did not meet the criteria: this point was detailed in the fifth paragraph of the discussion. According to our criteria it is not true that after exclusion of 6 patients with associated infarcts, 7 of the 10 remaining subjects fulfilled criteria for small-vessel occlusion: none of these 10 did. Only 1 patient (of 16) met criteria for small-vessel occlusion in our study; this patient had an associated ipsilateral thalamic infarct (see table 1). Dr Bruno agrees with the general conclusion of our study: the rule "anterior choroidal artery territory infarct = small-vessel occlusion" is not true for all patients, and patients with such infarcts should be systematically evaluated for possible large-vessel disease and cardioembolism. This remains the finding most important to determining the best therapeutic strategy for the secondary prevention of stroke in these patients.

Thrombosis and Endothelial Injury

To the Editor:
The recent article by Rote et al1 is extremely important. In it the authors discuss possible reasons for discrepancies between ex vivo and in vivo results using models of thrombosis. They also discuss differences between human drug trials and the data from animal models, including the model they used. A keynote of these comparisons was the effect, or lack thereof, of treatments designed to inhibit platelets, with the focus on inhibition of platelet GP IIb/IIIa. Platelets were activated by endothelial denudation, with exposure to subendothelial collagen (or collagen-bound von Willebrand factor) as the activating step leading to their exposure of GP IIb/IIIa. In the accompanying editorial comment by Feuerstein,2 the importance of endothelial breakdown and exposure of platelets to collagen is again discussed.

I wish to point out that the traditional emphasis on denudation as the starting point for platelet adhesion/aggregation continues to detract attention from the fact that endothelial cell dysfunction can lead to platelet adhesion and subsequent aggregation and degradation without any breakdown of the endothelial cell barrier to the basal lamina. In fact, adhesion/aggregation may lead to rather than result from denudation.3 4 In models with denudation as the cause of adhesion/aggregation, results of treatment may not parallel results in certain other models or in human disease because in the latter cases endothelial denudation is not the sole or even the primary cause of adhesion/aggregation. Additional useful information may be gained by studying models of platelet aggregation that depend on endothelial dysfunction rather than denudation to initiate the thrombotic event.

References

Stroke Scale Comparisons

To the Editor:
de Haan and coworkers1 evaluated five stroke scales and correlated them with the Barthel Index, the Rankin scale, and the Sickness Impact Profile in 87 patients examined 6 months after stroke. One of the scales evaluated was the Scandinavian Stroke Scale (SSS).2 3 However, in their use of this scale certain infelicities have crept in. Contrary to what de Haan et al state, the prognostic score of the SSS does not include gait, but only consciousness, gaze, and arm and leg strength. The total obtainable score is 22. In their Table 1 the mean value of the prognostic score of the SSS is 50.94,4 indicating that they must have misunderstood the design of the scale. In addition, the prognostic score is meant to be used for stratification in the acute phase of stroke and not at follow-up. At 6 months consciousness is usually normal and there is no gaze palsy. Therefore, evaluation of consciousness and gaze palsy does not contribute any additional information at follow-up, as is indeed demonstrated in the article: the correlation coefficients for the comparisons of the Barthel Index score with the SSS prognostic score and long-term score are identical. The authors question the value of the prognostic score on the basis of use of the scale at a point in time not appropriate for prognosis.

The long-term part of the SSS includes gait, as well as several other items, and has a maximal score of 48 points. de Haan et al1 analyzed the long-term score with and without what they call "functional items," which they do not explicitly describe. From the context we infer that one of them must be gait, but it is unclear whether other items were also excluded. In our opinion a stroke scale should be used according to its original design. If certain items are left out, it is another scale and can no longer be called by its original name. Gait is included in the SSS because it is an integral part of the neurological examination and because it is of utmost importance to the patient.

Opinions may differ as to the relevance of stroke scales as such. The relevance of comparing stroke scales with the Barthel Index can also be questioned. The SSS is meant to measure neurological restitution or deterioration from the acute phase until the end of some observation period, and is not to be used solely at the end of that period. It was not intended to be a replacement for the Barthel Index, which is has to do with activities of daily living and which measures the ability of the patient to cope with neurological deficits. Rather, the two scales were intended to evaluate different aspects of brain damage. However, we thank our colleagues for demonstrating an excellent correlation between the Barthel Index and the SSS 6 months after stroke.

Gudrun Boysen, MD
Ewa Lindenstrøm, MD
Department of Neurology
Hvidovre Hospital
University of Copenhagen
Hvidovre, Denmark

Letters to the Editor 1885

William I. Rosenblum, MD
Department of Pathology
Section of Neuropathology
Medical College of Virginia
Richmond, Va

François Mounier-Vehler, MD
Service de Neurologie B
Hôpital B
Lille, France

Francois Monnier-Vehler, MD
Richmond, Va

Gudrun Boysen, MD
Ewa Lindenstrøm, MD
Department of Neurology
Hvidovre Hospital
University of Copenhagen
Hvidovre, Denmark

References
References


Response

We thank Drs Boysen and Lindenstrom for drawing attention to two inaccuracies in our article. In fact we found the mean prognostic score of the Scandinavian Stroke Scale to be 20.16, less than 22 points, but by mistake a wrong number was reported in the table. They also point out a misperception that this prognostic score system includes the item "gait." However, the correlations we found between the prognostic score (without "gait") and the long-term scores on the one hand and the functional health scores on the other were correctly calculated and correctly based on the scale items as described by the Scandinavian Stroke Study Group.

Our analysis was meant to demonstrate the decreasing correlations between stroke scales and hierarchically ordered functional health scales. The long-term impairment scale for use 6 months after stroke contains items that seem to have a higher face validity for the functional status at that time. Surprisingly, this seemingly higher relevance was not reflected in an increase in the correlation coefficients compared with the coefficients of the prognostic score.

Nevertheless, in our further analysis (as summarized in Table 2) we focused on the long-term impairment score.

As mentioned above, we used the SSS according to its original design. However, one of our objectives was to evaluate the impact of purely long-term neurological impairments on functional health. This could only be done by deleting the disability items from the stroke scales that included them. Nevertheless, we question the original design of the long-term score; the addition of impairment and disability is not only conceptually confusing, but it also hampers clear interpretation of the total scale scores.

In our article we did not discuss the diagnostic and prognostic value of stroke scales in the acute phase of stroke, but we do question the use of such scales as outcome measures in the chronic or subchronic phase. As Boysen and Lindenstrom note, gait is of utmost importance to the patient. In accordance with this view, we think that stroke outcome studies should focus on similarly relevant functional health aspects.

Rob J. de Haan, RN, MS
Martien Limburg, MD, PhD
Department of Neurology
Academic Medical Center
Amsterdam, The Netherlands

References
