Evaluation of Vasomotor Reactivity by Transcranial Doppler and Acetazolamide Test Before and After Extracranial-Intracranial Bypass

I agree with Karnik et al that the cerebrovascular reactivity as measured with transcranial Doppler (TCD) sonography and acetazolamide test may well become a criterion for selecting those patients suffering from internal carotid occlusion in whom an extracranial-intracranial (EC-IC) bypass could lower the risk of ischemic stroke. Two points, however, must be kept in mind when considering the results of these authors.

First, the response of flow velocity to acetazolamide does not necessarily reflect the response of volume flow. The reason is that constancy of the cross-sectional area of the middle cerebral artery (MCA) cannot be ensured with this test. In fact, measurement of the Doppler signal power (which is proportional to the cross-sectional area of the vessel) along with mean spatial velocity (V) showed that acetazolamide leads to a dilation not only of the small resistance arteries but also of the trunk of the MCA (Figure 1). In the example demonstrated, the percent increase in velocity therefore was barely about half of the percent increase in volume flow, calculated as the product of V and p (TCD flow index [FI]). These findings were very similar to those obtained in CO2 respiration and clearly show that FI rather than V should be used for measuring the cerebrovascular reserve.

Second, and even more important, there is no evidence whatsoever that the cerebrovascular reserve demonstrated by means of the acetazolamide or CO2 respiration tests can be used for judging the integrity of autoregulation. Measurement of the response of the TCD FI to lowering blood pressure by tilting the head up or to lower body negative pressure would therefore appear to be more appropriate approaches to the selection of cases to be considered for carotid endarterectomy or EC-IC bypass surgery.

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Applications of Transcranial Doppler Sonography in Acute Ischemic Stroke

The article by Hedera et al suggests that a single transcranial Doppler (TCD) study of the middle cerebral arteries (MCAs) performed up to 48 hours after acute stroke may be clinically helpful, particularly in estimating prognosis over 28 days. We disagree. This is likely to be true only for highly selected patients.
Evaluation of vasomotor reactivity by transcranial Doppler and acetazolamide test before and after extracranial-intracranial bypass.

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