Standards for the hospital management of stroke patients

ABSTRACT—To examine the extent to which current guidelines for the hospital management of stroke are being met, a series of 15 specific standards covering initial assessment and management, rehabilitation, discharge and secondary prevention was developed from the guidelines suggested by the King’s Fund and the Royal College of Physicians. This article describes these standards, their interobserver reliability and their use in practice. The interobserver agreement on the application of most standards was good (80% or more). A survey of 100 consecutive patients with stroke showed that certain standards were well met (adequate social history, routine investigation, prevention of pressure sores and monitoring of blood pressure), whereas others were poorly met (diagnosis, rapid referral to therapists, functional reassessment, liaison with general practitioners, documentation of multidisciplinary rehabilitation programmes, and communication with patients and relatives). Several standards, especially those central to the rehabilitation process, were met significantly more frequently in patients managed by geriatricians than in those managed by general physicians. This may be attributable to geographical concentration of patients and to rehabilitation led by consultants trained in stroke management. It is suggested that these standards are verifiable measures which can be used more widely to audit the process of care.

Stroke is one of the commonest causes of adult physical disability and death, and is responsible for more than 100,000 admissions to hospital in England and Wales each year [1]. It consumes approximately 4% of the entire health service budget in England and Wales, excluding the cost of community services [2]. However, widespread concern about the poor quality of hospital management of stroke was emphasised by reports from the King’s Fund consensus conference [3] and the Royal College of Physicians (RCP) working party [4]. Both these publications, and an earlier one from the Bristol Stroke Unit [5], while offering general guidelines on good practices of hospital management for stroke, do not provide specific and detailed standards against which they can be assessed.

To make a systematic assessment of the process of the management of stroke in hospital, a series of 15 specific standards was developed from these published guidelines. This article describes these standards, their use both in practice and in a survey of the records of 100 consecutive patients with stroke, as well as their interobserver reliability.

Methodology

Based on the published reports [3–5] 15 key standards of management were identified. They cover all major aspects of hospital management, including diagnosis, initial assessment, routine and special investigations, acute management, rehabilitation, communication with patient and relatives, discharge arrangements, and measures to prevent recurrence. They are put forward as providing a minimum acceptable level of hospital management of stroke, and emphasise the importance of documentation of relevant findings and actions. The standards are summarised in Table 1 and fully described in the appendix.

Retrospective case-note review

The aim of the review was to determine how well the management standards were met by examining the records of 100 consecutive patients admitted as the result of acute stroke. The cases were identified by reviewing the notes of all consecutive admissions from 1 June 1989 with a discharge diagnosis of cerebrovascular disease other than subarachnoid haemorrhage (ICD-9 431–438). All patients whose presentation at admission corresponded to the accepted definition of stroke as ‘a sudden neurological deficit of presumed vascular origin lasting for more than 24 hours’ [6] were included. Seventeen case-notes could not be located and a total of 141 case-notes were examined. In 19 cases a stroke had occurred but was not the primary cause of admission, and in 17 the diagnosis of stroke appeared to be incorrect. Three patients who died in the accident and emergency department, and two who took their own discharge were also excluded.

The remaining 100 case-notes (including the nursing Kardex records, observation and prescription charts) were examined using a standard proforma by two observers, one a public health physician, the other a geriatrician with no responsibility for the care of...
these patients. A pilot study of 10 case-notes was carried out to standardise the method of data collection. (A copy of the guidelines developed to assess case-notes is available from the authors.) A blinded duplicate examination of 21 sets of case-notes was used to assess the level of interobserver agreement on the standards studied.

Statistical analysis

The assessment of the interobserver reliability of the application of the standards was based on the proportion of subjects in whom complete agreement was observed and on the kappa statistic [6]. Comparisons of the proportions of patients in whom standards were met between specialties were based on chi-squared and Fisher’s exact tests.

Results

Patient characteristics

Fifty-six of the 100 patients whose records were studied were men. The median age of the whole group was 76 years, and the ages ranged from 40 to 102 years; 78 were over 65 years old and 52 over 75; 22 had had a previous stroke and 21 pre-existing disability. Forty-three patients lived alone and only 10 had no main carer. The median length of hospital stay was 25 days (interquartile range 10–67 days), and the mean was 51 days. The 30-day case fatality rate was 27%.

