

Care of Acute Stroke Patients in General Hospitals in Israel

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Abstract

Background: An important question on the health agenda concerns the most appropriate place to hospitalize stroke patients and its effect on acute stroke care.

Objectives: To examine how the existing hospital system treats these patients, specifically: a) the departments to which stroke patients are admitted; b) differences in the admission, diagnosis and rehabilitative care of stroke patients, by department; c) patient characteristics, by department; and d) mortality rates during hospitalization.

Methods: We surveyed 616 people with acute stroke (ICD-CM9 430-433, 436) admitted consecutively to one of seven large general hospitals in Israel between October 1998 and January 1999. Data were collected from medical records at admission and at discharge.

Results: Forty-two percent of the patients were admitted to an internal medicine department, 56% to a neurology department, and only 2% to a geriatric department. The majority (95%) underwent a computed tomography scan of the brain, but other imaging tests were performed on fewer patients, with significant differences among hospitals and between internal medicine and neurology departments. Patients admitted to neurology departments were younger and had milder stroke symptoms than did patients admitted to internal medicine departments. Fifty-three percent of patients received at least one type of rehabilitative care during their hospital stay – usually physiotherapy, and least often occupational therapy. Seventeen percent of stroke patients died during hospitalization. Mortality was *not* found to be related to the admitting department.

Conclusions: Uniform realistic policies and work procedures should be formulated for all hospitals in Israel regarding the admitting department and processes as well as the performance of diagnostic imaging. Standards of medical and rehabilitative care and discharge destination should be developed to promote quality of care while containing utilization and costs.

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Stroke is the third leading cause of death in most developed countries; it exacts a heavy toll in disability worldwide and constitutes a significant economic burden to the health system [1–5]. Since about two-thirds of those who experience stroke are 65 years old or over [4–8], the illness may serve as a measure of hospitalization and care of the elderly. It is generally recognized that acute stroke is an urgent and severe medical problem, and that early treatment is crucial to maximizing short and long-term outcomes. The positive results of randomized controlled trials of intravenous rt-PA for the urgent treatment of patients with stroke further emphasize the importance of immediate care [8–10]. The significance of short-term care highlights one of the questions on today's agenda – namely, the most appropriate place to hospitalize stroke patients, and the effect this will have on acute stroke care. Many studies, including meta-analyses of randomized controlled

trials, have shown that care in stroke units is superior to that in conventional general medical, neurologic, and geriatric wards, with better functional outcome and reductions in early case-fatality and long-term institutionalization [11–13]. Despite a few initiatives to establish such units in Israel, it appears that their widespread establishment would incur very high costs that the health system would find difficult to bear.

In order to ensure the best care of acute stroke patients for the foreseeable future, and to assess how to improve the quality and efficiency of such care, we must first examine how the existing hospital system treats these patients. This study therefore examines: a) the departments to which patients who present with stroke at emergency rooms in Israel are admitted; b) any differences in the care of stroke patients in the different departments; c) the characteristics of patients admitted to each of the different departments; and d) mortality rates during hospitalization following stroke.

Methods

We conducted a survey of 616 people with a diagnosis of acute stroke (ICD-CM9 430-433, 436) admitted consecutively to one of seven large general hospitals in Israel between October 1998 and January 1999. The study included first-ever and recurrent stroke patients. People who died in the emergency room or who were discharged without being admitted to the hospital were not included. After procuring the patient's consent, data were collected from his/her medical records within 48 hours of admission to the hospital and at discharge from hospital. Data on mortality were compiled during the period of hospitalization.

Results

Forty-two percent of the patients were admitted from the emergency room to an internal medicine department (including the few patients admitted to cardiac intensive care, respiratory intensive care, and general intensive care units); 56% were admitted to a neurology department (including the few patients admitted to a neurosurgery department); and only 2% were admitted to a geriatric department. Four of the hospitals studied did not have a geriatric department, such that the patients at these hospitals were admitted to an internal medicine or neurology department. Our comparison concerns these two departments only. The average age of the patients admitted to an internal medicine department was 76, while that of patients admitted to a neurology department was 69 ($P < 0.05$). A larger proportion of those admitted to an internal medicine than to a neurology department had been disabled in ADL (activities of daily living) and IADL (instrumental ADL) prior to the

stroke and had needed the assistance of a formal caregiver [Table 1]. A larger proportion of patients admitted to an internal medicine as opposed to a neurology department suffered from severe stroke symptoms, as reflected in state of consciousness, paralysis and paresis, sensory deficits, aphasia and dysarthria. The average length of stay in the hospital for all patients was 11 days (range 1–110 days); 49% of the patients were hospitalized for less than 1 week. The average length of stay of patients admitted to an internal medicine department was 9 days, while that of patients admitted to a neurology department was 12 days.

