Disability and Rehabilitation, 2011; 33(2): 122–129

RESEARCH PAPER

Predicting outcome after stroke: the role of aphasia

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Accepted April 2010

Abstract

Objective. Very few studies have investigated the predictive value of functional outcome, social outcome and discharge destination in patients with cerebrovascular accident (CVA) with aphasia. The aim of this study was to verify whether aphasia is predictor for outcome in patients with stroke with aphasia.

Methods. The study was carried out in 262 patients with primary diagnosis of CVA and aphasia, included over a 6-year period (2001–2007): 131 with and 131 without aphasia. Statistically significant variables at the univariate regression analysis were submitted to the multivariate analysis. Backward stepwise regression analysis was applied to predict final motor-Functional Independence Measure (FIM), effectiveness in motor-FIM, final cognitive-FIM score and effectiveness in cognitive-FIM and discharge destination. Independent variables were age, gender, aphasia, stroke type, stroke lesion size, comorbidity, bladder catheter, motor function, trunk control test, initial motor-FIM and committed caregiver identified on admission to rehabilitation.

Results. Patients with aphasia had lower motor-FIM and cognitive-FIM scores both at admission and at discharge, if compared with those without aphasia. Effectiveness in motor-FIM and cognitive-FIM scores was also poorer in patients with aphasia. Seventy-seven per cent of patients with aphasia and 91.6% of patients without aphasia returned at home. In the multivariate regression analysis, aphasia was predictor of final motor-FIM ($\beta = 0.15$), final cognitive FIM ($\beta = 0.72$), effectiveness in motor-FIM ($\beta = 0.17$) and discharge destination ($\beta = 0.20$).

Conclusions. Aphasia is a predicting factor of outcome and it is the most important predictor of social outcome in patients with stroke with aphasia.

Keywords: *Cerebrovascular accident, aphasia, cognitive deficits, rehabilitation, stroke*

Introduction

Early accurate prediction of outcome for stroke is essential in order to establish realistic rehabilitation goals, to facilitate proper discharge planning and to anticipate the need for home arrangements and community support. Recent data from the literature have identified many important factors useful to predict outcome even early after stroke [1]. Among them, stroke severity and trunk movements are by far the most important predictors for outcome [1–3].

The role of neuropsychological deficits and aphasia in predicting outcome after a stroke is not clearly defined. Aphasia is a common neuropsychological symptom in stroke: it is a communication disability disorder caused by brain damage that affects speech, talking, reading and writing. Aphasia is usually secondary to stroke or other brain injuries to the left cerebral hemisphere and affects people differently depending on the injured brain area and injury severity [4].

It is present in > 1/3 of patients with acute stroke [5] and it is generally associated to hemiparesis or hemiplegia. Spontaneous recovery from aphasia occurs mainly during the first months after stroke, but some improvements may take place even later [6]. A significant number of language disturbances remains permanent [7]. The efficacy and the usefulness of language therapy provided to chronically aphasic patients are more controversial. A meta-analysis

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ISSN 0963-8288 print/ISSN 1464-5165 online © 2011 Informa UK, Ltd.
DOI: 10.3109/09638288.2010.488712

including all patients with aphasia (not limited to patients with stroke) showed that the more aggressive the therapy, the greater the improvement [8].

Language disorders add psychological and social problems to the existing medical problems of a patient in a rehabilitation programme by affecting the patients' verbal or written communication severely or totally [9]. As depression, anxiety and memory disorders occur more often in patients with aphasia; more severe disability in the activities of daily living (ADL) is also significantly associated with aphasia [7,10].

Persistence aphasia is an obstacle to motor rehabilitation and negatively affects quality of life (QoL) of patients who survived stroke [11].