Eighty-nine of the 100 patients were admitted under the care of general physicians to any one of 17 different wards, and 30 of them were subsequently transferred to one of three geriatric wards. Nine patients were directly admitted under the geriatricians, and two were admitted under neurologists to a single ward.

Sixty-six patients survived and were discharged from hospital, 43, 21 and two from the care of general physicians, geriatricians and neurologists respectively. Forty-nine of the survivors went home.

Interobserver reliability of application of the standards

In the 21 case-notes examined, interobserver agreement was at least 17 out of 21 (more than 80%) for all but three of the items included in the standards. The exceptions were:

- Assessment of the level of consciousness (agreement in 16 out of 21);
- Information given to relatives in the rehabilitation phase (agreement in 13 out of 21); and
- Assessment of underlying risk factors or disease (agreement in 13 out of 21).

The kappa values were > 0.60 for all but six items, indicating good reliability [6]. Reliability was moderate for initial assessment of visual fields (kappa = 0.52), gag reflex, involvement of carers in discharge planning and provision of a discharge summary (kappa = 0.47 in each case). Reliability was fair (kappa = 0.26) for assessment of risk factors and underlying disease, and poor only for information given to relatives in the rehabilitation phase (kappa = 0.14).

Achievement of management standards

Results for the achievement of the first seven standards, which concern the acute phase of hospital care, are based on all 100 admissions. Aspects of prevention, rehabilitation and discharge covered by the remaining eight standards are based on the 66 patients who survived until discharged from hospital.

1 Diagnosis: the side of the lesion was documented in 46 patients, the locus in 42, the presumed or confirmed pathology in 31, and risk factors in 27.

2 Initial neurological assessment: the levels of consciousness and motor function were recorded in 80–90% of patients and visual fields in less than half. The presence or absence of adverse prognostic features, such as visual neglect and proprioceptive loss, were rarely recorded (Table 2).

3 Social history: most of the required information was documented in more than 80% of case-notes.

4 Routine investigations: results were documented in more than 90% of cases. Tests for syphilis (12 patients) and hyperlipidaemia (six patients) were rarely recorded.

5 Special investigations: computerised tomography (CT) was performed in 50 patients. The reason for doing a CT scan was rarely documented, but it was inappropriate in 16 cases. Echocardiography (12 patients) and angiography (three patients) were appropriately performed.
6 Complications: measures to prevent pressure sores were documented in 82% of the Kardexes. Of 33 patients with documented dysphagia, seven (21%) were managed with clear fluids, 12 (36%) with nasogastric tubes, and the rest with intravenous drips. Speech therapy was requested for 14 (42%) patients with dysphagia. Mood state was commented on in 24 patients, and one patient received treatment for depression.

7 Referral to therapists: sixty-three and 71 of the 100 patients were referred to occupational therapy and physiotherapy respectively, and 22 out of 46 patients (46%) with dysphagia or dysarthria were referred to speech therapy. The time of referral was documented in less than half the notes: about one-third of the referrals were made at 24 hours, 60% at least four days after the stroke and 25% a week or more afterwards.

8 Prevention of recurrence: aspirin was prescribed in 33 survivors (50%), although the decision to use it was rarely documented. Blood pressure at 4–6 weeks was recorded by nurses in nearly all cases. In the 14 patients with a diastolic blood pressure above 100 mm Hg, the pressure was not checked and recorded by a doctor; and seven (50%) of them received no treatment. Smoking and drinking histories were recorded in 53% and 43% respectively, of patients over 75 years of age, and in 81% and 89% respectively, of younger patients.

9 Multidisciplinary rehabilitation: meetings were documented in a quarter, overall aims in about half, and interim goals in two-thirds of patients discharged (Table 3). Documentation was significantly more frequent in patients in the care of geriatricians, as was evidence of continuation of rehabilitation.

