

Stroke outcome in the absence of a structured rehabilitation programme

S. R. DEWAR

Summary

The outcome of acute stroke in 210 hospitalised patients was investigated by retrospective case-note review and household follow-up. The first month was the critical period for survival, with the highest number of fatalities being recorded in the first week (38%). Survival to 1 year was much lower than expected. Functional status of survivors ($N = 35$) was assessed by means of a structured interview, which included an objective functional assessment scale, carried out in the patient's own home. The factors influencing low assessment scores were identified. Recommendations centre on the development of a standard policy for co-ordinated stroke management and the methods by which this might be achieved.

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Cerebrovascular disease is a major contributor to morbidity and mortality in South Africa and stroke is an important component of this disease group. In spite of its importance, little has been published in South Africa about either the occurrence or the outcome of stroke. Stroke is important not only in relation to death or survival but also in relation to the quality of life of survivors.

This article focuses on the rehabilitation component of stroke management, an increasingly important aspect, since internationally mortality from stroke is showing a decline.^{1,2} South African mortality rates for stroke have fallen, although they remain higher than those of other Western countries.³ As ours is an ageing population, it is estimated that the incidence of non-fatal stroke in people over 75 years of age is likely to increase from the present 1 - 2/1 000 to 20/1 000.⁴

Reducing mortality from disease carries with it the responsibility of facilitating optimal quality of life for survivors. Much debate in medical publications has been stimulated by controversy about approaches to stroke rehabilitation, i.e. where it should occur, how to select patients who benefit most, and the type of programme which should be implemented. Although intensive stroke units are controversial, there is plenty of support for co-ordinated comprehensive programmes for stroke management.⁵⁻⁸ Published reports are controversial because stroke-outcome studies are difficult to compare. This is because of differences in methodology and wide variation in the instrument used to assess disability.

This non-concurrent prospective study of stroke outcome was undertaken in order to: (i) establish the survival rates of white patients with acute stroke who were admitted to a Durban provincial hospital; and (ii) determine, in a sample of survivors of first stroke, the degree of residual disability.

For the purposes of the study, stroke was defined, according to the World Health Organisation's recommendation, as 'a vascular lesion of acute onset resulting in disability lasting

more than 24 hours or leading to death'. Stroke diagnosis was made on the basis of clinical findings and patient history. Resident computed tomography (CT) facilities were not available at the time, so that a diagnosis confirmed by CT was not a requirement of the study. All patients within the International Classification of Diseases (ICD) codes 430 - 434 and 436 were included.

Patients and methods

The study comprised a hospital-based and a household-based component and concerned a population of white patients admitted to a Durban-based provincial hospital with a diagnosis of acute stroke during the period 1 January 1983 - 31 December 1984.

A total of 286 stroke admissions were identified through the hospital's medical records retrieval system. Careful case-note review resulted in the exclusion of 76 patients (26,5%) in whom a diagnosis of acute stroke could not be confirmed. A study population of 210 cases remained comprising 16 patients with acute but not initial stroke (7,6%), 113 who died in hospital (53,8%), and 81 who were followed up (38,6%).

The household component comprised patients selected according to the following criteria: (i) the stroke constituted an initial episode; (ii) the patient was discharged to a place of residence within the magisterial district of Durban; and (iii) the patient was alive at the time of follow-up.

Of the 210 subjects, only 35 patients (16,6%) fulfilled the criteria for household follow-up. (Of the 97 patients who were discharged from hospital, 16 were victims of recurrent strokes, 24 died after discharge, 16 were living beyond the geographical limits of the study, and 6 could not be traced.) Due to the small number of remaining cases, random sampling was not possible and all patients were included in the follow-up group.

Patient assessment

Patients were assessed in their own homes by objective functional assessment that took account of: (i) ability to perform daily activities (ADLs), e.g. dressing, feeding, bathing, etc.; and (ii) mental skills (MS).

ADL function was scored on three levels: independent, partially dependent and dependent; the highest score of 3 points being given to independence. Eight activities were scored, giving a total of 24. These included feeding, using the toilet, mobility on the level, using steps, dressing, bathing, getting into/out of bed, and shopping. Mental skills were scored similarly according to degree of difficulty experienced in the areas of self-motivation, verbal communication and short-term memory, giving a total score of 9. The score was a subjective rating with the patient being asked how they perceived their function: no difficulty scored 3, difficulty at times scored 2, and difficulty most of the time scored 1. Where the patient could not communicate, a carer was asked. This assessment only establishes problem areas in the broadest sense and particularly in regard to verbal communication.

