

Editorial

*Corresponding author

James H. Halsey, MD
Professor Emeritus
Department of Neurology
University of Alabama
School of Medicine
1720 2nd Ave, S. FOT 1203
Birmingham, AL 35294-3412, USA
Tel. (205)592-2177
E-mail: jhhalsey@gmail.com

Volume 1 : Issue 1

Article Ref. #: 1000NOJ1e001

Article History

Received: October 11th, 2014

Accepted: November 8th, 2014

Published: November 10th, 2014

Citation

Halsey JH. Vasospasm monitored by transcranial doppler. *Neuro Open J.* 2014; 1(1): e1. doi: [10.17140/NOJ-1-e001](https://doi.org/10.17140/NOJ-1-e001)

Copyright

©2014 Halsey JH. This is an open access article distributed under the Creative Commons Attribution 4.0 International License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Vasospasm Monitored by Transcranial Doppler

James H. Halsey*

Department of Neurology, University of Alabama School of Medicine, 1720 2nd Ave, S. FOT 1203, Birmingham, AL 35294-3412, USA

Vasospasm almost always occurs following rupture of an aneurysm in the Circle of Willis. Spasm is less likely in peripherally located aneurysms, for example those complicating bacterial endocarditis.

For a day or two spasm is often absent or minimal. If the patient's condition is good, many surgeons will proceed at this time either with surgery or endovascular placement of coils in the aneurysm to make it undergo thrombosis.

Spasm is due to the evolution of oxyhemoglobin from hemoglobin, causing depletion of the vasodilating nitrous oxide synthase.¹ From the third day after hemorrhage onward, with or without surgical or endovascular intervention, spasm develops progressively, generally reaching a maximum plateau at the end of the first week. It is during the period of increasing spasm and the early plateau period that serious ischemic complications are likely to occur. The standard management during this time is "Triple H": Hypertension, Hemodilution, and Hypervolemia.

Although this paradigm has been widely accepted for 20 years its efficacy remains unproven. Moreover it may carry medical morbidity, including pulmonary edema, myocardial ischemia, catheter infections, and cerebral edema.² Obviously careful ICU monitoring of the potential medical morbidities is important.

For specific monitoring, we have adopted the technique of Transcranial Doppler (TCD).³ This non-invasive method permits daily measurements defining the severity and time course of the evolving spasm in the individual patient. We have found that daily measurements are essential for this purpose. This enables optimization of medical management of the medical therapy.

In most cases this is adequate to bring the patient through without ischemic damage. In rare cases, TCD demonstrates a rapidly increasing severity of spasm. This is usually confirmed by angiography representing a vascular emergency. This can be dealt with by percutaneous angioplasty As the plateau progresses after which spasm decreases. All this can be objectively defined by TCD.

REFERENCES

1. ClinicalTrials.gov. A Service of the U.S. National Institute of Health. Website: <http://clinical-trials.gov/ct2/results?term=edema&Search=Search>. Accessed 2014.
2. Lee KH, Lukovits T, Friedman JA. "Triple-H" therapy for cerebral vasospasm following subarachnoid hemorrhage. *Neurocrit Care.* 2006; 4(1): 68-76.
3. Aaslid R, Huber P, Nornes H. A transcranial Doppler method in the evaluation of cerebrovascular spasm. *Neuroradiology.* 1986; 28(1): 11-16 .