10 Regular functional assessment: was not recorded in detail in the first week. Walking ability (12 patients) was the most frequently assessed activity. Weekly reassessment of activities of daily living was never reported. At discharge, walking ability was documented in 38 patients (58%), transfers in 36 (55%), feeding in 27 (41%), washing, dressing and continence in 25 (38%).

11 Regular neurological assessment: after the first week any neurological deficit was recorded at most at two-monthly intervals, motor function (15 patients, 23%) being the most frequently recorded deficit.

12 Information to patients/relatives: this was documented for very few patients and for about a quarter (acute phase) and a half (rehabilitation phase) of relatives (Table 4).

13 Involvement of carers in planning: the patient’s discharge was documented in 17 (31%) case-notes.

14 Liaison with general practitioners: phone communication was documented for three (5%) patients. An initial house physician’s letter was recorded in 38 (57%) and a discharge summary in 55 (83%). Although some information was given regarding activities of daily living and services (Table 3), it was frequently sketchy.

15 Follow-up: multidisciplinary follow-up was documented for six (9%) patients and consisted of day hospital review.

Table 2. Documentation of initial neurological assessment

| Neurological function       | Documented % (n = 100) | Abnormal % (n = 100) |
|----------------------------|------------------------|----------------------|
| Consciousness level         | 82                     | 48                   |
| Gaze paresis                | 67                     | 19                   |
| Visual fields               | 46                     | 12                   |
| Motor function              | 91                     | 91                   |
| Speech                      | 64                     | 46                   |
| Neglect                     | 12                     | 10                   |
| Joint position              | 14                     | 3                    |
| Gag/swallowing              | 76                     | 33                   |

Discussion

In this article 15 standards are put forward which, if achieved, might provide a minimum level of acceptable management of stroke patients admitted to hospital. They are largely based on the recommendations of previous reports [3–5]. Instead of the general statements contained in the RCP report [4] and, to a lesser extent, in the King’s Fund consensus statement [3] and Bristol Stroke Unit guidelines [5], these standards take the form of specific detailed activities. Like the ‘local standards’ piloted by the West Lambeth Health Authority [7], these standards are verifiable and can be audited, although they differ from the latter which concentrate on the accessibility of resources to stroke patients.

The standards chosen are entirely concerned with management process rather than outcome. Their validity can be questioned because they depend on good documentation which is not necessarily synonymous with good patient management. However, the use of measures of process in a hospital study is valuable, first, because there has been considerable concern about the quality of management processes [3–5] and, secondly, because there is considerable evidence that some management processes in stroke, particularly those directed to secondary prevention (such as prescription of aspirin and control of blood pressure), can influence outcome [10–12], as might early referral to occupational therapy [13] or multidisciplinary management on specialised units [14]. It must be acknowledged, however, that there is as yet no evidence that other management processes (e.g., regular mood and functional assessment, or documentation of communi-
Table 3. Comparison of achievement of some standards between general and geriatric medicine

| Standard                                      | General medicine (%) | p value    | Geriatric medicine (%) |
|-----------------------------------------------|----------------------|------------|-------------------------|
| Multidisciplinary meetings                   | 0/43 (0)             | < 0.0001   | 17/21 (81)              |
| Overall aims of rehabilitation               | 14/43 (33)           | < 0.001    | 17/21 (81)              |
| Interim goals                                 | 21/43 (50)           | < 0.001    | 20/21 (95)              |
| Continuation of rehabilitation:              |                      |            |                         |
| In evenings                                   | 22/43 (52)           | < 0.0025   | 20/21 (95)              |
| At weekends                                   | 18/43 (43)           | < 0.001    | 19/21 (90)              |
| Communication with relatives in rehabilitation phase | 7/43 (17)           | < 0.0001   | 16/21 (76)              |
| Discharge ADL in case-note summary           | 16/33 (48)           | < 0.001    | 20/20 (100)             |
| Social services in case-note summary         | 2/31 (6)             | < 0.01     | 8/20 (40)               |

