Cognitive decline in a prospectively studied group of stroke survivors, with a particular emphasis on the >75’s

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Abstract

Background: although cognitive decline is frequent after stroke, there has been very little work focussing upon older age groups, in whom the majority of strokes occur.

Objective: to determine whether cognitive decline is more common in older (>75) compared to younger (<75) stroke survivors.

Method: a cohort of 360 stroke survivors of all ages from a stroke register in Newcastle, UK, were assessed prospectively at 3 time points over 1 year with a standardized battery. Dementia was diagnosed according to Diagnostic and Statistical Manual of Mental Disorders, fourth edition criteria.

Results: the overall one year prevalence of dementia was 23%, but rose from 7% in the under 65’s to 53% in over 85’s. People over 75 were significantly more likely to have dementia (Odds Ratio 8.9, 95% Confidence Intervals 4.1–19.1).

Conclusion: the striking age related increase in the prevalence of dementia has important implications for service planning and clinical management.

Keywords: cerebrovascular disorders, thrombolytic therapy, random allocation

Introduction

It has been reported that approximately 25% of stroke survivors develop dementia within 12 months of having a stroke [1–6]. Stroke survivors have a 2–10 fold relative risk of dementia compared to elderly controls; an elevated risk which persists for at least 3–5 years [2]. Although a number of important studies have been conducted in this area, a serious omission has been that most of the cohorts have predominantly included younger subjects, with a mean overall age below 65, despite the fact that 50% of all strokes occur in the over 75’s. Zhu [7] conducted a cross sectional survey in order to address this issue, on 1,810 patients, all aged 75 or over, from Stockholm and demonstrated that the stroke sufferers from this cohort were significantly more likely to suffer from dementia than the non stroke subjects (Odds Ratio (OR) 3.6, 95% CI: 2.3–5.5). Due to the age restrictions of this study however, no comparisons could be made with subjects of a younger age. Several studies have, nevertheless provided informative data regarding the age related prevalence and incidence of dementia after stroke. Kokmen [2] identified an increased frequency of dementia following stroke that increased with older age but the relative risk of dementia compared with expected community rates was more pronounced in younger age categories (dementia rate ×12.9 aged 60–64 years, ×3.4 aged >85 years). However this study used retrospective data from case note review and did not indicate the number of cases in different age categories. Tatemichi reported the prevalence and incidence of dementia in a sample of 726 stroke survivors aged >60 years in the Stroke Data Bank cohort [3]. Prevalence increased with age: dementia occurred in 13/130 (10%) aged 60–64 years, ×3.4 aged >85 years). However this study used retrospective data from case note review and did not indicate the number of cases in different age categories. Tatemichi reported the prevalence and incidence of dementia in a sample of 726 stroke survivors aged ≥60 years in the Stroke Data Bank cohort [3]. Prevalence increased with age: dementia occurred in 13/130 (10%) subjects aged 60–64 years, compared to 14/63 (22.2%) in >85 year old subjects (P<0.001). The one-year dementia incidence increased from 5.4% at age 60 to 10.4% at age 90 years.

Further reports from Tatemichi [4, 5] recorded dementia prevalence in 251 stroke survivors aged >60 years at 3 months post-stroke. The rates in the age groups 60–69, 70–79 and >80 years were 17/115 (14.8%), 26/92 (28.3%) and 23/44 (52.3%) respectively. The odds ratios for post-stroke dementia in the two
latter age groups compared with the 60–69 years old group were 2.9 (95% CI 1.3–6.4) and 14.5 (95% CI 5.4–38.9) respectively. The same group was followed up to investigate dementia incidence [6], which similarly greatly increased in the oldest age groups (relative risk ×2.3 in 70–79 year olds and ×5.7 in ≥80 year olds compared with rate in 60–69 year old group). More recently, Pohjasvaara [8] demonstrated a significant increase in dementia prevalence with age in a large sample of subjects 3 months following ischaemic stroke (55–64 years 19.3%, 65–74 years 23.7% and 75–85 years 32.4%, $p=0.014$). Even within these studies, there are often small numbers of patients $>75$, and no previous UK based study has focused upon dementia in older stroke patients.

The nature of the relationship between increasing age and post-stroke cognitive deficits is important in terms of identifying the needs of this vulnerable patient population in the UK, and planning appropriate services. Furthermore such information could be important in helping to understand some of the underlying mechanisms. In the current study we report on the prevalence of dementia across three assessments over one year after a stroke, and the incidence of dementia between the month 1 and month 12 assessments. We hypothesize that dementia will increase in frequency with advancing age.