Up to now, very few studies have addressed the predicting value of functional and social outcomes and discharge destination in patients with aphasia: moreover, they report contradictory data. Wade et al. [7] found significant correlations between aphasia score and Barthel ADL score and a significant effect of aphasia on social activities. Fang et al. [12] demonstrated that aphasia is negatively associated with changes of modified Barthel Index. Pedersen et al. [13], using multiple linear and logistic regression analyses, showed that initial aphasia had a small and clinically irrelevant influence on functional improvement and no effect on social outcome. Taub et al. [14] showed that aphasia somehow influences disability, as well. Conversely, Giaquinto et al. [15], by analysing the predictive value of 12 factors, found no effect of aphasia on Functional Independence Measure (FIM) scores. Carod-Artal et al. reported similar results [16].

The aim of this prospective study was to evaluate whether aphasia is a predictor of outcome in patients with stroke.

Material and methods

Study population

The study was carried out in patients consecutively admitted to our Rehabilitation Department from January 2001 to June 2007 with clinical evidence of acute cerebrovascular accident (CVA).

Neuropsychological [17–19] and clinical tests were used to screen patients. Patients with stroke with or without aphasia were enrolled in the study. Presence of previous history of stroke, or other ongoing neurological disorders, neglect, anosognosia, hemisomatoagnosia or confusion states were exclusion criteria.

All patients included in the study underwent rehabilitation. The needs of every patient, the specific goal set for the patient and the rehabilitation achievements were discussed bi-monthly by a team of specialists (physician, speech therapist and physiotherapist). All patients without aphasia underwent motor rehabilitation [average 330 min/week (6-day/week)], while those with aphasia also speech rehabilitation [average 120 min/week (4-day/week)]. Motor rehabilitation was based on the Bobath method [20] while speech therapy on the cognitive neuropsychological approach [21]. Type of aphasia did not affect the weekly amount of therapy for aphasia. Patients were not discharged until further in-hospital improvement was considered unlikely to occur by the rehabilitation team.

The Ethics Committee of our Institute approved the study protocol. The study was carried out in accordance with the principles of the Declaration of Helsinki.

Independent variables

Independent variables were chosen on the basis of the results of previous studies and on clinical grounds [22,23]. The following independent variables were chosen: age, gender, aphasia, stroke type, stroke-lesion size, presence of bladder catheter, comorbidity, motor function, trunk movements, initial functional status and caregiver commitment. Independent measures were assessed within 2 days from admission to our Rehabilitation Unit.

- Presence and severity of aphasia were assessed using the Italian version of Aachen Aphasia Test (AAT) [17]. AAT assesses main linguistic modalities (spontaneous speech, repetition, written language, confrontation naming, comprehension) and identifies five aphasic syndromes (motor, sensory, mixed, anomic and unclassified aphasia). According to deficits of linguistic modalities, we classified aphasia using a 5-step ordinal scale (severe = mixed aphasia; moderate = sensory aphasia; mild = motor aphasia; slight = anomic aphasia; no aphasia).
- Stroke type (infarct or haemorrhage) and stroke-lesion size were assessed by computed tomography (CT) scan or magnetic resonance imaging (MRI). Based on their largest diameter, lesions were classified as small, medium or large (<3 cm, 3–5 cm, or >5 cm, respectively) [24].
- Comorbidity was assessed by the Cumulative Illness Rating Scale (CIRS) [25]. This instrument measures disease burden in individuals with various chronic diseases, without evidence of acute deterioration or infection. CIRS is considered a user-friendly, comprehensive review of medical problems of 14-organ systems:

it is based on a 0–4 rating of each organ system. The scale has been validated in older adults living in long-term care facilities and has demonstrated better validity in predicting healthcare than functional measures. The instrument gives information about severity and comorbidity of chronic diseases. This study evaluated comorbidity only [26].