ADL = activities of daily living

Table 4. Documented communication of information

| First week                          | Rehabilitation |
|-------------------------------------|----------------|
|                                     | To patients (%) | To relatives (%) | To patients (%) | To relatives (%) |
|                                     | (n = 100)         | (n = 84)          | (n = 65)         | (n = 55)         |
| Diagnosis                           | 4               | 25              | 14              | 51              |
| Prognosis                           | 2               | 24              | 14              | 53              |
| Management                          | 5               | 23              | 15              | 35              |

Stroke management is complex, and others may wish to emphasise different standards (eg prevention of deep vein thrombosis [8], speed of hospital admission [7] or assessment of cognitive function [9]), or dispute the precise content of those suggested (eg the need for all patients with dysphasia to be referred to speech therapy, or for disability to be assessed weekly). However, these 15 standards are put forward for debate as standards that can and should be met independently of the clinical severity of stroke.

Although the practice of good medicine may not necessarily relate to good record keeping, many physicians recognise the importance of accurate record keeping and particularly the documentation of relevant negative findings and actions [15]. A comparison of the documentation of the prevalence of neurological deficits in the present study with that of earlier studies provides some support for this view. In particular, the prevalence of those deficits recorded as present or absent in less than half the cases (visual field defects, neglect, and joint position sense) is much less than the prevalence estimates in other studies of hospital populations where these deficits were specifically sought [16-20]. In contrast, when the prevalences of neurological deficits were recorded in a high proportion of cases (such as levels of consciousness, hemiparesis and speech) they were similar to those described in other studies [16,17,21]. It is possible that in some patients certain deficits could not be assessed because of, for example, impaired level of consciousness. However, studies of stroke populations with 30-day case fatality rates similar to the current study or with similar proportions of patients with impaired consciousness [16-19,22], have reported much higher levels of deficits such as neglect and hemianopia when these were specifically sought. Moreover, in the 66 patients who survived, the proportion of patients assessed for initial neurological deficits was almost identical to that of the whole group, despite including fewer patients with impaired consciousness. None the
less, the standard relating to initial neurological assessment should probably be amended to note specifically the occasions when drowsiness or dysphasia makes assessment impossible so that allowance can be made for differences in case mix.

The Bristol Stroke Unit’s guidelines emphasise good record keeping [5] and for certain standards, the act of documentation is in itself important. Documenting the information given to relatives and patients might prevent passing on conflicting information, and documenting team meetings, overall aims and interim goals provides a focus and direction for the team and makes for better communication. A discharge summary in the case-notes is obviously important. Some might argue that pressure of work prevents adequate documentation. However, a recent study has shown, for example, that on busy acute wards for elderly people it is possible to assess and document disability every week and at discharge from hospital [23].

The standards are sufficiently reliable for practical use. They identified the same problems in management as those identified in the RCP report. The quality of initial assessment, the monitoring of change, the importance of recognising complications (particularly depression), the implementation of multidisciplinary rehabilitation programmes, and the integration of hospital and home care are all areas in which problems were identified in the current study. Where patients were not only located in geriatric wards but were also under the management of physicians and teams with an interest and training in stroke, standards central to the rehabilitation process were better achieved (eg notes kept of team meetings, rehabilitation programme specified, and communication with relatives recorded in the case-notes). This indicates that the standards are sensitive to different styles of management. It is consistent with the view that stroke patients should be brought together on specific wards [3] and that a stroke service should be coordinated by a designated consultant with appropriate training [4]. Various suggestions have been made to improve hospital stroke services according to local circumstances, such as the use of a stroke protocol and booklet [7], operation of a stroke therapy team [24], provision of a stroke unit [13, 14], or management of all strokes according to age by either geriatricians or rehabilitation physicians [25]. The 15 standards proposed by us might prove useful in an initial evaluation of local services and in assessing the effect of changes (‘closing the audit loop’).

In conclusion, the hospital management of stroke is complex. Simple standards are not being met. Fifteen key standards are offered for discussion. Similar studies should be carried out in other hospitals to determine whether such weaknesses are widespread. Preliminary results of a study in another London teaching hospital and its local district general hospital suggest that they are (P Gompertz; personal communication). It remains to be seen whether reorganisation of a stroke service alters the achievement of standards and how this would affect the physical, social and emotional outcomes of stroke, as well as patient and carer satisfaction, and the use of resources.

