The effect of a stroke unit: reductions in mortality, discharge rate to nursing home, length of hospital stay, and cost - a community-based study

Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

Health technology
Treatment and aftercare for stroke patients in a dedicated stroke care unit.

Type of intervention
Treatment; rehabilitation.

Economic study type
Cost-effectiveness analysis.

Study population
Acute stroke patients (according to WHO criteria), average age approximately 74 - 75, admitted within 2 weeks after stroke. Patients with subarachnoid haemorrhage were excluded.

Setting
Hospital. The economic study was carried out at Bispebjerg Hospital (stroke unit) and Frederiksberg Hospital (standard care), Copenhagen, Denmark.

Dates to which data relate
The Frederiksberg effectiveness data were collected between 1 April 1989 and 31 March 1990. The Bispebjerg effectiveness data were collected between September 1 1991 and September 30 1993. Resource data were collected at the same time as effectiveness data. The price year was not stated.

Source of effectiveness data
Effectiveness data were derived from a single study.

Link between effectiveness and cost data
The costing was undertaken prospectively on the same patient sample as that used in the effectiveness analysis.

Study sample
From a total of 1,241 acute stroke patients, 936 were placed in the stroke unit and 305 in the control group. It was not stated whether power calculations were used to determine the sample size.

Study design
This was a non-randomised study with historical controls (prospective) carried out in two community hospitals. The
form of treatment received by patients depended on which of the two districts of Copenhagen they lived in. The duration of follow up was one year after stroke. There was no loss to follow up in either group.

**Analysis of effectiveness**
The analysis of effectiveness was implicitly based on intention to treat. The primary health outcomes were post stroke death rates and length of hospital stay rates, and proportion of discharges to nursing home or home. Although groups were shown to be comparable in terms of demographic and prognostic factors (with the exception of hypertension and diabetes which were more frequent in the stroke unit group) and clinical characteristics, the analysis was further supported by the results of multivariate regression analyses which controlled for differences in such characteristics.

**Effectiveness results**
Stroke unit treatment significantly reduced hospital mortality: odds ratio 0.5 (95% CI: 0.34 - 0.74, (p <0.001)). The case fatality rate odds ratio was 0.45 (95% CI: 0.28 - 0.71, (p <0.001)). The 6 month mortality odds ratio was 0.57 (95% CI: 0.39 - 0.82, (p<0.002). The 1 year mortality odds ratio for the stroke unit was 0.59 (95% CI: 0.42 - 0.84, (p <0.003). The length of hospital stay in the stroke unit, excluding patients discharged to nursing homes, was 29.6 (27.1 - 32.0) days compared with 38.5 (32.2 - 44.9) days in general wards, (p< 0.002). The discharge rate home odds ratio was 1.90 (1.30 - 2.7, p <0.001), whilst the corresponding figure for discharge rate to nursing home was 0.61 (0.38 - 0.98, p=0.04)

**Clinical conclusions**
Treatment in a stroke unit reduces mortality and length of hospital stay compared to treatment in a general ward.

**Modelling**
Multivariate regression analysis was used to estimate costs and benefits while controlling for differences in demographic and prognostic factors between groups.

**Measure of benefits used in the economic analysis**
The measure of benefits used in the economic analysis was deaths avoided at one year.

**Direct costs**
Expenditures per bed day were assumed to be identical at both hospitals. This included all hospital costs: all medical facilities, training staff, nursing and physician costs. No data source given. The total costs were approximated by length of hospital stay. The effect of choice of treatment strategy on resource use was estimated both from actual data from the clinical study and by adjusting for minor differences between patient groups using a model.

**Statistical analysis of costs**
Student t tests were used on continuous data comparisons.

**Sensitivity analysis**
No sensitivity analysis was performed.

**Estimated benefits used in the economic analysis**
The 1 year mortality odds ratio for the stroke unit was 0.59 (95% CI: 0.42 - 0.84, (p <0.003)) which represents a 41% reduction relative to the standard ward.
Cost results
Overall the stroke unit was associated with a 30% reduction in length of stay (55.2 days (95% CI: 47.1 - 63.4) versus 38.6 days (35.7 - 71.6), p<0.0001). Linear regression analysis yielded a mean hospital stay reduction of 13.1 days (p=0.0001), for the intervention. The authors reported that these results imply savings of 1,313 bed-days and 3 places at a nursing home per 100 stroke patients.

Synthesis of costs and benefits
The costs and benefits were not combined since the intervention was found to be the dominant strategy.

Authors' conclusions
Treatment of unselected acute stroke patients on a stroke care unit saves lives, reduces the length of hospital stay, reduces the frequency of discharge to a nursing home, and potentially reduces costs.

CRD Commentary
The clinical aspects of the study were well designed and the fact that ethical considerations prevented randomisation is understandable. The authors could have provided more information regarding daily operating expenses which were only reported as comparable. The authors stated that the results of the trial may not be generalisable due to differences in practice in other countries.

Implications of the study
Although this study investigated the most important sources of bias associated with the clinical study design, a full break down of costs would be useful to assist the reader in assessing the generalisability of the results.

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