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Stanton B. Elias

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Science or Technology: A Challenge for Clinical Neurosciences

The clinical neurosciences have experienced dramatic growth during the past ten years. The application of advanced technology to diagnostic procedures and treatment modalities has distinctly altered the practice of physicians concerned with diseases of the nervous system. The dilemma confronting the practitioner is how to reconcile increasing possibilities for intervention in circumstances where the benefit to patients is uncertain. This is particularly difficult in an era where technology has created its own market among the lay public who unrealistically believe that medicine is now capable of preserving and restoring function in all circumstances.

The articles in the *Journal* demonstrate several aspects of this issue. Redmond and Ahmad report a case of pontine hemorrhage in which the patient had excellent recovery despite early signs that indicated likely fatality. The accompanying editorial by Gade provides eloquent expression to the moral and ethical dilemmas encountered when technology can preserve life despite serious loss of function. In contrast, two articles concerned with interventional radiology indicate the potential for continued growth of the role that technology may play in preserving function.

Three other articles demonstrate that careful observation and attention to clinical detail remain the mainstay of clinical practice. Teasdall reviews the utility of accurately elicited and appropriately analyzed clinical signs in the evaluation of patients with neurological deficits. Glasberg et al describe the unexpected finding of pathological changes in muscles from patients undergoing total knee replacement, adding another dimension to the evaluation of patients with advanced osteoarthritis. Twyman and Bivins present a review of the topic of the nutritional requirements of patients with severe head injury, including a series of clinical investigations carried out over five years. Their data challenge accepted clinical practice and lay the groundwork for modifications in patient care protocols that could potentially reduce morbidity and mortality resulting from severe head injury.

The discussion of the extracranial-intracranial bypass study by Diaz and Ausman addresses a stunning example of the situa-

tion where science and technology diverge. New surgical procedures utilizing advanced technology uniformly arrive on the medical scene to great fanfare. Physicians, generalists and specialists alike, get caught up in the excitement of discovery and the feeling of relief that a new treatment may reduce morbidity and mortality in our patients. It is disappointing when a promising procedure does not live up to its early promise. It is greatly disturbing when such procedures enter the mainstream of clinical practice before adequate testing of their utility has been carried out.

Within the latter context, the discussion by Diaz and Ausman holds much promise. Since the EC-IC bypass study has failed to validate the value of this procedure in a carefully controlled study, Diaz and Ausman conclude that cerebral revascularization procedures are not indicated in daily clinical practice. They also call for a randomized controlled study to attempt to find a smaller subpopulation that might benefit from a bypass procedure. However, only 10% of patients with ischemic cerebrovascular disease are potential candidates for any surgical procedure, and of this group only 15% of cases might be identified by physiological measures as potential candidates for intracranial bypass. A controlled study to identify surgical candidates from 1% of the stroke population may not be cost-effective, and it could prove to be difficult to identify sufficient numbers of patients to achieve statistical significance. Recognition of the need for carefully controlled studies might appropriately be extended to all intracranial bypass procedures. The EC-IC bypass study tells us that new surgical procedures, in general, must undergo the same review as new medications.

Scientific investigation does not impede the entry of valuable treatment modalities into the mainstream of medical practice, but science does preserve the credibility of medical practice.

Stanton B. Elias, MD
Senior Staff Physician, Department of Neurology
Guest Editor