Acknowledgements

This study was supported by a grant from Hampstead Health Authority. Thanks to Dr Kate Mulholland for her help with data extraction, to Professors A Young and S Ebrahim for helpful comments on earlier drafts, and Mrs Donna Greene and Miss Alison Sharp for secretarial assistance.

References

1 Office of Population Censuses and Surveys. Mortality statistics. 1990. Series DH2. London, HMSO 1991.
2 Royal College of Physicians. Stroke: towards better management. London: Royal College of Physicians, 1989.
3 King’s Fund consensus conference. Treatment of stroke. Br Med J 1988;297:126-8.
4 Royal College of Physicians. Stroke: towards better management. Summary and recommendations of a report of the Royal College of Physicians. JR Coll Physicians 1990;24:15-7.
5 Langton-Hewer R, Holbrook M. The Bristol Stroke Unit. Health Trends 1983;15:15-8.
6 Altman DG. Practical statistics for medical research. Andover: Chapman and Hall, 1991.
7 West Lambeth Health Authority Stroke Steering Group. Setting district stroke standards and objectives. JR Coll Physicians 1992;26:172-6.
8 McCarthy ST, Turner J. Low dose subcutaneous heparin in the prevention of deep vein thrombosis and pulmonary emboli following acute stroke. Age Ageing 1986;15:84-8.
9 Wade DT. Stroke octet: stroke rehabilitation and long term care. Lancet 1992;339:791-3.
10 Ebrahim S. Clinical epidemiology of stroke. Oxford: Oxford University Press, 1990;27-44.
11 Antiplatelet Trialists Collaboration. Secondary prevention of vascular disease by prolonged antiplatelet treatment. Br Med J 1988;296:320-1.
12 Carter AB. Hypotensive therapy in stroke survivors. Lancet 1976:485-9.
13 Garraway WM, Akhtar AJ, Hockey L, Prescott RJ. Management of acute stroke in the elderly: preliminary results of a controlled trial. Br Med J 1980;280:1040-3.
14 Indredavik B, Bakke F, Solberg R, et al. Benefit of a stroke unit: a randomized controlled trial. Stroke 1991;22:1026-31.
15 Swash M, Mason S (eds). Hutchinson’s clinical methods, 18th edition. London: Bailliè re Tindall, 1984.
16 Fullerton KJ, MacKenzie G, Stout RW. Prognostic indices in stroke. Quart J Med 1988;66:147-62.
17 Allen CMc. Predicting the outcome of acute stroke: a prognostic score. J Neurol Neurosurg Psychiatry 1984;47:175-80.
18 Fullerton KJ, McSherry D, Stout RW. Albert’s test: a neglected test of perceptual neglect. Lancet 1986;430:2-3.
19 Stone SP, Greenwood RJ. Assessing neglect in stroke patients. Lancet 1991;i:114.
20 Smith DL, Akhtar AJ, Garraway WM. Proprioception and spatial neglect after stroke. Age Ageing 1983:12:63-9.
21 Gordon C, Hewer RL, Wade DT. Dysphagia in acute stroke. Br Med J 1987;295:411-4.
22 Stone SP, Halligan PW, Greenwood RJ. The incidence of neglect phenomena and related disorder in patients with an acute right or left hemisphere stroke. Age Ageing 1993;22:46-52.

S P Stone and P Whincup

56 Journal of the Royal College of Physicians of London Vol. 28 No. 1 January/February 1994
Appendix. Standards of management.

1 Diagnosis [3,4]
The diagnosis should be documented in terms of the side (right or left), locus (hemisphere or brain stem), pathology (infarct or haemorrhage), and underlying disease or associated risk factors (eg hypertension, diabetes, smoking).

2 Initial neurological assessment [3]
The initial assessment should include documentation of the level of consciousness, severity of power loss, and the presence or absence of visual field defect, neglect, dysphasia, dysphagia, dysarthria, proprioceptive loss and gaze paresis.

