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Riks-Stroke – A Swedish National Quality Register for Stroke Care

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Key Words
Stroke · Quality registers · Stroke units

Abstract
Background: Riks-Stroke, the Swedish national quality register on stroke care, provides unique opportunities to evaluate stroke units in routine clinical care. ***Methods:*** Basic patient characteristics, process indicators and outcome variables are recorded in all 85 hospitals admitting acute stroke patients. A 3-month follow-up is included. ***Results:*** There are wide variations between hospitals in the proportion of patients admitted to a stroke unit, in secondary prevention and in the proportion of patients in institutional care at 3 months. Even after adjustment for available prognostic indicators, case fatality is lower and functional outcome is better in patients treated in stroke units than in patients treated in general wards. ***Conclusion:*** Riks-Stroke shows that outcome is consistently better in patients treated in a stroke unit than in general wards, not only in randomised trials but also in routine stroke care.

Nation-wide quality assessment registers are an integral part of Swedish health care [1, 2]. About 50 quality registers on common disorders, most of them in orthopaedics, surgery and oncology, are supported by the government (via the National Board of Health and Welfare), and there are numerous additional quality registers on less common disorders and procedures. Register data allow comparison of processes and outcomes between hospitals, adjusting for available prognostic indicators. The registers are also used to assess the effectiveness and adverse effects of new methods in clinical practice, e.g.: do the effects demonstrated in randomised trials translate into benefits for patients in routine health care? Do stroke units improve outcome not only in randomised trials but also in large-scale routine care?

Key Features of Riks-Stroke

The national quality register for stroke care in Sweden (Riks-Stroke) was established in 1994. It started as a voluntary register covering about half of the Swedish hospitals. In the ensuing years, other hospitals joined the collaboration and, since 1998, the register covers all 85 hospitals admitting acute stroke patients. About 20,000 stroke events are recorded every year.

The Riks-Stroke register covers acute stroke patients of all ages. It includes key patient characteristics, various aspects of acute stroke management and a follow-up at 3 months after stroke. Registration is internet-based. Feedback, in the form of national comparisons, is provided to

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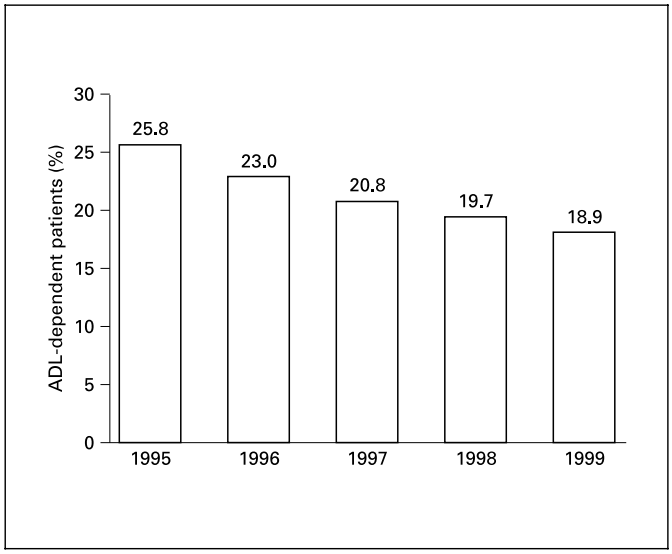

Fig. 1. Proportion of surviving stroke patients in Sweden dependent on others for their activities of daily living (ADL dependent) 3 months after stroke during the years 1995–1999.