Method

A consecutive series of 360 stroke patients admitted to one of three major hospitals in Newcastle were consented into the study (where the patient was unable to give consent assent was obtained from their carer). The evaluation included a detailed medical history, assessment of neurological deficits, full blood screen, CT scan, evaluation of disability using the Barthel Activity of Daily Living Index [9] and a measure of cognitive impairment using the Abbreviated Mental Test Score (AMTS) [10] and a clock drawing task. Language function was also evaluated and patients with significant dysphasia were excluded because of the difficulties of evaluating cognitive function in these patients. Diagnosis of stroke was assigned to those who met the World Health Organisation (WHO) definition [11] and did not have a primary sub-arachnoid haemorrhage. Information derived from evaluation pertaining to cognition (AMTS and Clock Drawing Test) and function (Barthel scale) was utilized to apply Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM IV) criteria [12]. Although this assessment is brief it provides information regarding global cognitive impairment and several other cognitive domains in addition to memory, which in conjunction with the evaluation of activities of daily living was sufficient to apply DSM IV criteria. In addition previous work has suggested that the AMTS has reasonable sensitivity to change [13] and correlates well with the Mini Mental State Exam [14]. These criteria were applied at 1, 6 and 12 months post-stroke. In addition however, if there was an improvement to the point where cognitive deficits no longer met DSM IV criteria for dementia, it was assumed that the initial diagnosis of dementia was incorrect and the patients were re-assigned as not having dementia. The rater for the assessments was blind to age, gender and previous stroke history of the patient.

The one-year period prevalence of dementia and the 11 month incidence of dementia from month 1 to month 12 are reported according to age. The one-year prevalence of dementia is compared between people over and under the age of 75 using odds ratios with 95% CI.

Results

General demographics

Of the 360 patients, 351 (98%) met the WHO definition for a stroke. The mean age was 73.6 (SD = 11.49 years). One hundred and sixty eight (48%) were male and 183 (52%) were female. At months 1, 6 and 12 respectively 192, 168 and 148 patients were assessed. Twenty-nine percent of strokes in patients $<75$ and 26% of strokes in patients $>75$ were recurrent. The patients not included in the month 1 evaluations had either died ($n=95$) or were excluded because of dysphasia ($n=59$). Dropouts between month 1 and 12 were also mainly because of death ($n=43$).

Dementia/cognitive decline

The overall one year prevalence rate for dementia was 23% (45/197), rising from 7% (3/47) in the under 65's, to 45% (9/20) amongst 81–85 year olds and 53% (10/19) in those over 85, a significant age effect ($>75$ vs $<75$, OR 8.9, 95% CI 4.1–19.1). The age related prevalence and incidence is shown in Table 1. There

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were 8 (6%) new cases over the 11 month follow-up between months 1 and 12, of whom 4 were over 75 (incidence of 13% for >75 and 4% for <75, OR 3.5, 95% CI 0.8–14.9).

Discussion

The main finding of the study is a substantial increase in the prevalence of post-stroke dementia in people over the age of 75 compared to younger stroke patients. Although an important finding the methodological limitations of the study need to be considered. The main purpose of the study was not specifically to examine post stroke dementia, hence the instruments used were not ideal. Nevertheless sufficient information was collected to allow the application of DSM IV criteria for dementia, and the longitudinal design enabled the identification of patients with resolving cognitive impairment, presumably related to an acute confusional state, avoiding misdiagnosis of these individuals as having dementia. The absence of a pre-stroke assessment renders it impossible to differentiate people with post-stroke dementia at month 1 from those who already had dementia prior to the stroke. The proportion of people with a previous stroke was similar in the under and over 75 groups, hence this was not a major confounder in the age comparisons. Although the initial sample included 351 patients, mortality rates were high and many patients were excluded because of marked dysphasia, with less than 200 patients completing the month 1 assessment. The total number of people >75 was larger than in most previously reported studies, but the numbers within some individual age cells were still small, particularly with respect to incidence rates in the oldest-old, hence some of the confidence intervals are wide. The exclusion of people with dysphasia was necessary as dementia could not be reliably evaluated in these patients from the assessment measures used in the current study, although it is quite possible that these patients had different prevalence rates of dementia from the patient groups that were included.

The current report, focussing upon an elderly UK cohort, confirms the high prevalence of post-stroke dementia. The rates of cognitive decline increased dramatically in the over 80's with a 1 year prevalence of 45% in the 81–85 year old age band, and a frequency >50% in the over 85%. These prevalence rates are substantially higher than those reported in the US, and may reflect differences in lifestyle and clinical management.

The incidence rates of cognitive decline from month 1 to month 12 increase from 4% in the under 75 year age group compared to 13% in the over 75 year age group, although the difference is not significant, probably because of the small numbers in the oldest old groups.

The increased prevalence of dementia in older stroke patients in the UK is extremely important, as the overall prevalence of 23% does not reflect the clinical need of people within different age groups. Furthermore these issues are likely to become more important with the evolution of better management strategies for acute stroke, with increased survival of older and more disabled stroke patients. The high prevalence and incidence of dementia/cognitive decline in elderly stroke patients also indicates the value of this patient group to help develop a better understanding of their predictors and mechanisms of dementia; and the potentiating effects of vascular and neurodegenerative pathologies.

Key point

- The frequency of dementia increases dramatically in elderly stroke survivors, with important implications for care needs.

References

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