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### CITATION

Horgan, Frances; Cunningham, Conal J.; Coakley, Davis P.; Walsh, James B.; O'Neill, Desmond; O'Regan, Myra; et al. (2005): Validating the Orpington Prognostic Score in an Irish in-patient stroke population.. figshare. Journal contribution. <https://hdl.handle.net/10779/rcsi.10798901.v1>

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## Validating the Orpington Prognostic Score in an Irish In-patient Stroke Population

Frances Horgan, CJ Cunningham, D O'Neill, D Coakley, Jennifer Walsh, M O'Regan, AM Finn, P McCormack

Ir Med J. 2005 Jun;98(6):172-5

### Abstract

An accurate assessment of stroke severity and the ability to predict prognosis is important for determining rehabilitation needs and long term management of patients after stroke. The Orpington Prognostic Score (OPS) is a clinically derived stroke severity scale that can be used to stratify patients into different severity groups. The aim of this study was to validate the Orpington Prognostic Score (OPS) in an Irish in-patient stroke population. Fifty 'first stroke' patients (21 male, median age 72.5 [range 31-93] years) were assessed within two weeks following stroke onset. Subjects were stratified into mild, moderate and severe groups using previously established cut-offs for the OPS. Outcomes were determined prospectively and compared to initial severity groups. Patients in the severe group had a significantly increased chance of dying (Odds ratio [95%CI] 2.16 [1.72-2.72] and this persisted after adjustment for age and gender. Length of stay increased significantly with increasing stroke severity group (F ratio 7.0 p=0.0025) and this association remained after adjusting for age and gender. The odds of being discharged home or of being able to walk independently by time of discharge decreased significantly (all p<0.001) as stroke severity increased and adjusting for age and gender did not alter these associations. A higher OPS score within 2 weeks of stroke onset was significantly associated with longer length of stay, increased mortality, reduced mobility at discharge and a reduced likelihood of discharge home. The OPS is a valid measure of stroke severity in Irish stroke in-patients.

### Introduction

Stroke remains the third leading cause of death and disability worldwide. In 1997 there were 8,584 strokes admitted to hospital in the Republic of Ireland, and the in-hospital mortality was 21% in general hospitals in the Eastern Regional Health Authority region<sup>1</sup>. Stroke research presents several challenges owing to the heterogeneous nature of the stroke population in terms of clinical manifestation, aetiology, prognosis and recovery. Many stroke scales and classification systems have emerged in an attempt to standardise trial populations and to compare results across studies.

An accurate assessment of the severity of impairment following stroke is important in quantifying stroke severity and determining the needs of patients. Patients and healthcare providers need such information to be able to predict survival, recovery and the anticipated demand on rehabilitation resources after stroke. The ideal stroke scale should be valid, reliable, easy to use and quick to administer in different settings

**Table 1 Baseline comparison in terms of initial stroke severity as classified by the OPS**

Factor	Group 1 Mild N=7	Group 2 Moderate N=30	Group 3 Severe N=13	F ratio	P value
Median IQR Age in years	57(52.25-76.5)	71.5(66-77)	84 (71-88)	2.7	0.077
N %				x2 2df	
Male gender	6 (85.7)	11 (36.7)	4 (30.8)	6.52	0.039
Right hemiparesis	3 (42.9)	18 (60)	3 (23.1)	5.04	0.081

\* adjusted for age and sex

by a broad range of health professionals<sup>2</sup>. While numerous scales have been developed their validity and suitability for clinical use is highly variable. To date none have been validated for use in an Irish setting.

The Orpington Prognostic Score (OPS) was developed as a modification of the Edinburgh Prognostic Score<sup>3, 4, 5</sup> and is a simple predictor of outcome in elderly stroke patients suitable for everyday clinical use. It is the shortest of the available stroke severity scales having only 4 items. It takes less than 5 minutes to complete, does not require extensive training, and can be used by medical and non-medical staff alike. It has a clinically derived score, which incorporates measures of motor deficit, proprioception, balance and cognition. Each of the four category scores are weighted and added to a coefficient to give a total score, which ranges from 1.6 (best prognosis) to 6.8 (worst prognosis). The OPS score can be used to stratify patients into different severity groups on the basis of the following score cut-offs<sup>4</sup>:

Score < 3.2 Mild - moderate deficit 'Best' prognosis

Score 3.2 - 5.2 Moderate - severe deficit 'Intermediate' prognosis

Score > 5.2 Severe - very severe deficit 'Poor' prognosis

The reliability of the OPS has been established (overall kappa > 0.9 individual category scores  $k = 0.75 - 0.92$ ) (L. Kalra personal communication). The OPS has highest predictive validity when assessed at two weeks following the onset of stroke and has been validated for an elderly population<sup>4</sup>.

The aim of this study was to validate the OPS in an Irish in-patient stroke population.

## **Methods**

### **Subjects**

Subjects were consecutive patients who were admitted to the Department of Medicine for the Elderly in St. James's Hospital or the Stroke Service in the Adelaide and Meath Hospital, Tallaght following a 'first' stroke between January to July 1998 who were willing to participate in the study. Very severe stroke patients who were medically unwell or terminally ill were not approached. A group of 50 patients was recruited, comprising 24 patients with right-sided hemiplegia and 26 patients with left-sided hemiplegia. Twenty-three patients were recruited from St. James's Hospital and 27 from the Adelaide and Meath Hospital, Tallaght. There were 21 male patients. Median age was 72.5 (range 31-93) years. All were medically stable and had different levels of disability.