Household interview was carried out a minimum of 19 months after stroke so that it was considered reasonable to

Department of Nursing, University of Natal, Durban
S. R. DEWAR, B.SOC.SC. (NURS.), R.N.R.M.R.CHN., M.SC. (MED.SCI.)

assume that most recovery had already occurred and that differences in time from stroke onset to assessment would not significantly affect the findings.

Results

Mortality and survival rates

The hospital-based component ($N = 210$) comprised 106 men and 104 women with a mean age of 66 years (range 28 - 97 years). The mean age of women (70 years) was significantly higher than that of men (62,9 years) ($P = 0,002$). Establishing early survival was achieved by retrospective case-note review and revealed a mortality rate of 38% in the first week and 51,4% within the first month. The cumulative mortality rate at the end of 1 year was 58,6% (Table I). The median survival time from stroke onset to death was calculated to be 32 days. The greatest number of hospital deaths (80) occurred within the first week (71%).

TABLE I. MORTALITY AFTER ACUTE STROKE

Time from onset	Deaths	Adjusted mortality (% per wk)	Cumulative mortality (%)
0	80	38,0	38,0
8 d	28	7,1	51,4
31 d	11	0,4	56,6
7 mo.	3	0,1	58,0
13 mo.	9	0,2	62,3
2 - 2½ yrs	6	0,3	65,2

With regard to stroke type, 70% of strokes (148 patients) were classified acute and ill-defined (ICD 436) and 74 of these patients died (50%). There were an equal number of haemorrhagic and occlusive strokes (31 patients, 15%, each) diagnosed during the period. Patients in the haemorrhagic category suffered a higher mortality (27 patients, 87%), and constituted the youngest group of patients (mean 63,7 years), than the occlusive group (12 patients, 39%).

Functional status at household follow-up

Of the 35 patients comprising the household-based component, 15 were men (43%) and 20 were women (57%) (mean age 73,5 years). Although 8 subjects (23%) were under 65 years, only 2 were employed outside the home after their stroke. The median length of hospital stay was 19 days. Age and length of hospital stay were not associated. The median survival time from stroke onset to assessment was 31 months. Levels of independence with regard to the ADLs are shown in Table II. In spite of a mean age of 73,5 years, 13 patients (37%) were fully independent in the ADLs. Bathing and climbing steps were the activities with which most assistance was required (Table II).

In keeping with other studies^{9,10} age, sex and side of weakness bore no significant relationship to functional outcome scores. However, low MS scores, the presence of depression in 20 patients (57%) and urinary incontinence in 7 (20%) were significantly related to low functional status scores (Table III).

The high degree of social isolation experienced was revealed by the fact that 12 stroke patients (34%) never left their homes and 11 (31%) were unable to use the telephone due to physical inability or limited access. Almost two-thirds of these patients were living in the community as opposed to institutions.

TABLE II. LEVEL OF INDEPENDENCE IN DAILY LIVING ACCORDING TO ACTIVITY

Daily activity	Level of independence					
	Independent		Partial		Dependent	
	No.	%	No.	%	No.	%
Shopping	17	48,5	1	3,0	17	48,5
Climbing steps	17	48,5	3	8,5	15	43,0
Bathing	19	54,0	4	12,0	12	34,0
Dressing	25	71,0	2	6,0	8	23,0
Mobility on level	26	74,0	2	6,0	7	20,0
Toilet	27	77,0	2	6,0	6	17,0
Getting in and out of bed	28	80,0	1	3,0	6	17,0
Feeding	31	88,5	1	3,0	3	8,5

TABLE III. MEAN FUNCTIONAL ASSESSMENT SCORES ACCORDING TO SIDE OF WEAKNESS

Weakness	ADL score (24*)		MS score (9*)		Total (33*)	
	No.	%	No.	%	No.	%
Left	18	75	6	78	25	81
Right	20	83	7	78	27	87
Neither	15	63	5	56	20	65

*Maximum achievable score.

ADL scores compared with side of weakness — $P = 0,2921$ (N/S); with MS scores — $P = 0,02$ (S); with sex — $P = 0,4131$ (N/S); with age — $P = 0,058$ (N/S). ADL = ability to perform daily activities; MS = mental skills.

