complementary roles in the hemodynamic evaluation of the acute stroke patient, and it does appear that the two techniques have additive value in acute stroke prognosis.\(^1,4\)

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References

Blood Viscosity and Cerebral Blood Flow

Walzl and coworkers\(^1\) reported an improvement of neurological function following heparin-induced extracorporeal low-density lipoprotein precipitation (HELP) in a mixed group of acute stroke and multi-infarct dementia (MID) patients.

In the introduction the authors state that “a direct relation between plasma fibrinogen level and whole-blood and plasma viscosity and cerebral blood flow has been reported.” Whereas the direct relation between plasma fibrinogen and whole-blood or plasma viscosity is well known, the relation between plasma fibrinogen (and plasma or whole-blood viscosity) and cerebral blood flow (CBF) is far from being accepted by all investigators, and in no case would it be direct but rather inverse. Even if strongly expected on the basis of the Hagen-Poiseuille law, a strict relation between blood viscosity parameters other than hematocrit and CBF has never been reported. Grotta and coworkers\(^2\) found a very weak (\(P=0.05\)) inverse correlation between fibrinogen and CBF in fifty-three heterogeneous patients; Cavestri et al\(^3\) reported significant (\(P<0.02\)) inverse correlations between either fibrinogen or mean erythrocyte aggregation and CBF in normal subjects over 45 years but not in those under 45 years; and we\(^+\) were unable to find any relation between fibrinogen and CBF in three large groups—normal subjects, patients with vascular risk factors, and chronic stroke patients— independent of age. In a series of fundamental experiences,\(^5,6\) the group of Martin M. Brown and John Marshall clearly showed that changing blood viscosity had no significant effect on CBF, which was on the other hand strongly dependent on the oxygen-carrying capacity of arterial blood.

In their discussion, Walzl et al\(^1\) report finding increased CBF after HELP in 10 patients not taking part in the study (5 with acute stroke and 5 with MID). As shown by Burke et al,\(^7\) CBF, together with neurological status, often improves between the first and second week after stroke with no therapy other than the conventional one; therefore, lacking an appropriate control group, the CBF increase in a group of which half are acute stroke patients can hardly be considered a consequence of HELP. Moreover, the CBF parameter considered in this article (which is likely to be the gray-matter flow because values are expressed as milliliters per 100 grams per minute) may be misleading in low-flow conditions, such as those reported in the article (from a mean±SD value of 44.3±9.4, values as low as 30 or 35 mL/100 g per minute can be derived). In this respect, analysis of initial slope index (ISI)\(^8\) is more reliable, but ISI values are not reported in the article. Toward this purpose, one study\(^9\) failed to find changes of CBF (ISI) following LDL apheresis despite a significant drop in fibrinogen, LDL cholesterol concentrations, and whole-blood viscosity (low shear) in a small group of familial hypercholesterolemics.

Finally, if (as the authors suggest) HELP has caused a lipoprotein and fibrinogen reduction that leads to a CBF increase, the two phenomena should in some way be correlated; this, however, is not mentioned in the article. Although we found both reduced CBF and increased fibrinogen and plasma and whole-blood viscosity in cerebrovascular disease patients, we did not obtain significant correlations between each of the hemorheological variables and CBF.\(^10\) Indeed, CBF could become dependent on blood viscosity in individual patients whose cerebral regions have a strongly impaired CBF autoregulation, as demonstrated in animals,\(^11\) but this was not shown by the authors.

In conclusion, although we appreciate the effort to support the hemorheological approach to therapy of cerebrovascular disease, the discussion seems to be mainly based on the assumption that clinical improvement observed after HELP can be mediated by increased CBF, which is not clearly supported by the results and needs an ad hoc study design, since conflicting data are present in the literature.

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References
Does Ticlopidine Prevent Reversible Cerebrovascular Ischemic Events in Women?

Recently, there has been a greater awareness of gender differences in age-specific stroke mortality and morbidity, risk factor constellations, and treatment outcomes. For example, it is controversial whether aspirin is equally effective in preventing stroke in women and men. However, the primary analysis from the Ticlopidine Aspirin Stroke Study (TASS) found that ticlopidine reduces the risk of subsequent fatal and nonfatal stroke in women and men with initial reversible cerebrovascular ischemic event or minor stroke. The overall risk reduction for ticlopidine-treated patients was greater than that seen for aspirin-treated patients. This efficacious response in both genders was confirmed by the Canadian American Ticlopidine Study. Andre Bellavance recently reported a subgroup analysis from the TASS Group on the efficacy of ticlopidine compared with aspirin in preventing reversible cerebrovascular ischemic events. Ticlopidine was again superior to aspirin in reducing the risk of these events either occurring alone or in conjunction with stroke or death. The data presented did not provide information regarding the effects of gender in this subgroup analysis, however. Were there sufficient numbers of events to assess whether women treated with ticlopidine had a decreased risk of reversible ischemic cerebrovascular events compared with women treated with aspirin? This sort of information from large clinical stroke trials is needed to further our understanding of the biologically based differences between genders that could affect our management of patients with cerebral ischemic events.

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References

Improving Stroke Rehabilitation: A Controlled Study

The randomized clinical trial by Karla and colleagues found a significantly better outcome for stroke patients treated in a stroke unit compared with those in general medical wards. Although baseline characteristics of the patients and total physiotherapy time were similar in the two groups, the authors did not give any information about the physiotherapy staff in the two arms of the trial.

It is likely that physiotherapists in the unit dedicated to stroke care were more interested and specialized in stroke rehabilitation than their colleagues in general medical wards. The study was carried out in a district general hospital in Britain. Stroke rehabilitation in the general medical wards of such hospitals makes up only a part of physiotherapists' total workload, with the bulk comprising other activities, such as chest physiotherapy. Furthermore, the seniority of the physiotherapy staff in the two treatment areas was not addressed. Consequently, an equal number of “30-minute therapy units” of stroke rehabilitation delivered by therapists of different experience and seniority cannot be considered as equivalent.
Blood viscosity and cerebral blood flow.
F Nobili and G Rodriguez

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