The national sentinel audit for stroke:
a tool for raising standards of care

A G Rudd, P Irwin, Z Rutledge, D Lowe, D Wade, R Morris and M G Pearson

ABSTRACT - Study objective: To assess the quality of inpatient care and follow-up for stroke in England, Wales and Northern Ireland.

- Design: Retrospective audit of case notes and service organisation.
- Setting: 197 trusts (80% of eligible trusts in England, Wales and Northern Ireland).
- Patients: 6,894 consecutive stroke patients admitted between 1 January 1998 and 31 March 1998 (up to 40 per trust).
- Audit Tool: The Intercollegiate Stroke Audit.
- Results: Most patients were admitted to acute hospitals with access to the appropriate acute investigations and treatments. Only 64% of trusts had a physician with responsibility for stroke and only 50% had a stroke team. Involvement of different members of the multidisciplinary team within appropriate time-frames varied from 37% to 61%. Assessment of impairments specific to stroke was inadequate (screening for swallowing disorders in only 55%, cognitive function tests in 23% and visual field examination in 44%). Rehabilitation goals were agreed by the multidisciplinary team in only 55% of eligible cases. 41% of patients were contacted by their GP within 3 days of discharge. The best compliance with standards was achieved for the 18% of patients who spent at least 50% of their time in a stroke unit.
- Conclusions: This national audit demonstrates that care is suboptimal in many areas, and that there is wide variation in standards for the management of stroke across the country. This may have implications for clinical governance.

Introduction

Stroke is responsible for 5% of all acute medical admissions. Research has shown that stroke unit care results in lower levels of mortality and disability than care provided for stroke in other settings1. In 1997 the National Health Service Executive (NHSE) commissioned a series of National Sentinel Audits (NSAs) to encourage the development of clinical audit, particularly across disciplines and sectors, and to help lay the ground for the development of clinical guidelines. The NSA for Stroke is the first to report.

The study examined the structure and process of care in England, Wales and Northern Ireland, with the intention of establishing the state of current practice and the degree of variability between units.

Methods

The audit tool was developed at the Royal College of Physicians Clinical Effectiveness and Evaluation Unit under the guidance of an Intercollegiate Stroke Working Party. It was based on standards for service organisation and care agreed by the different professional colleges and patients organisations represented. The standards were confirmed by a formal consensus Delphi survey2 of 90 individual experts in stroke and 10 patients organisations external to the working party. The audit proforms were piloted in 14 volunteer trusts including teaching, district general and community rehabilitation hospitals, and in two general practices. Detailed explanatory notes were developed to help in the completion of the audit proforms by different members of the multidisciplinary team. To enable data to be scanned, the questionnaire was designed in conjunction with optical mark recognition software (Teleform), which works with the Statistics Package for Social Science (SPSS).

The audit covered:
- organisation and facilities for treating stroke
- the case-mix of admitted patients
- the processes of care in the domains of: initial assessment; rehabilitation management; secondary prevention; discharge planning; communication with carers; and follow-up and review up to six months after discharge.

For each of the questions the auditor was asked to identify whether the standard had been met or whether pre-defined characteristics about the patient meant that the standard was not applicable, in which case the response was 'No, but...'; eg where patients were unconscious and could
not be assessed for speech problems. Results are presented as the proportion of patients for whom the standard was applicable and the percentage who met that standard.

Sampling and data collection

All trusts in England, Wales and Northern Ireland involved in treating stroke patients were invited to participate. Each site completed the organisational audit and performed retrospective case note audit on up to 40 consecutive patients admitted between 1 January 1998 and 31 March 1998 with a diagnosis of stroke (ICD 10 codes 161–164). The total number of admissions with stroke during the study period was also documented. Six-month follow-up data were obtained from GP records and hospital notes.

Data were collected by trust staff from a range of disciplines (of whom some can be classified according to more than one discipline), including clinical audit co-ordinators (58%), doctors (28%), nurses (20%) and therapists (8%). To ensure inter-rater reliability the first five sets of notes were audited twice by separate auditors, one of whom, it was recommended, was expert in stroke.

Results

Of 266 trusts with responsibilities for the care of acute stroke patients, 197 participated. A further 15, mainly community trusts with rehabilitation facilities, collaborated with a registered audit site, resulting in an overall participation of 80% of trusts. Results were returned three months after data were submitted, detailing individual performance against the national figures.

