transfer.<sup>6</sup>

Thus, telemedicine has become a reliable tool in acute stroke care, associated with improved outcome. It is well accepted when used in an integrative approach of organized stroke care. Nevertheless, efficacy data on the use of telemedicine in stroke management are needed from more networks, and the independent effect of teleconsultations on safety and outcome must be demonstrated for more than intravenous thrombolysis. We think that use of telemedicine should increase, eg, to facilitate inclusion of patients with rare causes of stroke into controlled studies.

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4. Audebert HJ, Schenkel J, Heuschmann PU, Bogdahn U, Haberl RL; Telemedic Pilot Project for Integrative Stroke Care Group. Effects of the

implementation of a telemedical stroke network: the Telemedic Pilot Project for Integrative Stroke Care (TEMPiS) in Bavaria, Germany. *Lancet Neurol.* 2006;5(9):742-748.

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*In reply:* We appreciate the interest that Vatankhah and Audebert have in our recent article and accompanying editorial. We thank them for providing information on their numerous publications generated from the TEMPiS study.<sup>1</sup> The network of hospitals in Bavaria that make up TEMPiS has demonstrated that telemedicine can be an effective way of delivering stroke expertise to hospitals that had previously lacked extensive experience with thrombolytic therapy. It is true that the nonrandomized, unblinded, open-intervention TEMPiS study showed that specialized stroke treatment in TEMPiS telemedicine network hospitals independently reduced the probability of a poor outcome. However, it is worth noting that the positive effects of being in-network were likely not simply the result of telemedicine. The intervention, and thus the systematic difference between in-network and out-of-network hospitals, included implementation of stroke wards, stroke teams, continuous medical education for the personnel of the participating network hospitals, collaboration with stroke neurologists, and the telemedical support. Interestingly, the overall rate of teleconsultation among the in-network hospitals was only 36%.

For large geographic regions, telemedicine provides an impetus for better organization and standardization of care for stroke. Recruitment rates for acute stroke trials are influenced by the organizational structure of the research team.<sup>2</sup> Advantages of TEMPiS and similarly structured regional telestroke networks could make phase 3 clinical stroke trials more cost- and time-efficient. For instance, hub hospitals engaged in acute stroke trials could use telemedicine to screen patients and obtain consent as well as to enroll, randomize, treat, and even follow up patients at remote spoke hospitals.

We agree that long-term stroke telemedicine patient outcome and safety data, beyond thrombolysis decision making, are needed from an increased number of international networks. Additional questions that require an answer are as follows: (1) Is stroke telemedicine cost-effective? (2) What is the most favorable stroke telemedicine network model: hub-and-spoke or third-party consult? (3) Must telemedicine-treated acute stroke patients be transferred from a rural spoke hospital to a primary stroke center to derive long-term benefit? (4) How can telestroke practitioners best overcome interstate, interstate, and even international licensing, credentialing, privilege, marketplace, business, and malpractice insurance issues for a consultative modality that knows no geographic limits?<sup>3</sup>

The stroke telemedicine review by Demaerschalk et al<sup>4</sup> also highlighted that, despite the fact that many international centers are engaged in telestroke practice and research, the field is still missing common, standardized, and uniformly

applied measures of telestroke quality of care and acceptable guidelines for telestroke practice.

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Dr Demaerschalk served on a Genentech Education Advisory Board.

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### Confirming the Diagnosis of Cannabinoid Hyperemesis

*To the Editor:* I was delighted to read the interesting case report by Chang and Windish<sup>1</sup> of 2 patients with cannabinoid hyperemesis and compulsive bathing. However, I was surprised by the authors' claim that these cases were the first reported in the United States. I found 3 other case reports that had already been published in the United States by simply searching PubMed and Google.<sup>2-4</sup> Although still rarely reported, cannabinoid hyperemesis may be much more common than currently recognized. Because this syndrome has been recognized only recently and its validity has been questioned,<sup>5</sup> it is of paramount importance to clearly define and fully report all new cases.

The diagnosis is suggested by the characteristic triad of habitual cannabis use, cyclic vomiting, and compulsive bathing, but confirmation relies heavily on patient follow-up. Previous case reports and case series have shown that, almost universally, patients improve in the months after marijuana cessation, thus confirming the diagnosis. Unfortunately, adequate patient follow-up was lacking for the 2 cases by Chang and Windish, and the diagnosis remains uncertain. I hope that the authors can convey their patients' outcome and that a future issue of *Mayo Clinic Proceedings* might provide the necessary follow-up to confirm the suspected diagnosis.

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2. Singh E, Coyle W. Cannabinoid hyperemesis [letter]. *Am J Gastroenterol*. 2008;103(4):1048-1049.
3. Chepyala P, Olden KW. Cyclic vomiting and compulsive bathing with chronic cannabis abuse. *Clin Gastroenterol Hepatol*. 2008;6(6):710-712. Epub 2008 May 5.
4. Budhraj V, Narang T, Azeez S. Cannabinoid hyperemesis syndrome: cyclic vomiting, chronic cannabis use, and compulsive bathing. *Pract Gastroenterol*. 2008;32(9):79-80.

5. Byrne A, Hallinan R, Wodak A. "Cannabis hyperemesis" causation questioned [letter]. *Gut*. 2006;55(1):132.

*In reply:* We thank Dr Budhraj for pointing out other articles related to the use of cannabinoids and hyperemesis.

When we saw our first patient with hyperemesis in June 2007, we were immediately intrigued by the patient's symptoms of refractory nausea and vomiting that were relieved only with hot showers. We immediately performed PubMed and Google searches and learned about cannabinoid hyperemesis. When we saw a second patient with a similar presentation in January 2008, we decided to write about our patients because, to the best of our knowledge at that time, they would be the first cases to be reported in the United States. We wrote the manuscript during the spring of 2008 and then submitted it to *Mayo Clinic Proceedings*. We think it was during that time that the other articles were published without our knowledge.

The article by Byrne et al<sup>1</sup> published in 2006, which we were aware of when writing our manuscript, raises the question of whether the syndrome is valid without further investigating the etiology. The purpose of our article was to raise awareness of the syndrome as one of the differential diagnoses in patients who present with hyperemesis and abnormal bathing behaviors and to tease out possible causes given the paradoxical response to marijuana use. In fact, our article in *Mayo Clinic Proceedings* is already shedding light on these topics. We have received many e-mails from physicians who have treated similar patients for years without a clear etiology, and they have said that their patients feel "validated" by the possibility of this diagnosis. We have also received e-mails from patients who report feeling relieved that this syndrome is receiving more attention because they have experienced it for years.

We think that the issue raised by Dr Budhraj is an unfortunate consequence of overlap that occurred during simultaneous submissions of manuscripts.

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1. Byrne A, Hallinan R, Wodak A. "Cannabis hyperemesis" causation questioned [letter]. *Gut*. 2006;55(1):132.

### CORRECTION

**Incorrect number:** In the article by Koplman and Stevenson entitled "Ventricular Tachycardia and Sudden Cardiac Death," published in the March 2009 issue of *Mayo Clinic Proceedings* (*Mayo Clin Proc*. 2009;84(3):289-297), an incorrect number was published in the top box of Figure 2 on page 291. The figure incorrectly recommends 3 shocks (Shock  $\times$ 3) for hemodynamically unstable ventricular tachycardia/ventricular fibrillation. The most recent 2005 American Heart Association Emergency Cardiovascular Care guidelines recommend a single shock with resumption of cardiopulmonary resuscitation if indicated (*Circulation*. 2005;112(24):IV-206-IV-211). Therefore, the box in Figure 2 should read as follows: Shock ( $\times$ 1).