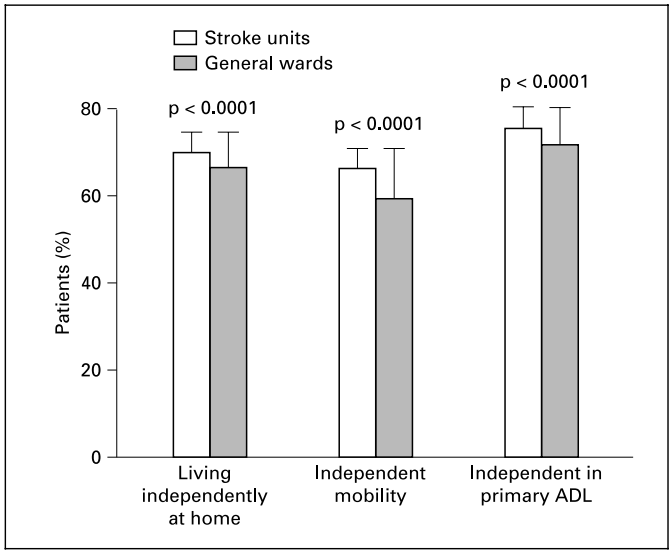

Fig. 2. Functional outcome at 3 months in stroke patients admitted acutely to stroke units compared with those admitted to general wards. Only patients without impairment of consciousness on admission to hospital are included. Age-adjusted data, modified from Stegmayr et al. [4].

the participating hospitals annually. Comparisons are also publicly available on the internet, but they are then presented at county level only (i.e. combined results of two or more hospitals).

The full registration protocol is available on the internet (http://www.riks-stroke.org). Basic patient characteristics, including living conditions and function before stroke, are recorded.

Quality Indicators

Examples of process indicators are (a) proportion admitted to a stroke unit; (b) proportion with CT scan; (c) treatment in the acute phase and at discharge (= secondary prevention), and (d) length of hospital stay.

The benefits of stroke unit care are well documented, and admission to a stroke unit is therefore a key quality indicator. According to Riks-Stroke, about 70% of Swedish acute stroke patients had access to stroke unit care in the year 2000. In about half of the hospitals, 75% or more of all patients are admitted to a stroke unit. In some hospitals with stroke units, only a minority of patients has access to the unit due to limited capacity.

The proportion examined by CT scans is high, above 95% in most hospitals. Riks-Stroke has identified a few hospitals that deviate from this general pattern. In the early years of registration, there was an age bias in who obtained access to CT scans, with patients above the age of 75 having a lower chance of undergoing the examination than younger patients. This difference is no longer evident.

Process indicators may also reveal to what extent evidence-based therapy is applied in routine stroke care. For instance, in all Swedish hospitals the great majority of patients (89%) with ischaemic stroke are discharged on antithrombotic treatment, most often antiplatelet agents. The proportion of patients with an ischaemic stroke and atrial fibrillation (presumed cardioembolic stroke) that are discharged on warfarin varies between hospitals from below 10 to around 50%.

Some key outcome measures in Riks-Stroke are case fatality, proportion of ADL-dependent patients at 3 months, proportion of patients in institutional care at 3 months, and patient satisfaction with care. On the national level, stroke outcome improved in parallel to the expansion of stroke unit care during the latter half of the 1990s. Thus the proportion of stroke patients who depend on others for their activities of daily living declined steadily (fig. 1).

Assessment of Stroke Units in Routine Clinical Practice

The benefits of stroke unit care are amply documented in randomised controlled trials [3]. As with other clinical methods, there is uncertainty to what extent the findings in trials can be translated into benefits for the patient in a routine clinical setting – the method may not be strictly applied (dilution effect) and the patient populations may be different from those included in the trials. Since stroke units have been established in so many large as well as small hospitals in Sweden, Riks-Stroke has provided a unique possibility to assess the impact of stroke units under real-life conditions [4]. As shown in table 1 and figure 2, the main findings of the randomised trials (reduced case fatality and better functional outcome in patients treated in stroke units compared with general wards) were replicated, although the magnitude of the effect was, in general, somewhat smaller [4]. A 2-year follow-up showed that the beneficial results of stroke unit care persisted [5].

Table 1. Case fatality in patients treated in stroke units and in general wards

Time point	Case fatality		p value
	stroke units	general wards	
At day 7	5.2	7.2	<0.0001
At day 27	9.5	13.7	<0.0001
At 3 months	13.9	19.6	<0.0001

All data are percentages, adjusted for available prognostic indicators on admission to hospital. Taken from Riks-Stroke 2000.

The Riks-Stroke comparisons between stroke units and general wards represent an observational study design which, generally, is weaker than randomised controlled trials. Due to the simplicity of the Riks-Stroke database, it has not been possible to adjust for differences in all putative prognostic factors.

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