Organisational audit

Data were collected on the availability of a number of services in relation to the way stroke care is organised. Of the trusts surveyed, 64% had a consultant physician specialist in stroke and 50% of hospitals had a specialist stroke team. Although 90% of trusts provided physiotherapy, speech and language therapy and occupational therapy, only 29% had support from a clinical psychologist. Important services were sometimes not available, thus on nearly 20% of sites there was no specialist nursing advice for continence management, nor were there practice protocols for this common complication of stroke. Only 55% of trusts had written guidelines for assessment of swallowing. In half of the trusts multidisciplinary notes were not used, and regular team meetings on all wards occurred in only a quarter. For each of the items listed, organisation was significantly better in rehabilitation units and more so in stroke units. Thus 90% of stroke units had regular team meetings and over 80% had stroke literature available for patients and carers.

Case-mix

During the study period 16,121 patients with a primary diagnosis of stroke were admitted. Of these, 6,894 (43%) consecutive cases were included in the audit (median 39 cases per site, inter-quartile range 25–40 cases). Ninety-seven trusts reported 737 sets of missing notes (range 1–60 per trust) which were therefore unavailable for the audit.

The mean age of the patients was 75 years (median 77 years, range 19–98 years). The 30-day mortality was 28%. For those discharged alive, the median length of stay was 21 days. Of those admitted, 90% were from independent housing or sheltered accommodation, and 9% from institutions. Where known (11% unknown), 4,486 (discharged alive), 74% were discharged to independent or warden-controlled housing with 19% going into institutional care, and a further 7% moving on to another hospital. Pre-stroke 20-point Barthel scores were available for 69% and discharge scores for 61% of survivors. The respective means were 18 and 15. Pre-stroke, 69% of the sample had been fully independent with Barthel scores of 20, and 7% were severely disabled with scores of under 10. At discharge 35% scored 20, and 20% under 10. Of those alive one week after stroke, 42% were incontinent.

Processes of care

A total of 886 case notes were double-rated in 183 separate trusts; the auditors were of different disciplines in 75% of cases. Kappa values were within the range 0.41–0.6 for 24 items (moderate agreement), 0.61–0.8 for 56 items (good agreement) and over 0.8 for 16 items (very good agreement). Overall, agreement was slightly better than that reported by Gompertz et al.

Data were collected on the processes of care, indicating the proportion of patients for whom the standard was met and documented. Patients were categorised according to the type of ward where they had spent more than 50% of their inpatient stay. Only 18% and 15% respectively spent more than half their stay on a stroke or a rehabilitation unit. Thus 67% spent most of their stay on general wards. Significant deficiencies were shown for many aspects of care. For example, stroke-specific impairments were poorly documented (swallow screening in 55% of cases, visual field examination in 44% and cognitive function tests in only
23%). Weight was recorded in only 40% and mood in 45%. Nutritional needs were assessed in 68%.

Involvement of the different members of the multidisciplinary team within appropriate time-frames ranged from 42% to 61% and rehabilitation goals were agreed by the multidisciplinary team in 55% of eligible cases. Social work response within seven days of referral occurred in only 37% of referred cases. Aspirin was prescribed in 88% of patients with cerebral infarction on discharge from hospital. Of patients discharged, 41% were contacted by their GP within three days. Best compliance with standards was achieved for patients who spent at least 50% of their time in a stroke unit, followed by those treated in generic rehabilitation wards, eg incontinent patients were almost twice as likely to have a plan for continence promotion on a stroke or rehabilitation unit than if they were on a general ward.

Because the number of patients was large, the 95% confidence intervals for compliance rates to each standard were narrow. Without adjusting for the fact that the sample represents a substantial proportion of the total population of stroke patients receiving hospital care during the audit period, these confidence intervals were at 5% width at most. For the majority of standards these estimates of compliance rates will be accurate, in respect of random error, to within +/- 2%. The variation in rates of compliance between the trusts can be seen in Fig 1. For many of the variables the lowest quartile of compliance with the standards is below 30%.

Discussion

This is the largest audit of stroke care conducted so far in the UK and the first of the National Sentinel Audits to report. The audit forms were completed thoroughly in most areas, and even six-month follow-up data achieved a 70% completion rate. The inter-rater reliability study showed that the audit tool was sufficiently robust for rater variability not to be an important factor in interpretation of the data. The case-mix data suggest the sample is representative of a typical group of hospitalised stroke patients.