- Presence or absence of a bladder catheter was assessed with a dichotomised scale.
- Motor function was assessed with the Fugl-Meyer scale [27]. This is a system for assessing motor function, balance, some sensory details and joint dysfunction in hemiplegic patients. This study evaluated motor function only. In total, 50 items are included: a 3-step (0-1-2) ordinal scale is applied to each item (0 = details cannot be performed; 1 = details can be only partially performed; 2 = details are performed throughout the total range of motion of the joint). This gives a maximum score of 100, i.e. normal motor-function: 66 as maximum score for upper and 34 for lower extremities.
- Trunk movements were assessed by Trunk Control Test (TCT) [28] which examines four simple aspects of trunk movement. The patient lies supine on bed and is asked to roll on the weak side, roll on the strong side, sit up from lying down and sit in a balanced position on the edge of the bed, with feet off ground for a minimum of 30 s. Scoring is: 0 = unable to perform movement without assistance; 12 = able to perform movement, but in an abnormal style; and 25 = able to complete movement normally. TCT score is the sum of the scores obtained on four tests (range 0–100).
- FIM was used to determine the degree of independence and need for assistance in ADL [29]. FIM is an ordinal scale consisting of 18 items, with seven levels ranging from 1 (total dependence) to 7 (total independence). FIM can be subdivided into a 13-item motor subscale (eating, grooming, bathing, dressing upper body, dressing lower body, toileting, bladder control, bowel control, transfer to bed/chair/wheelchair, transfer to toilet, transfer to tub/shower, walk or wheelchair and stairs) and 5-item cognitive subscale (comprehension, expression, social interaction, problem-solving and memory). The score's ranges for motor and cognitive subscales are 13–91 (motor-FIM) and 5–35 (cognitive-FIM), respectively. The total-FIM score is 126. The patients were tested by a qualified physiatrist both at admission and discharge. The initial motor-FIM score was used to describe initial functional status.
- Presence or absence of a committed caregiver, identified on admission to rehabilitation, was recorded as well.

Dependent variables

The dependent variables were final motor-FIM, effectiveness in motor-FIM, final cognitive-FIM, effectiveness in cognitive-FIM and discharge destination.

Effectiveness is proportion of potential improvement achieved during rehabilitation, calculated by the following formula: (final score-initial score)/(maximum score-initial score) × 100. Therefore, if a patient achieves the top score after rehabilitation, effectiveness is 100% [30].

Discharge destination from our Rehabilitation Unit was classified in four categories (nursing homes, home with caregiver, home with relatives and home alone).

The dependent variables were determined upon discharge.

Statistical analysis

Data were statistically analysed using the software application Statistica Version 6 (StatSoft-2001). Statistical analysis was performed using descriptive tests (mathematical mean, standard deviation, percentage), χ^2, Student's *t*-test and ANOVA (1-way, *post-hoc* analysis with Scheffé correction) for comparison between groups.

Moreover, univariate and multivariate regression analyses were applied. All statistically significant variables at univariate regression analysis were submitted to the multivariate analysis. Backward stepwise regression analysis was used to predict final motor-FIM, effectiveness in motor-FIM, final cognitive-FIM and discharge destination. $p < 0.05$ was considered statistically significant.

Results

Study population

During the study period, we screened 403 patients with primary diagnosis of CVA. Of these, 56 patients had previous history of stroke and 63 cases had neuropsychological deficits or were not evaluated for various logistical reasons. Therefore, we included 284 patients: during the inpatient rehabilitation, 22 died or were transferred back to acute care hospitals. As a result, 262 patients were included in the outcome analysis: 131 with and 131 without aphasia. Table I shows the patients' demographic and clinical

Table I. Demographical and clinical characteristics of patients with and without Aphasia ($n = 262$).

