Letters to the Editor

Directional Doppler in Occlusive CBVD

To the Editor:

Fifty-six patients on the Neurology and Neurosurgical Services at the Boston Veterans Hospital and Boston University Hospital with symptoms suggestive of cerebral or ocular ischemia were examined using a Parks Electronics Model 807 directional Doppler. The techniques employed were similar to those described previously. A total of 100 carotid angiograms were done on these 56 patients.

In the supine position the supratrochlear and supraorbital vessels were examined bilaterally. Judgments of direction of flow were based only on auditory signals and effects of digital compression of ipsilateral superficial temporal and facial arteries.

The examiner had no prior knowledge of the angiographic findings or of the clinical symptoms in the vast majority of cases, but at times clinical signs were obvious.

It is noteworthy that flow reversal in the supratrochlear artery was present in 11 cases (73%) of 15 with internal carotid occlusion and in 3 others with very tight stenoses. In all of these there was reversal of flow in the supraorbital as well. In no case was there antegrade flow in the supraorbital vessel when retrograde flow was present in the supratrochlear. Hence, supratrochlear reversal is an indicator of occlusion, with a high degree of reliability (4% false positives) and fair degree of sensitivity (73% true positives). Reversal of flow in the supraorbital artery was present in 94% of the occluded internal carotids and 68% of those with high grade stenosis, and, hence, is a far more sensitive indicator than supratrochlear reversal, although it is somewhat less reliable, yielding 9% false positives.

These results concur with those reported in other sizeable series,1-4 and resemble the degree of accuracy achieved by techniques such as thermography, ophthalmodynamometry and phonoangiography.4,5 Angiographic studies of the patterns of collateral circulation in internal carotid occlusions indicate that in 76% of cases the collateral route is via the ophthalmic artery.4 The directional Doppler technique is, therefore, achieving a high degree of correlation.

In the 31 abnormal angiograms without high grade stenosis, 18 had nonstenotic atheromatous lesions in the extracranial carotid, 3 in the intracranial portion, and 10 had low grade stenotic lesions (20-65% narrowing).

Directional Doppler ultrasonography, therefore, provides a technique for screening only for high grade stenosis or occlusion of the internal carotid artery. When the clinical symptoms warrant an investigation of the cerebral vasculature, the decision whether or not to employ contrast angiography should not be based upon the results of this (or other) noninvasive techniques, since significant angiographic abnormalities were present in 73 of the 100 carotid angiograms, whereas only 33 (46%) were associated with Doppler abnormalities.

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References

<table>
<thead>
<tr>
<th>100 Carotid angiograms</th>
<th>Supraorbital artery flow patterns</th>
<th>Directional Doppler flow patterns</th>
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<tbody>
<tr>
<td>Subtotal</td>
<td>58</td>
<td>53</td>
</tr>
<tr>
<td>Occlusion</td>
<td>15</td>
<td>14 (94%)</td>
</tr>
<tr>
<td>Normal</td>
<td>27</td>
<td>19 (68%)</td>
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<tr>
<td>Subtotal</td>
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<td>33 (79%)</td>
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<tr>
<td>&gt;70% Stenosis</td>
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<td>19 (68%)</td>
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<tr>
<td>Normal</td>
<td>30</td>
<td>1 (3%)</td>
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<tr>
<td>Subtotal</td>
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<tr>
<td>&lt;70% Stenosis</td>
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<td>4 (17%)</td>
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<tr>
<td>Normal</td>
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<td>1 (4%)</td>
</tr>
<tr>
<td>Subtotal</td>
<td>53</td>
<td>5 (9%)</td>
</tr>
</tbody>
</table>

Table 1

Aubrey Lieberman, M.D.
Directional Doppler in occlusive cerebrovascular disorders.
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