

Discharge Disposition After Inpatient Stroke Rehabilitation an International Comparison

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ABSTRACT

Objective(s): To compare discharge disposition after inpatient rehabilitation following stroke.

Design: Secondary analyses on the pooled dataset from two prospective cohort studies, one in Europe (Collaborative Evaluation of Rehabilitation In Stroke across Europe, CERISE-study) and one in the United States (Post-Stroke Rehabilitation Outcomes Project, PSROP-study).

Settings: Four inpatient rehabilitation facilities (IRF) in Europe and 6 IRF's in the United States.

Participants: 1154 patients with first ever-stroke, admitted to an IRF within six weeks post-stroke (N=532 from CERISE and N=622 from PSROP-study).

Intervention: none.

Main Outcome Measure(s): Discharge disposition and Barthel Index at discharge.

Results: Overall, 81.2% of the patients were discharged home, with no significant differences between the CERISE-group and the PSROP-group (81.71% and 80.54% respectively, $p=.618$). The Barthel Index (BI) at discharge was significantly different between both groups (median values: 17 (CERISE), 13 (PSROP)). Stepwise regression analysis revealed no significant differences in the likelihood to be discharged home (OR, [95% CI]: 1.11 [0.74-1.66]).

Conclusions: Discharge disposition was not different between both patient groups. However, functional status at discharge differed significantly. Incorporating contextual information on the organization of health care is needed to improve the comparison of results enabling a better evaluation of rehabilitation programs.

INTRODUCTION

Stroke is a major health burden throughout Europe and the United States and consumes large amounts of health care resources.^{1,2} Optimal models for delivery of stroke care that result in good outcomes at reasonable cost are of great importance.

Organized inpatient stroke rehabilitation has proven to be more effective in terms of survival and long-term functional achievement compared to other type of services.³ However, these comparisons are mainly made within one health care system, characterized by a particular set of incentives and disincentives to organize a rehabilitation program.

Hence, in order to better understand which components of inpatient stroke rehabilitation that are crucial for improved patients' outcome, studies in which outcome is compared across different health systems can help to unravel the elements of efficient stroke rehabilitation.

This study reports on the international comparison of functional outcome and discharge disposition after inpatient rehabilitation between a sample of European and American patients who have had a stroke.