### **Procedure**

Patients were assessed at a period within one to two weeks post admission and again on the day of discharge by the same researcher (NFH). The researcher followed the standardised OPS test methodology<sup>6</sup> in calculating OPS scores at the first assessment. Demographic and discharge details were also recorded.

### **Statistical analysis**

Subjects were stratified into mild (OPS score < 3.2), moderate (OPS score 3.2-5.2) and severe (OPS score > 5.2) groups according to established OPS scores<sup>4</sup>.

Outcome variables were log-transformed length of stay, in-hospital mortality, being independently mobile at discharge and being discharged to one's own home. These were compared across OPS groups using analysis of variance for log length of stay, and Chi Squared and logistic regression for the other variables. Odds ratios for groups 2 and 3 versus group 1 were calculated for these latter variables. Analyses were repeated after adjusting for baseline factors that differed between the OPS groups. Apart from the analysis for in-hospital mortality analyses were performed on patients who survived to hospital discharge only (n=44). All significance levels reported are two-sided (alpha set at 0.05) and all analyses were performed using Datadesk 6 software (Data Description Inc., Ithaca, NY).

### Ethics Committee Approval

The study was approved by the Federated Dublin Voluntary Hospital research and ethics committee. Each patient was asked to read a patient information sheet and sign a consent form. The patients were advised regarding the nature of the study and that they could withdraw at any time.

### Results

There were 50 patients with hemiplegia (24 [48%] right-sided). There were 21 male patients (44%) and median age was 72.5 (range 31-93) years. Median (range) length of stay was 34 (3-195) days, 6 (12%) died while in hospital, 33 (66%) were discharged home and 11 (22%) were discharged to a nursing home. Sixteen of 44 survivors (36.4%) were independently mobile at discharge.

Patients were classified into three stroke severity groups on the basis of their two-week OPS scores using previously established cut-offs. Median (range) OPS score was 4.8 (1.6-6.8) and based on OPS score 7 (14%) had suffered a mild stroke, 30 (60%) a moderate stroke and 13 (26%) a severe stroke. Profiles for each group are presented in (Table 1). It can be seen that patients with more severe strokes were older and more likely to be female.

No patients in group 1 (mild stroke) died, compared to 1 patient (3%) in group 2 (moderate stroke) and 5 (38.5%) in group 3 (severe stroke) (Chi square =11.71, 2 df, p=0.0029). Patients in group 3 had a significantly increased odds of dying and this persisted after adjustment for age and gender (see Table 2).

OPS Grade	Odds ratio (95% CI)	P value
1 Mild	–	–
2 Moderate	1.07 (0.87-1.31)	0.53
	0.96 (0.77-1.20)*	0.74*
3 Severe	2.16 (1.72-2.72)	<0.0001
	1.78 (1.39-2.28)*	<0.0001*

Length of stay increased significantly with increasing stroke severity group and this association remained after adjusting for age and gender (see Table 3). The odds of being discharged home or of being able to walk independently by time of discharge decreased as stroke severity increased and adjusting for age and gender did not alter these associations (see Tables 3 and 4).

Factor	Group 1 Mild N=7	Group 2 Moderate N=30	Group 3 Severe N=13	F ratio	P value
Median IQR					
Length of stay days	7 (5-25)	55 (3-195)	60.5 (20-134)	7.0 5.6* x2 2df	0.0025 0.0073*
N%	6 (85.7)	11 (36.7)	4 (30.8)	6.52	0.039
Right hemiparesis	3 (42.9)	18 (60)	3 (23.1)	5.04	0.081
Discharged home	7 (100)	23 (79.3)	3 (37.5)	8.6	0.013
Independently mobile at discharge	5 (71.4)	10 (34.5)	1 (12.5)	5.7	0.057

\* adjusted for age and sex

OPS Grade	Odds ratio (95% CI)	P value
1 Mild	–	–

2 Moderate		
Discharged home	0.66 (0.54-0.81) 0.91 (0.73-1.13)*	≤0.0001 0.38*
Independently mobile at discharge	0.48 (0.39-0.59) 0.72 (0.58-0.91)*	=0.0001 0.0049*
3 Severe	0.29 (0.22-0.37)	=0.0001
Discharged home	0.40 (0.31-0.52)*	=0.0001*
Independently mobile at discharge	0.31 (0.24-0.40) 0.43 (0.33-0.55)*	=0.0001 =0.0001*

### Discussion

A higher OPS score within 2 weeks of stroke onset was significantly associated with longer length of stay, increased mortality, reduced mobility at discharge and reduced likelihood of being discharged home. These associations were independent of patient age and gender. A strength of this study is the fact that patients were recruited from 2 different hospital settings. Weaknesses include the fact the neither service admitted all stroke patients presenting to the hospital and that patients with very severe stroke who were medically unwell or terminally ill were not approached. Nevertheless the demographics of the patients included are similar to a previous study of stroke in-patients from a different Irish hospital which did include all patients presenting with stroke<sup>7</sup> and we believe therefore that our results are representative of the Irish setting.

We conclude that the OPS is a valid measure of stroke severity in Irish stroke patients. We recommend that future studies of outcome in Irish stroke services should measure stroke severity using the OPS, in addition to basic demographic data, so that differences in outcome between centres and over time can be interpreted.

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### Acknowledgement

We wish to thank all the patients who participated in the study.

### Other References

No References