3 Social history [3]
The social history taken on admission should note whether the patient lives alone, identify the main carer, record services received and document the pre-stroke level of independence in self-care, with particular reference to the ability to stand, transfer, walk, feed, remain continent, wash and dress. When this information is either unavailable or unreliable on admission, a third-party history should be sought from the main carer, services or general practitioner (GP).

4 Routine investigations [3]
All patients should be investigated with a full blood count, urea and electrolytes, blood glucose, chest X-ray and ECG. Patients below 60 years should have an erythrocyte sedimentation rate, syphilis serology and serum cholesterol performed. The results should be clearly documented in the notes.

5 Special investigations [3]
A CT brain scan should be performed only if a differential diagnosis is suspected (such as subarachnoid haemorrhage), if anticoagulation or surgery (endarterectomy, evaluation of cerebellar haematoma) is being considered, or if the patient is young (below 60). Echocardiography should be performed only if there is reason to suspect cardiac emboli, and imaging of the carotids only if dissection is suspected or endarterectomy is being considered. Both the reasons for such investigations and the results should be clearly recorded.

6 Complications [3–5]
Measures should be taken to anticipate and avoid the major complications of stroke. In particular, the management of dysphagia should be clearly documented with respect to prevention of aspiration, measures taken to avoid pressure sores clearly stated in the nursing Kardex, and the presence of depression or other mood disturbance [4,5] should be noted.

7 Referral to therapists [5]
Within 24 hours of admission all patients should be referred for occupational therapy and physiotherapy, and all those with dysphasia, dysphagia and dysarthria for speech therapy. The date of referral should be clearly documented in the notes.

8 Prevention of recurrence [3]
Evidence should be present in the notes that measures have been taken to prevent recurrence, treat underlying disease and minimise risk factors. In particular, the decision to use aspirin or warfarin, and the blood pressure one month after the stroke should be recorded in the notes. A history of smoking and drinking should be routinely recorded and advice given to smokers and excessive drinkers noted.

9 Multidisciplinary rehabilitation [3–5]
The notes should record that there has been a weekly multidisciplinary team meeting involving doctors, nurses, therapists and social workers. Decisions made should be recorded, with particular reference to the overall aims (such as discharge destination) and interim goals (such as ‘independent transfers’) of the rehabilitation programme, and in a more detailed way than by the statement ‘continue therapy’. Evidence should be given in the nursing Kardex or medical notes that rehabilitation has continued in the evenings and weekends when remedial therapists are not available.

10 Regular functional assessment [3,5]
Activities of daily living should be recorded in detail in the notes weekly and on discharge, and cover a minimum of standing, transfers, walking, continence of urine and faeces, feeding, washing and dressing.

11 Regular neurological assessment [3,4]
The initial neurological deficits should be reassessed and documented in the notes at least once in the first week and thereafter at least monthly.

12 Information to patients/relatives [3,5]
The doctor should give the patient’s main carer and the patient (if conscious and not too dysphasic) information about the nature, diagnosis, prognosis and management of stroke in the first week, and repeat it at least once during the rehabilitation phase. All information should be recorded in the notes.

13 Involvement of carers in planning [3–5]
Evidence should be present in the notes that the main carer or relatives have been involved in the discharge plan (eg documentation of case conference, or of discussions between family and therapists/doctor/nurse, or of the presence of relatives on a home visit).
Liaison with general practitioner [3,5]
The GP should be contacted by phone before discharge and the details of the conversation recorded in the notes. The GP should also receive a house physician’s letter recording the diagnosis, drugs, activities of daily living, services and follow-up plans. A discharge summary should be sent that includes all these plus the neurological deficits still present on discharge. Copies both of the letter and of the discharge summary should be retained in the notes.

Follow-up [3,5]
Follow-up arrangements should be documented as above, and include at least one multidisciplinary follow-up assessment unless the patient has no residual neurological deficit. The result of that assessment should be recorded, together with evidence that the main carer has been involved in the follow-up.

Address for correspondence: Dr S P Stone, University Department of Geriatric Medicine, The Royal Free Hospital, Pond Street, London NW3 2QG.