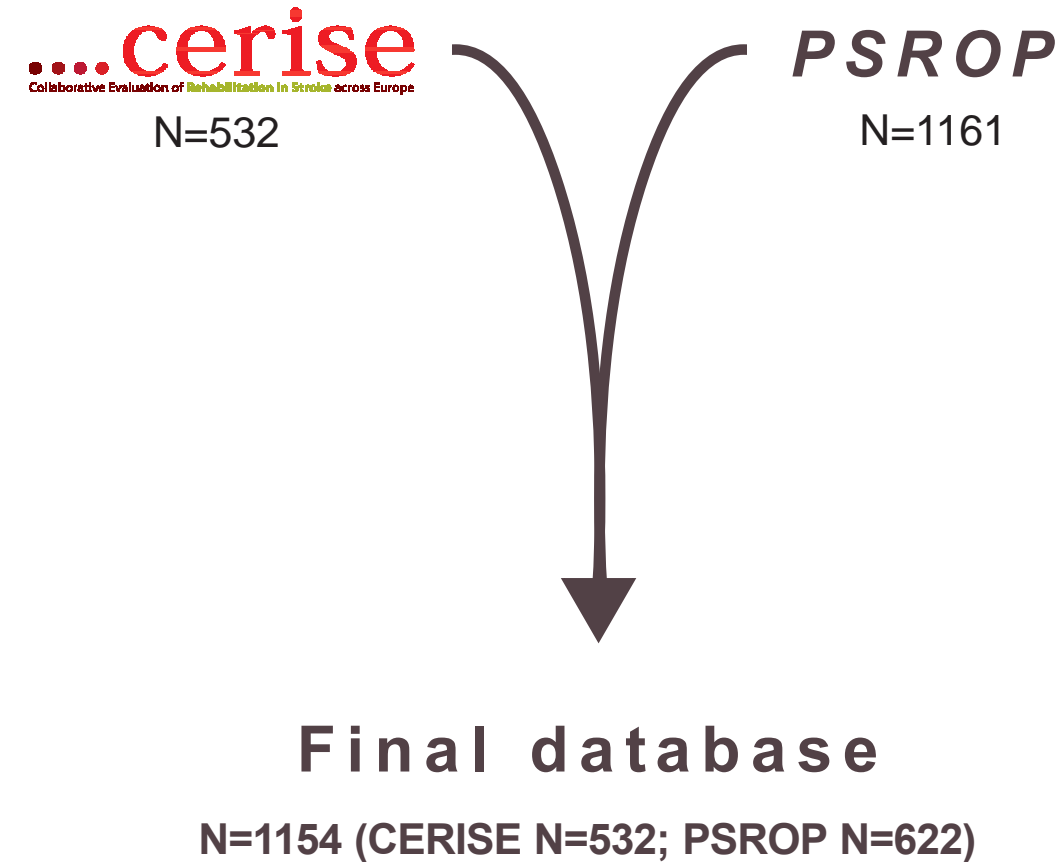
DESIGN

Secondary analyses of a pooled dataset derived from two large prospective observational studies on stroke rehabilitation:

European sample: Collaborative Evaluation of Rehabilitation In Stroke across Europe (CERISE, 2002-2006)⁴

American sample: Post-Stroke Rehabilitation Outcomes Project (PSROP, 2001-2005)⁵

The inclusion criteria for the CERISE study were applied to the PSROP study group, resulting in a total sample of 1154 patients (see below).



Inclusion criteria:

1. first-ever stroke as defined by WHO,
2. age 40 to 85 years.

Exclusion criteria:

1. other neurological impairments with permanent damage;
2. stroke-like symptoms caused by subdural hematoma, tumor, encephalitis, or trauma,
3. admission to the center 6 weeks after stroke,
4. no informed consent.

OUTCOME MEASURES

Discharge disposition:

- 1 = to the community (living alone, living with family or friends)
- 0 = institutionalized (other rehabilitation center, acute hospital, nursing home)

Barthel Index score:
range = 0-20

The FIM-scores of the American stroke patients were converted to the Barthel Index score using the algorithm that was described by Nyein K. et al.⁶

RESULTS

TABLE 1:

PATIENT AND PROCESS CHARACTERISTICS ON ADMISSION AND DISCHARGE

	PSROP N=622cerise N=532	P
Patient characteristics			
Age, yrs, mean, (SD)	65 (12)	68 (10)	<.001*
Gender (female), %	47.5	46.7	.801 [□]
Lived Alone, %	21.3	35.6	<.001 [□]
Comorbidities			
Myocardial infarct, %	8.7	12.3	.053 [□]
Atrial fibrillation, %	17.0	19.5	.281 [□]
Hyperlipidemia, %	39.0	41.6	.378 [□]
Coron heart disease, %	19.1	24.7	.023 [□]
Diabetes, %	29.3	20.2	<.001 [□]
Functional scores			
Hemorrhage, %	24.9	16.2	<.001 [□]
Ischemic infarct, %	75.1	84.2	<.001 [□]
ADM BI, median	8	11	<.001§
Process variables			
Onset days (median)	7.0	16.0	<.001§
LOS, days, (median)	17.0	53.5	<.001§
Outcome variables			
DC BI, median	13	17	<.001§
Discharged home, %	81.7	80.5	.618*

*:T-test; **: Chi²-test §:Mann-Whitney test
ADM BI: Barthel Index on admission; Onset days: days from onset to rehabilitation admission; LOS: length of stay; DC BI: Barthel Index at discharge

TABLE 2:

LOGISTIC REGRESSION MODEL ESTIMATING THE LIKELIHOOD TO BE DISCHARGED HOME

Parameter	Estimate ± SE	P
Pre-stroke living alone	-0.19 ± 0.25	0.438
Pre-stroke living with family	1.20 ± 0.25	<.001
Gender (F=0; M=1)	0.24 ± 0.09	0.009
Age	-0.03 ± 0.01	<.001
Onset days	-0.03 ± 0.01	<.001
Bleeding (0=no; 1=yes)	0.21 ± 0.10	0.039
ADM BI	0.22 ± 0.02	<.0001
Center group (US vs EU)	0.05 ± 0.11	0.620

Onset days: days from onset to rehabilitation admission;
ADM BI: Barthel Index on admission

The likelihood for being discharged to the community was not significantly different between the American and European patient group (see Table 3).