In order to differentiate diagnosis, the majority of patients (95%) underwent a computed tomography scan of the brain – 81% of them once, and the remainder twice or more. About two-thirds of the patients (68%) were scanned in the emergency room at admission to the hospital, and the remainder on their first or second day in the department. Nevertheless, other imaging tests that help to establish the anatomic regions of the brain and the structures involved were performed on a far smaller number of patients during hospitalization. For example, magnetic resonance imaging was conducted in 2.5% of the patients, a Doppler sonography test of the extracranial cervical arteries in 32%, and a transcranial Doppler sonography in 6%. It should be noted that all patients who did *not* undergo a CT were admitted to one of two hospitals. In addition, in two of the hospitals studied no MRI tests were performed, while in two other hospitals no transcranial Doppler sonography tests were performed. A smaller proportion of patients admitted to an internal medicine ward underwent each of these imaging tests, relative to patients admitted to a neurology department [Table 1]. In addition, a larger proportion of younger patients (under age 64), and of patients who had been independent in their functioning prior to the stroke, underwent imaging tests than did older and more disabled patients.

Half the patients (53%) received at least one type of rehabilitative care during their hospital stay – usually physiotherapy, and least often occupational therapy. Larger proportions of patients with total or partial paralysis, incontinence and impaired speech received rehabilitative care, regardless of demographic characteristics (such as gender and age) and admitting department. However, it should be noted that four hospitals provided no occupational therapy, even though the characteristics of their patients were no different to those of the patients admitted to the other hospitals.

Seventeen percent of all stroke patients died during hospitalization. We found differences between departments in mortality rates: 20% of the patients admitted to an internal medicine department died, compared to 14% of those admitted to a neurology department. However, multivariate analysis (a logistic regression not presented here) revealed that mortality was independently related to coma or stupor, complete paralysis, medical complications during hospitalization, and functional status prior to the stroke, but *not* to admitting department.

Discussion

The findings of the study reveal that, in Israel, most of the patients with acute stroke were admitted from the emergency room to an internal medicine or neurology department, and only a few were

Table 1. Characteristics of stroke patients, by general hospital admitting department (in %)

	Total [†] (n=605)	Internal medicine departments (n=260)	Neurology departments (n=345)
Total	100	43	57
Age ^{**}			
< 64	25	15	33
65–74	30	30	30
≥ 75	45	55	37
Had formal caregiver prior to event (part or full-time) ^{**}	21	27	17
Disability in ADL prior to event ^{**}	7	10	5
Fully functional in ADL prior to event ^{**}	29	34	25
Type of stroke			
Ischemic	73	69	77
Hemorrhagic	16	17	15
Unclear/unrecorded	11	14	8
Motor ability at admission			
Full paralysis	20	20	19
Partial paralysis (paresis)	52	65	44
No paralysis	28	15	37
Sensory deficits at admission ^{**}	54	62	52
Speech impairment (aphasia/ dysarthria) at admission ^{**}	45	38	46
Disoriented at admission ^{**}	18	25	15
Consciousness at admission ^{**}	9	11	7
Comatose			
Semi-conscious (stupor)	12	16	9
Fully conscious	79	73	84
Had CT in hospital	95	93	96
Had MRI in hospital ^{**}	2	0	4
Had Doppler sonography of the extracranial cervical arteries in hospital ^{**}	32	24	39
Had transcranial Doppler in hospital ^{**}	5	2	8
Had rehabilitative care (physical/ occupational therapy) in hospital ^{**}	53	50	55
Died in hospital ^{**}	17	20	14

* Not including 11 patients admitted to acute geriatric departments, whose small number precluded examination of statistical significance.

** $P < 0.05$

admitted directly to a geriatric department. However, there were significant differences in the case-mix of patients admitted to internal medicine and neurology departments. Internal medicine departments admitted older and more disabled patients with more severe stroke symptoms than did neurology departments. This suggests that patient characteristics and the severity of the stroke affect the decision regarding admitting department.

The majority of all stroke patients underwent a CT scan, either at admission to the hospital or on their first or second day in the department. This is in accordance with accepted western medical practice since the 1980s [14]. However, the time between admission to the hospital and the performance of the CT was not measured.

Other imaging tests were conducted on a far smaller proportion of patients, and those admitted to an internal medicine department underwent fewer tests than those admitted to a neurology department. This corroborates the findings of other studies that neurologists conduct more imaging tests than do other specialists [15,16]. This study did not examine the appropriateness of performance of imaging tests; neither did it examine the specific indication for performance of these tests. It is possible that the younger age of the patients in neurology departments explains the finding that more patients in these departments were examined than those in internal medicine departments. Nevertheless, since all those who did *not* undergo a CT were admitted to one of two hospitals, and since some of the hospitals did not perform *any* MRI or Doppler tests, it is possible that organizational factors, and not only clinical ones, influence the performance of diagnostic tests. Similarly, it is possible that the shorter average length of stay of patients in internal medicine departments than in neurology departments – despite many of them being more severely affected – is a result of policy considerations and the respective rates of bed turnover in these departments, rather than an outgrowth of the patients' medical or functional needs.