	Aphasia						
	Severe ($n = 43$)	Moderate ($n = 26$)	Mild ($n = 37$)	Slight ($n = 18$)	Unclassified ($n = 7$)	No ($n = 131$)	p-value
Age	66.6 ± 12	68.1 ± 10	70.1 ± 9.4	72.8 ± 10	73.3 ± 7.8	70.7 ± 10	0.146
Male/female	25/18	7/19	16/21	10/8	2/5	75/56	0.042*
Stroke types (infarct/haemorrhage)	39/4	17/9	30/7	12/6	5/2	102/29	0.332
Stroke lesion size (little/medium/large)	4/25/14	11/10/5	16/11/10	7/9/2	1/3/3	38/49/45	0.071
Initial AAT	61.8 ± 62	180.6 ± 83	275.2 ± 104	349.9 ± 96	223.8 ± 143		0.000
OAI	23.4 ± 12	27.6 ± 15	27.2 ± 11	21.7 ± 13	21.1 ± 9.2	20.3 ± 10	0.004†
LOS	56.8 ± 13	45.1 ± 13	51.2 ± 15	42.5 ± 15	44.6 ± 10	47.0 ± 17	0.002†
CIRS	3.5 ± 1.3	3.15 ± 1.2	3.0 ± 0.9	3.2 ± 1.2	3.5 ± 1.5	3.4 ± 1.1	0.252
Bladder catheter (n)	25	11	15	5	3	34	0.002†
Committed caregiver (n)	35	22	31	17	7	119	0.362
Initial TCT	10.2 ± 11	27.4 ± 23	26.7 ± 17	29.2 ± 23	26.6 ± 19	32.2 ± 23	0.000‡
Initial Fugl-Meyer	12.5 ± 14	45.1 ± 32	33.2 ± 24	55.3 ± 33	54.6 ± 36	44.9 ± 28	0.000‡
Initial total-FIM	32.5 ± 12	46.0 ± 20	46.7 ± 18	56.2 ± 20	49.5 ± 24	66.1 ± 21	0.000‡
Initial motor-FIM	22.9 ± 8.8	34.6 ± 19	32.2 ± 14	40.5 ± 17	32.3 ± 20	38.2 ± 17	0.000‡
Initial cognitive-FIM	9.6 ± 4.9	11.3 ± 4.2	14.4 ± 6.2	16.7 ± 7.5	18.1 ± 7.7	27.7 ± 5.8	0.000‡
Final TCT	35.4 ± 15	55.3 ± 29	53.4 ± 24	66.3 ± 28	60.1 ± 5	65.2 ± 26	0.000‡
Final Fugl-Meyer	25.6 ± 19	57.6 ± 34	4.9 ± 26	80.6 ± 19	68.3 ± 137	64.5 ± 27	0.000‡
Final total-FIM	53.3 ± 21	75.0 ± 25	79.5 ± 20	95.7 ± 18	83.3 ± 25	95.9 ± 21	0.000‡
Final motor-FIM	41.4 ± 16	59.4 ± 22	60.0 ± 17	72.5 ± 16	62.1 ± 23	66.6 ± 18	0.000‡
Final cognitive-FIM	12.8 ± 6.0	15.6 ± 5.9	19.5 ± 6.7	23.1 ± 6.5	21.8 ± 6.3	29.3 ± 4.9	0.000‡
Effectiveness in motor-FIM	28.0 ± 18	49.3 ± 29	50.2 ± 22	68.5 ± 13	57.4 ± 13	57.8 ± 24	0.000‡
Effectiveness in cognitive-FIM	11.0 ± 10	15.0 ± 12	19.5 ± 17	32.8 ± 25	12.5 ± 9.3	14.7 ± 13	0.042*
Home (%)	62.7	80.7	86.4	83.3	85.7	91.6	0.000‡

AAT, Aachen aphasia test (spontaneous speech, repetition, written language, confrontation naming and comprehension were included); CIRS, cumulative illness rating scale; LOS, length of stay; OAI, onset to admission interval; TCT, trunk control test.
Data are shown as mean ± SD, number or percentage. Comparison between groups was performed with ANOVA (age, OAI, LOS, CIRS, TCT, Fugl-Meyer, FIM) and χ^2 (gender, stroke type, stroke lesion size, bladder catheter, committed caregiver, destination).
*$p < 0.05$; †$p < 0.01$; ‡$p < 0.001$.

characteristics. AAT classified aphasia as: mixed ($n = 43$), sensory ($n = 26$), motor ($n = 37$), anomic ($n = 18$) and unclassified aphasias ($n = 7$). CT scan was performed in all patients, while MRI only in seven. Left-brain damage was present in 130 patients with and in 58 without aphasia. Conversely, right-brain damage was present in only one patient with aphasia and in 73 without aphasia. Stoke lesion was cortical in 49 patients with aphasia and in 43 without aphasia. In 82 patients with and in 88 without aphasia, the stroke lesion was sub-cortical either with or without involvement of the cerebral cortex.