Discussion

At the study hospital, stroke patients are managed in general medical wards and no specific programme of ongoing assessment or planned rehabilitation is available. In spite of high mortality rates in the early weeks after stroke, the impression gained in respect of functional recovery in long-term survivors was surprisingly good. As objective functional assessment is not practised at the study hospital, the degree of recovery over time could not be established and the study merely served to describe existing levels of disability at a specific time.

Mortality rates and longer-term survival

Critical periods for stroke survival were the first week and the first month, mortality rates for these periods being 38% and 56,6%, respectively. The Framingham study¹¹ records 30-day mortality at 22%. In agreement with other studies,^{12,13} decreased levels of consciousness proved to be a poor prognostic sign. According to Hutchinson,¹⁴ death in the first week is usually associated with the severity of stroke, and death in the next 3 weeks is commonly related to systemic complications. The results of this study may be a reflection of the predominantly older age group seen at our hospital; however, they are suggestive of the need for further investigation.

Accurate analysis of mortality and type of stroke was not possible. Stroke diagnosis at the study hospital was made on the basis of clinical findings with a very small proportion being confirmed by CT at an outside facility. At the time, resident CT facilities were not available and it was not policy to confirm stroke diagnosis by CT. This may have contributed to the high proportion of strokes being categorised 'acute and ill-defined' (ICD 436). Kannel and Wolf¹⁵ give an expected

figure of 11% to this category so that a finding of 70% would seem to indicate the need for improved diagnostic techniques. Hospital size, pressure of work and the older age of stroke patients have been said to influence the willingness of doctors to make an accurate diagnosis.¹ Improved diagnostic accuracy has been cited as an advantage of stroke units, with the additional benefit of better prevention of complications.¹⁶

The mean age of 62,9 years for stroke in men in this series was surprisingly low, given the common assumption that stroke is predominantly a disease of the elderly.

Survival to 1 year was calculated at 37%. This is much lower than the expected 1-year survival rate of 51-53% quoted by others.^{17,18} While the occurrence of stroke was equal in both sexes, the longer period of survival observed in women is consistent with that of other studies.¹⁷

Functional independence in the longer term

It is estimated that between 30% and 50% of surviving stroke patients of all ages will make a functionally complete recovery.¹ In spite of the high average age of the household component (73,5%) in this study, 37% were fully independent in the ADLs. It is interesting that a distinct pattern emerged in relation to the loss of functional skills. Skills appeared to diminish in reverse order to that in which they are acquired during the course of normal development (Table II). This would support the principle of retraining functional skills following the pattern of normal motor development in infancy. The skills that created the greatest challenge to independent living were climbing steps and bathing. In most cases this appeared to be due to physical weakness, poor balance, loss of power and a fear of falling. This observation highlights the importance of multidisciplinary involvement in stroke management and the need for supportive community-based health care services that will enable people to remain in their own homes in preference to institutionalisation. The advantage of objective functional assessment is that it highlights patient needs in relation to the provision of community health services far better than a decision based on diagnosis alone.¹⁹

While the management of stroke is a controversial issue,^{6,20-23} there is sufficient support for the opinion that stroke sufferers are never too old or too impaired to be successfully rehabilitated.²⁴ The major advantages of specialised stroke units lie in their potential for improving outcome^{7,25} both neurologically and in terms of achieving discharge home as opposed to institutionalisation.¹⁸ Essentially, a specialist team including skilled rehabilitation nurses is available to the patient and family. Diagnostic accuracy is greater¹⁶ and lengthy, unplanned hospital stays are avoided. Selective criteria based on controlled studies are required to differentiate between those who will benefit, those who will recover spontaneously and those whose prognosis for recovery is poor.

Conclusion

This study illustrates the mortality trend and potential for functional recovery in a population of hospitalised white

patients. The results have provided useful insights into the challenges of acute and long-term management. The need for properly designed controlled studies that adhere to epidemiological principles is indicated. These will provide useful information about patient care and the organisation and delivery of cost-effective rehabilitation services for stroke.

In spite of its social and economic impact, stroke does not have the emotive appeal of cancer and coronary heart disease and has not attracted the attention it deserves as a major cause of disability in communities.

In the final analysis, the only hope may lie in primary preventive measures. However, it is inappropriate to exclude advancement in the therapeutic and rehabilitative approaches of non-fatal stroke given the sudden and profound readjustments required of the sufferer and the family.

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