In light of the significant differences that we found among hospitals and departments in the patterns of admission, diagnosis, and rehabilitative care of stroke patients, it appears that there is inequity across the country in the care a patient can expect to receive, and that there are no clear, evidence-based procedures or clear and uniform clinical performance criteria. Israel is no different from most western countries in this regard, whether differences are ascribed to geographic region, hospital, or even to different departments in the same hospital. Despite sincere efforts to promote standardized care for stroke patients in Europe and the United States, a variety of diagnostic and care processes persist, leading to immense differences among countries and among medical centers in the same country [17,18].

Regarding short-term outcomes of care, this study did not find an independent relationship between admission to a specific department and mortality following stroke. However, given the significant influence of other outcome measures on stroke (not included in this paper), particularly the long-term disability that can develop in its wake, it is crucial to clarify the most efficient and effective ways of treating acute stroke patients.

Consequently, there appears to be a need to determine uniform policies of admission, diagnosis, care, and discharge destinations for acute stroke patients in all of Israel's general hospitals. To this end, clear and uniform clinical guidelines should be formulated and realistic work procedures developed. These need to address the goals and processes of admission, the performance and use of diagnostic imaging and other tests, and the processes of care – especially those that are likely to have a critical effect on outcomes. It would also be prudent to develop detailed standards and clinical guidelines on medical and rehabilitative care during the acute phase of stroke, as well as guidelines on discharge destination that consider the severity of the stroke and the social and premorbid state of the patient. In order to save time and conserve resources, it would be worthwhile to

examine the appropriateness of clinical guidelines, best-practice methods, and cost-containment tools developed elsewhere in the world for use in Israel [9,11,19,20]. The outcomes of such an investigation may be used to formulate guidelines for Israel to promote the quality of care, while controlling the use of health services and containing the cost to the health system.

References

1. Warlow CP. Epidemiology of stroke. *Lancet* 1998;352(Suppl III):1–4.
2. Wolfe C. The impact of stroke. *Br Med Bull* 2000;56(2):275–86.
3. Ebrahim S, Harwood R. Stroke: Epidemiology, Evidence and Clinical Practice. 2nd edn. Oxford: Oxford University Press, 1999.
4. Wolfe C, Talling K, Beech R, Rudd A. Variations in case fatality and dependency from stroke in western and central Europe. *Stroke* 1999;20:350–6.
5. Koton S, Bornstein NM, Green MS. Population group differences in trends in stroke mortality in Israel. *Stroke* 2001;32:1984–8.
6. Thorvaldsen P, Asplund K, Kuulasmaa K, Rajakangas AM, Schroll M. Stroke incidence, case fatality and mortality in the WHO MONICA Project. *Stroke* 1995;26:361–7.
7. Asplund K, Bonita R, Kuulasmaa K, et al. Multinational comparisons of stroke epidemiology. *Stroke* 1995;26:355–60.
8. Brott T, Bogousslavsky J. Treatment of acute ischemic stroke. *N Engl J Med* 2000;343:710–22.
9. The National Institute of Neurological Disorders and Stroke rt-PA Stroke Study Group. Tissue plasminogen activator for acute ischemic stroke. *N Engl J Med* 1995;333:1551–87.
10. Wise J. New clinical guidelines for stroke published. *Br Med J* 2000;320:823–4.
11. Langhorne P. Collaborative systematic review of the randomised trials of organized inpatient (stroke unit) care after stroke. *Br Med J* 1997;314:1151–9.
12. Langhorne P, Legg L, Pollock A, Sellars C. Evidence-based stroke rehabilitation. *Age Ageing* 2002;31(Suppl 3):17–20.
13. Evans A, Perez I, Harraf F, Steadman J, Donaldson N, Kalra L. Can differences in management processes explain different outcomes between stroke units and stroke team care? *Lancet* 2001;358:1586–92.
14. Vuandens P, Bogousslavsky J. Diagnosis as a guide to stroke therapy. *Lancet* 1998;352(Suppl III):5–9.
15. Mitchell JB, Ballard DJ, Whisnant JP, Ammering CJ, Samsa GP, Matchar DB. What role do neurologists play in determining the costs and outcomes of stroke care? *Stroke* 1996;27:1938–43.
16. Smith MA, Shahar E, McGovern PG, et al. HMO membership and patient age and the use of specialty care for hospitalized patients with acute stroke. The Minnesota stroke survey. *Med Care* 1999;37:1186–98.
17. Beech R, Ratcliff M, Tilling K, Wolfe C. Hospital services for stroke care: a European perspective. *Stroke* 1996;27(11):1958–64.
18. Aboderin I, Venables G. Stroke management in Europe. *J Intern Med* 1996;240:173–80.
19. Hacke W. European stroke council: European stroke initiative recommendations for stroke management. *J Stroke Cerebrovasc Dis* 2000;10:335–51.
20. Oddone G, Brass L, Booss J, et al. Quality enhancement research initiative in stroke: prevention, treatment and rehabilitation. *Med Care* 2000;38:192–1104 (QUERI Supplement).

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