Patients with aphasia, if compared with those without, had lower motor-FIM (both $p = 0.000$) and cognitive-FIM scores (both $p = 0.000$) at both admission and at discharge. Effectiveness in motor-FIM and cognitive-FIM was also significantly poorer in patients with aphasia (both $p = 0.000$). 74.1% of patients with aphasia and 95% of patients without aphasia returned at home ($p = 0.001$).

Final motor-FIM

Patients with severe aphasia had significantly lower motor-FIM scores than patients without aphasia ($p = 0.000$), moderate ($p = 0.010$), mild ($p = 0.001$) and slight aphasia ($p = 0.000$). There was no difference in motor-FIM scores among patients with moderate, mild, slight and no aphasia.

Univariate analysis (Table II) showed significant associations among final motor-FIM, aphasia ($\beta = +0.41$), onset to admission interval (OAI) ($\beta = -0.23$), length of hospital stay (LOS) ($\beta = -0.47$), bladder catheter ($\beta = +0.53$), TCT ($\beta = +0.67$), motor function ($\beta = +0.73$), initial functional status ($\beta = +0.73$) and committed caregiver ($\beta = -0.23$). Functional status, motor function and aphasia were valid independent predictors for final motor-FIM in the final model (final motor-FIM = 24.191 + 0.511 initial motor-FIM + 0.269 motor function + 2.834 aphasia, Table III). The explained variance of the model was 0.66 (adjusted $R^2 = 0.66$).

Effectiveness in motor-FIM

In patients with severe aphasia, effectiveness in motor-FIM was significantly poorer than that of patients with no aphasia ($p = 0.000$), moderate

Table II. Univariate regression analysis ($n = 255$).

	Final motor-FIM	Effectiveness in motor-FIM	Final cognitive-FIM*	Effectiveness in cognitive-FIM*	Discharge destination
	β	β	β	β	β
Age	−0.01	−0.00	0.08	−0.06	−0.09
Gender	−0.06	−0.06	−0.08	0.16*	−0.05
Stroke type	−0.01	−0.01	−0.01	0.09	−0.05
Stroke lesion size	−0.05	−0.02	0.08	0.04	0.13*
OAI	−0.23*	−0.25*	−0.21*	−0.07	−0.00
LOS	−0.47*	−0.42*	−0.17*	0.06	−0.14*
Aphasia	0.41*	0.37*	0.72*	0.04	0.25*
CIRS	−0.03	−0.02	0.09	−0.03	−0.08
Bladder catheter	0.53*	0.40*	0.39*	0.01	−0.15*
Fugl-Meyer	0.73*	0.66*	0.36*	0.03	0.25*
TCT	0.67*	0.54*	0.38*	0.02	0.26*
Initial motor-FIM	0.73*	0.56*	0.39*	0.01	0.23*
Caregiver	−0.23*	−0.21*	−0.16*	0.04	−0.57*

CIRS, cumulative illness rating scale; LOS, length of stay; OAI, onset to admission interval; TCT, trunk control test.
β = regression coefficient. Significant data are marked with the asterisk (*). 2.6% of patients with unclassified aphasia ($n = 7$) were excluded from the analysis.

Table III. Multivariate regression analysis ($n = 255$).

Dependent variables	Independent variables	β	Multiple R^2	p-value
Final motor-FIM			0.66	
	Initial motor-FIM	0.42		0.000
	Initial Fugl-Meyer	0.38		0.000
	Aphasia	0.15		0.000
Effectiveness on motor-FIM			0.47	
	Initial Fugl-Meyer	0.60		0.000
	Aphasia	0.17		0.000
Final cognitive-FIM*			0.58	
	Aphasia	0.67		0.000
	Bladder catheter	0.24		0.000
Effectiveness on final cognitive-FIM	n.e.			
Discharge destination			0.37	
	Caregiver	−0.56		0.000
	Aphasia	0.20		0.000

n.e. indicates not entered.
β = regression coefficient. 2.6% of patients with unclassified aphasia ($n = 7$) were excluded from the analysis.

($p = 0.015$), mild ($p = 0.002$) and slight aphasia ($p = 0.000$).

