Prognostic Value of Peripheral White Blood Cell Count in Intracerebral Hemorrhage

To the Editor:

Very high fatality rates have been reported in intracerebral hemorrhage, and the chances for survival have been expressed as a "prognostic score," based mainly on the combination of neurologic signs and/or the neuroradiologic findings. Since peripheral white blood cell (WBC) counts have been reported as prognostic indicators in other cerebrovascular diseases, we have investigated their potential role in this respect in intracerebral hemorrhage. The relations between peripheral WBC count measured within 48 hours after the occurrence of an intracerebral hemorrhage, the patient's initial clinical status, the degree of tissue damage on computed tomography (CT) scan, and the final clinical outcome were evaluated.

Thirty-seven consecutive patients hospitalized during 1985 were reviewed. There were 12 women and 25 men, aged 14-64 years, all admitted to the hospital within 36 hours after the onset of an intracerebral hemorrhage. No patient had any detectable evidence of infection nor were they using anti-inflammatory drugs. CT scan was performed with a Siemens Siretom 2000 (Cherry Hill, N.J.). The size of each hemorrhage was assessed by choosing the CT scan section with the largest area of lesion. The margin of the lesion was drawn on the TV screen using a cursor (light pen), and its area was then calculated by means of a computerized graphics table. Patients were classified according to their clinical status as 1) alert (n = 15), 2) drowsy (n = 11), 3) lethargic (n = 7), or 4) comatose (n = 4).

Neither the clinical status nor the size of intracerebral hemorrhage showed any significant correlation with WBC counts. Figure 1 shows a positive correlation between the early peripheral WBC count and the rate of survival. The greater mean peripheral WBC count was observed in the group of patients who died (p < 0.01, Student's t test). Moreover, of patients with a normal (4-10 x 10^9/mm^3) WBC count, only 1 died compared with a 50% mortality in patients with a peripheral WBC count of > 10 x 10^9/mm^3.

Early peripheral WBC counts may have prognostic value in patients with acute intracerebral hemorrhage.

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References

Carotid Endarterectomy in Private Practice by Fellowship-Trained Surgeons

To the Editor:

We seriously question the assumption that the results of carotid endarterectomy are necessarily poorer in outlying communities compared with university centers. In addition, we suggest that specialty training is a major contributor to good results. The senior author of this letter has trained 10 general vascular surgical fellows, 9 of whom practiced vascular surgery in 1985. The fellowship consisted of 12 months of clinical training. All fellows in training performed at least 100 major vascular cases, with a minimum of 25 carotid endarterectomies. The fellowships were at both the University of Iowa Hospitals and Clinics (3 fellows) and Loyola University Medical Center, Maywood, Ill. (6 fellows). To test our hypothesis that well-trained vascular surgeons can achieve excellent results in a variety of clinical settings, the 1985 carotid endarterectomy data from these 9 former fellows were reviewed.

Four surgeons are in population centers of greater than one million whereas others are in communities with populations ranging from 15,000 to 200,000. Four have clinical academic appointments, but only 2 operate routinely with surgical residents. Five of the 9 fellows practicing vascular surgery do so in combination with a general surgical practice. Collectively, 254 carotid endarterectomies were performed by the 9 fellows. Three patients (1.2%) died, and 1 additional patient suffered a nonfatal stroke for an overall stroke and mortality rate of 1.6% (4 of 254). Of the 3 mortalities, 2 patients died secondary to an operation-related stroke and 1 died of cardiac complications neurologically intact. The strokes and deaths occurred in the three busiest practices, resulting in stroke/death rates of 2.7%, 3.7%, and 3.8%, respectively (Table 1). In addition, 6 patients (2.4%) suffered a transient neurologic deficit; of these, 3 lasted < 24 hours and 3 cleared within 30 days.

These data support our contention that carotid endarterectomy can be practiced safely in a variety of settings. We believe that excellent surgi-
Table 1. Results of 254 Carotid Endarterectomies

<table>
<thead>
<tr>
<th>Surgeon</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>Total</th>
</tr>
</thead>
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<tr>
<td>Cases</td>
<td>75</td>
<td>54</td>
<td>26</td>
<td>26</td>
<td>22</td>
<td>16</td>
<td>13</td>
<td>11</td>
<td>11</td>
<td>254</td>
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<tr>
<td>Temp. deficit</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>6 (2.4%)</td>
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<tr>
<td>Nonfat. stroke</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (0.4%)</td>
</tr>
<tr>
<td>Fat. stroke</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 (0.8%)</td>
</tr>
<tr>
<td>Other death</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (0.4%)</td>
</tr>
<tr>
<td>Stroke/death rate</td>
<td>2.7%</td>
<td>3.7%</td>
<td>3.8%</td>
<td></td>
<td></td>
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References


The following letter is in reply:

To the Editor:

The statistics cited by Dr. Baker and his colleagues are indeed impressive. Although low complication rates are frequently recorded in anecdotal reports by individual surgeons, it is rare that extremely low rates such as 1.6% death or permanent stroke and 4% death or deficit of any sort are reported. Surveys of all procedures in hospitals or communities over a specified period of time report much higher complication rates than this.

It is presumed that these surgeons are reporting the total population upon whom they have scheduled surgery during the year 1985 and that all patients who had been selected for surgery had all events recorded from the time surgery was scheduled to the time of discharge or preferably to 30 days after the operation. It is also assumed that each patient had thorough and competent neurologic examinations to establish that there was no major defect. For example, patients may appear to be superficially normal in the presence of a severe nondominant right parietal lobe deficit, and yet severe constructional dyspraxia, dressing dyspraxia, and spatial disorientation make it impossible for them to function even in their own home.

On the assumption that all these criteria were met, Dr. Baker’s group has demonstrated that well-trained surgeons can have very low complication rates and should be complimented.

In fairness to the four studies cited by the authors, in none was it stated that the results of carotid endarterectomy were poorer in outlying communities than in university centers. In the two community studies of all endarterectomies and the statistics reviewed by Pokras and myself, the total complication rates were far too high. It is interesting that the large multicenter study of all 3,328 endarterectomies performed during 1981 at 46 institutions did demonstrate that, although the combined mortality and stroke risk was quite high (6%), the range was from 0 to 21%. This suggests that much lower complication rates than the average are possible, but, unfortunately, in large studies of this sort, if all were equal some would by chance fall on the extremes of a bell-shaped curve. Let us hope that this is not a mathematical variation and that the excellent results reported by this group can be reached by most good surgeons.

Until properly designed prospective studies have established specific indications for endarterectomies, it is imperative that those who have patients operated on because it “seems” right limit the operation to surgeons with comparably low complication rates. It is assumed that to guarantee this, Dr. Baker and his colleagues would recommend that prospective audits be required to establish that the complication rates by individual surgeons and institutions are low. These efforts should be applauded.

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