Retrospective case note audit has potential limitations in that the sample could be biased. However, coding for acute stroke on routine information systems has been shown to be adequate and the size of the cohort and the use of consecutive cases makes it unlikely that any systematic bias has had a significant influence on the overall results. This audit was limited to defining care by what was documented rather than by what was necessarily provided. Davenport et al have shown how difficult it is to correct outcome measures accurately for case-mix in stroke. Measures of process have been shown to be reliable indicators of the differences between services.

The organisation of care is far from ideal: only 50% of trusts have a specialist team for stroke, despite the very clear evidence that stroke unit care provides better outcomes than care on general wards; only 18% of patients spent over half their stay on such a unit. Compliance with almost all of the standards was significantly better for patients managed on stroke units.

Documentation of care showed assessment of impairments and disabilities on admission to be inadequate. This appeared to be particularly true for higher level functions such as cognition where only 23% of patients' records complied with the standard. Assessment during the hospital stay was, if anything, worse. Nutrition, for example, is well recognised as being a potential problem, especially for patients with swallowing problems, yet only 40% of patients were weighed even once during their admission and nutritional needs were mentioned in the notes of only 68%.

Fifty-six percent of patients were assessed within 72 hours by a physiotherapist and 42% within seven days by an occupational therapist. Virtually no one saw a psychologist despite the frequency of perceptual, cognitive and mood disturbance following stroke. Rehabilitation goals were agreed by the multidisciplinary team in only half of cases eligible for rehabilitation. This suggests a disorganised approach to rehabilitation. The proportion of patients discharged from the acute setting without adequate support, information or involvement also leaves room for improvement.

The national compliance rates for many of the variables shown in the data conceal the variation between different trusts. Fig 1 suggests that there are a significant number of trusts where stroke care is markedly suboptimal. Either these hospitals have major organisational or recording problems, or they are failing to deliver quality care. Since the audit has national coverage, those trusts in the lowest quartile know that at least the median values are being achieved by half their fellow units. They now have an opportunity to respond before a re-audit takes place. These types of comparative performance data could be relevant for clinical governance in the future.

This study has shown that co-operative audit is feasible, but it did require considerable effort from clinicians and audit staff in the trusts. If such data were to be collected routinely, information systems must be improved to the extent that they could be collected automatically from clinical records. The study was able to confirm expected differences in care provision, for example that stroke unit care is better than care on general wards, and is consistent with previous findings. It has also demonstrated wide variations in the care being delivered that cannot be explained by case-mix.

At any one time within an average district general hospital there will be between 20 and 30 patients with

Fig 1. Variation between trusts. The box and whisker plot displays the median and interquartile range (shaded area) and the largest and smallest values that are not outliers (whiskers). A score of 100 denotes 100% compliance with the standard. There are two categories of outliers. Those more than 3 box-lengths from the upper or lower edge of the box are more extreme and are denoted by *. Those 1.5 to 3 box-lengths away from the box edges are designated with O.
stroke as their primary diagnosis. Collecting these patients together in a stroke unit should lead to improved efficiency, rather than resulting in greater cost. At the ward level there are many changes that can be introduced without the need for major additional resources. For example, the simple strategy of introducing a clerking proforma has been shown to improve the quality of documentation. Development of protocols for the management of common stroke complications such as incontinence, pressure sores, contractures and malnutrition may result in improved practice and heightened awareness of the risk of such problems. Better communication between professionals through regular meetings and sharing notes, involving patients and carers in the planning of care, are all achievable without much financial investment.

Stroke accounts for about 5% of the National Health Service budget. It is the third main cause of death and the main cause of adult disability. Urgent attention is now needed to raise the standard of care for this common, devastating disease to an acceptable level.

Acknowledgements

Thanks are due to the many people who completed the audit forms to such a high standard. We are grateful to Marks & Spencer and the Stroke Association for funding the development and piloting of the audit tool and the Department of Health for funding the National Sentinel Audit. The group was originally established as a result of the skill and enthusiasm of the late Anthony Hopkins, former Director of the Research Unit of the Royal College of Physicians.

This article is available in booklet form with the detailed data collected for the study, and details of the participating trusts and the organisations represented on the Intercollegiate Stroke Working Party. Price £6.00.

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Address for correspondence: Dr A Rudd, Associate Director, Clinical Effectiveness and Evaluation Unit, Royal College of Physicians, 11 St Andrews Place, London NW1 4LE.
E-mail: a_rudd@umds.ac.uk