Aphasia ($\beta = +0.37$), OAI ($\beta = -0.25$), LOS ($\beta = -0.42$), bladder catheter ($\beta = +0.40$), TCT ($p = +0.54$), motor function ($\beta = +0.66$), initial functional status ($\beta = +0.56$) and committed caregiver ($\beta = -0.21$) were related to effectiveness in motor-FIM in the univariate analysis (Table II). Motor function and aphasia were independent predictors of effectiveness (effectiveness in motor-FIM = 17.812 + 0.549 motor function + 4.027 aphasia, Table III). The explained variance of the model was 0.47 (adjusted $R^2 = 0.46$).

Final cognitive-FIM

Patients with severe aphasia had lower cognitive-FIM score than patients with no aphasia ($p = 0.000$), mild ($p = 0.000$) and slight aphasia ($p = 0.000$). In patients with moderate aphasia, the cognitive-FIM scores were lower than those of patients without aphasia ($p = 0.000$) and slight aphasia ($p = 0.003$). Patients with moderate or mild aphasia had lower cognitive-FIM scores than those without aphasia ($p = 0.000$ and $p = 0.002$, respectively).

In the univariate analysis, aphasia ($\beta = 0.72$), OAI ($\beta = -0.21$), LOS ($\beta = -0.17$), bladder catheter ($\beta = +0.39$), TCT ($\beta = +0.38$), motor function ($\beta = +0.36$), initial functional status ($\beta = +0.39$) and committed caregiver ($\beta = -0.16$) were related to effectiveness in final cognitive-FIM (Table II). Aphasia and bladder catheter were independent predictors for final cognitive-FIM in the final model (final cognitive-FIM = 2.449 + 3.668 aphasia + 4.352 bladder catheter). The explained variance of the model was 0.58 (adjusted $R^2 = 0.58$).

Effectiveness in cognitive-FIM

There was no difference in effectiveness in cognitive-FIM between patients with and without aphasia

($p = 0.235$). None of the variables were related to effectiveness in final cognitive-FIM in either univariate or multivariate analysis (Tables II and III).

Discharge destination

A smaller percentage of patients with severe aphasia (62.7%) returned at home in comparison with other groups.

In the univariate analysis, aphasia ($\beta = +0.25$), stroke lesion size ($\beta = +0.13$), LOS ($\beta = -0.14$), TCT ($\beta = +0.26$), motor function ($\beta = +0.25$), admission motor-FIM ($\beta = +0.23$), bladder catheter ($\beta = +0.15$) and committed caregiver ($\beta = -0.57$) were significantly related to discharge destination (Table II). Aphasia and presence of a committed caregiver identified on admission to rehabilitation were independent determinants for discharge destination in the multivariate regression analysis (Table III, discharge destination $= 3.779$–1.346 committed caregiver $+ 0.141$ aphasia). The explained variance of the model was 0.37 (adjusted $R^2 = 0.37$).

Discussion

The aim of this prospective study was to verify the role of aphasia as a predicting factor for outcome. We studied motor-FIM, cognitive-FIM and discharge destination of patients with stroke with or without aphasia. Patients with severe aphasia had significantly lower motor-FIM and cognitive-FIM scores at admission and discharge than patients with other level of aphasia. Effectiveness in motor-FIM was also poorer in patients with severe aphasia. In addition, patients with severe aphasia had longer LOS than patients without aphasia. Conversely, patients with either moderate or mild aphasia had the same scores in motor-FIM and effectiveness in motor-FIM if compared with patients without aphasia. This finding gives additional evidence that only severe aphasia is correlated with higher risk of low response on ADL. These data are in keeping with those from previous studies [7,13].

We used multiple regression models in order to evaluate the impact of the considered variables on outcome prediction. The results of this statistical analysis show that aphasia is an important outcome predictor.