TABLE 3:

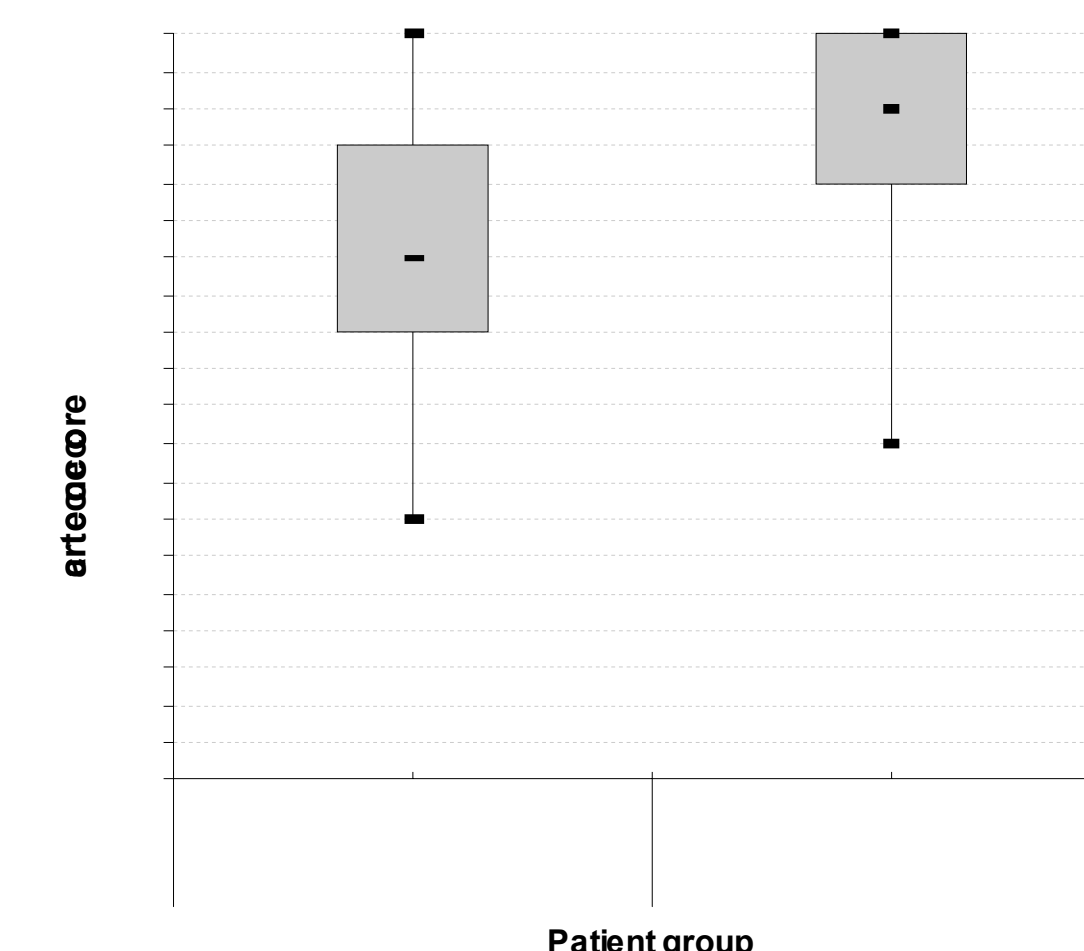
ODDS RATIO FOR THE DISCHARGE DISPOSITION TO THE COMMUNITY

Contrast	Odds Ratio	95% CI	P
US vs EU	1.11	0.74 - 1.66	0.620

Additional subanalyses were performed on the group of patients who were discharged to the community. The American group of patients showed significant lower scores on the Barthel Index compared to European stroke patients (median: 14 vs 18 ($p<.001$), respectively) (see Figure 1).

FIGURE 1:

BOXPLOT ON THE BARTHEL INDEX AT DISCHARGE FOR THE PATIENTS WHO WERE DISCHARGED TO THE COMMUNITY



CONCLUSION

The percentages of those discharged to the community after inpatient stroke rehabilitation was not different between both patient groups. After controlling for case-mix, the following variables were significant in determining the likelihood of community discharge: pre-stroke living situation, gender, age, time between stroke onset and admission to rehabilitation, bleeding and the Barthel Index on admission.

No significant differences were found between the American and European patient groups in the likelihood for discharge to the community. However, the functional status at discharge differed significantly between both patients groups, with the American patients having significantly lower scores on the Barthel Index compared to their European counterparts.

Since discharge to the community is often used as an outcome in comparing rehabilitation programs, discharge disposition may mask underlying differences in functional outcome. Incorporating contextual information about the organization of health care systems can improve our understanding of the factors that shape differing stroke rehabilitation outcomes.

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