Stroke Units or Stroke Centres?

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FEW MAJOR ILLNESSES are treated more inconsistently than stroke, ranging from fatalistic resignation to recovery or demise at home to intensive care in specialized units. The finding of Strand and colleagues of benefits of specialised care of stroke patients,1 raises anew the question of the value of stroke units.

In the 1970s, in the wake of successes achieved by coronary care units, papers appeared which described the advantages of acute or intensive care stroke units.2-4 Unlike CCUs, specialised acute units for stroke care never became widely established. Mortality rates in stroke victims and the residual neurological deficits of survivors appeared largely unaffected by these units. The reduction in systemic complications of prolonged immobility, such as pulmonary embolism and pneumonia, reflected efficient rehabilitation, not acute medical treatment. Moreover, long-term bed-occupation and placement problems became concentrated in one unit, overburdening nursing and rehabilitation services.

Problems in Evaluating Stroke Units

Published reports of 'stroke units' vary from descriptions of intensive care neurological facilities to 'cardio-cerebrovascular' units to acute rehabilitation care, which are not comparable. For example, rehabilitation units select patients likely to do well in their

References

27. Wolf PA, Kelly-Hayes M: Personal communication, 1983
rehabilitation programmes, and the resulting data reflect neither the initial high mortality (about 25% in the first month) nor those patients who will never regain useful function. Since rehabilitation units draw patients from a variety of specialties, the accuracy of diagnosis and type of treatment differ widely. Virtually all acute stroke unit studies preceded the advent of CT scanning, and inadequate methodology and optimistic anecdotal reports only compound the problem. The lack of a standardised approach to both the diagnosis and evaluation of stroke patients has made comparisons even of similar units impossible.

The proliferation of 'stroke scoring scales' reflects the lack of consensus concerning quantification of neurological deficits. Different units quantify stroke deficits differently, so that multicentre comparisons of therapeutic strategies, and even natural history studies of stroke patients, are difficult.

The first published evaluation of the effectiveness of acute stroke units remains the best. It compared outcome of patients admitted to a newly-established acute neurovascular unit with those treated in two community hospital wards. Although the patients were not randomly allocated, there is a convincing degree of comparability between the three groups. The authors were first to point out the lack of impact of specialised care on mortality and morbidity but did note a beneficial effect on systemic complications, and emphasised the superiority of around-the-clock nursing care over even the most sophisticated electronic monitoring. However, only random allocation of patients to either standard treatment or to a stroke unit can guarantee comparable subjects for study, which has not yet been undertaken.

**Impact of Stroke Units on Diagnosis, Mortality and Morbidity**

The diagnosis of stroke is notoriously poor, about 40% accurate when death certificates are compared to autopsy results. Many illnesses masquerade as 'stroke', most notably post-ictal states, especially when the seizure is due to a previous acute cerebrovascular lesion. The expertise of the examining physician is critical to the accuracy of the diagnosis, which varies between 36–94%. Differential diagnosis depends almost entirely on clinical acumen, CT being of little help in the majority of cases. Since stroke units are usually supervised by physicians specialising in stroke, diagnosis is probably enhanced by admission to such a facility. Diagnostic accuracy is also the most compelling reason to admit all stroke patients to hospital in the first instance.

Death in the first two weeks in both ischemic and hemorrhagic stroke is from transtentorial hemiation (coning), but after this time is usually systemic, and mainly cardiac. No known drugs prevent coning, except hyperosmolar agents which gain temporary respite in the few cases that profit from surgical decompression. It is unlikely therefore that acute or intensive care management could significantly affect stroke mortality.

No treatment has been demonstrated to affect the degree of neurological deficit ('primary morbidity'). Anticoagulants, vasodilators, antiedema agents, oxygen therapy and hemorheological agents are of theoretical but unproven benefit.

Systemic complications ('secondary morbidity'), mainly cardiac failure, pneumonia, and pulmonary embolism, are probably decreased by the early rehabilitation therapy available in acute care units. Acute rehabilitation units can supply this need more efficiently and at a lesser cost than intensive care facilities.

**Stroke Unit or Stroke Centre?**

All stroke patients deserve hospital evaluation for diagnosis, although not necessarily for treatment. Care of patients with completed stroke is enhanced by concentrating medical and nursing facilities in one area, but this need not be intensive or even acute care. A multi-disciplinary approach is essential, but this can be provided by neurologists or internists with a special interest in stroke, preferably with specialised facilities available, such as CT scanning. Immediate and expert rehabilitation is essential.

It is unlikely that the cost and logistic problems of intensive care of stroke patients is justified in most cases of completed stroke if it results in decreased mortality and increased vegetative survival.

Acute investigational stroke units should be reserved for patients with TIAs or minor stroke, and for initial evaluation of patients with major stroke. Sometimes risky, expensive or scarce investigations such as nuclear magnetic resonance or angiography can be provided at high priority. Non-invasive studies such as carotid Doppler and echocardiography can provide safe, rapid diagnoses in the subgroup of patients in whom prevention of a future devastating stroke may be possible.

The key elements to comprehensive and appropriate stroke care are an interested and knowledgeable health team, a designated area and standardised procedures for diagnosis, investigation and management. The personnel could vary from an interested physician and nurses in a small hospital to neurologists with a research interest in stroke at a university centre. The important component is devoted interest, to which knowledge and experience accrue. The presence of a dedicated area to stroke is more important than its type. Four beds in a hospital or even an outpatient evaluation unit would serve the main purpose of facilitating proper diagnosis, triage and follow-up. Standardised procedures and protocols would assure a rational approach and an objective basis for evaluating care. Such a facility would also serve as the focal point for preventive and rehabilitation programmes. Today's rising demands and declining resources make the rationalisation of stroke management not only desirable, but imperative.

**References**

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