Aphasia was positively related to final motor-FIM score and effectiveness in motor-FIM. In addition, aphasia was predictor for both final motor-FIM and effectiveness in motor-FIM. Our data are consistent with those by Wade et al. [7], Fang et al. [12], Taub et al. [14] and Pedersen et al. [13]. Conversely, they differ from those by Giaquinto et al. [15] and Carod-Artal et al. [16]: these authors found no effect of aphasia on functional outcome, but we have to consider that they assessed patients with chronic sequels of stroke [16] and performed the study in a small population of patients with aphasia [15].

In this study, aphasia was related to impaired ADL and had significant effect on functional outcome.

The presence of aphasia may negatively affect the rehabilitation progress by several mechanisms. Comprehension deficit could prevent a patient from understanding therapeutic instructions [31]. Because of this, the patients with stroke and aphasia could not follow the rehabilitation therapist thus exercising paralytic limbs spontaneously [10,12,31]. Ideomotor apraxia often accompanies aphasia and it interferes with motor activities thus impairing functional recovery [31]. Aphasia may also be an indicator for severity of global deficit [7,31]. Comprehension deficit, apraxia and stroke severity are related to aphasia severity.

In our study, patients with more severe aphasia had lower Fugl-Meyer and motor-FIM scores at admission than patients without aphasia, thus indicating a relationship between more severe aphasia, poorer outcome and more severe motor deficit.

In addition, this study verified the effect of aphasia on final cognitive-FIM scores and effectiveness in cognitive-FIM. The cognitive-FIM assessed communication, social interaction, problem-solving and memory. We found that all patients with aphasia had lower cognitive-FIM score if compared with those without aphasia. In addition, aphasia had positive relationship with final cognitive-FIM score and has strong effect on this outcome, indicating that it is a crucial component for social interaction.

There are few studies addressing this issue. Wade et al. [7] found a negative effect of aphasia on social activities assessed through Frenchay Activities Index. Conversely, Pedersen et al., using the same assessment scale, did not observe the same at 6-month follow-up [13]. Our data are in keeping with those by Wade et al.: adequate communicative capacity is essential for social interaction and problem-solving as extensively demonstrated in other studies. It is reported that everyday activities change considerably with the onset of aphasia, and the patients with aphasia are hindered from participating in activities by communication problems [32]. The persistence of aphasia also negatively influences friendships [33], occupational capacity and QoL [11,34]. Moreover, people with communication disorder due to aphasia have problems in using information and communication technology such as mobile phones and are more socially isolated than their peers [35]. These observations may support our findings.

In this study, 77% of patients with aphasia returned home and the percentage was even lower in patients with severe aphasia (62.7%). Conversely, up to 92% of patients without aphasia returned home. Our data are in line with Petrilli et al. [36] who showed that 74% of patients with aphasia and 95% of those without aphasia return home. We showed that aphasia was positively related with discharge destination and had effect on this outcome. These findings differ from those by Pedersen et al. [13]. Presence of comprehension and spontaneous speech deficits hamper a patient to live by him/herself [36] and negatively affect social professional, family reintegration and life participation [37,38].

Knowledge of outcome is very important for patients, family members and rehabilitation team. Outcome should be identified at early stages because: (i) patient and family members need to know the prediction for survival, degree of recovery and extent of possible residual disability following rehabilitation, (ii) it can guide rehabilitation team in selecting specific and appropriate therapies [39] and (iii) it is useful, in the frame of social and the territorial rehabilitation services, in order to plan home care needed to guarantee continuity and rehabilitative care (both physical and speech care) in patients with aphasia.

The study had some limitations. First, this is not a population-based study (patients are referred by general hospitals) and therefore not all stroke survivors are enrolled. The study was performed in a population admitted to a rehabilitation hospital, needing physical rehabilitation. Secondly, all possible predictors may not have been included in the regression analysis. However, in this study, the independent variables have been chosen on the basis of the results of previous studies [22,23], and we analysed the mean score of AAT linguistic modalities.

Conclusions

This study indicates that aphasia is a strong prognostic factor of outcome and is the most important predictor for social outcome in patients with stroke.

Acknowledgements

The authors thank Dr. Laura Comini and Dr. Alessandro Bettini for critical revision and editing the manuscript. The study was not supported by pharmaceutical company. The study was supported by institutional funding.

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