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ORIGINAL ARTICLE

Role of Aphasia in Discharge Location After Stroke

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Abstract

Objective: To evaluate language deficits after acute stroke and their association with post–acute care at a setting other than home. We hypothesized that deficits in language comprehension would be associated with discharge to a setting other than home after adjustment for physical/occupational therapy (PT/OT) needs.

Design: Secondary analysis of prospectively collected data. Discharge location, demographic characteristics (age, sex, race), and the presence of PT/OT recommendations were abstracted from the medical record.

Setting: Acute stroke unit at a tertiary medical center.

Participants: Left hemispheric stroke patients (N=152) within 24 hours of event.

Interventions: The following tasks were administered: (a–b) oral and written naming of pictured objects, (c) oral naming with tactile input (tactile naming), (d–f) oral reading, oral spelling, and repetition of words and pseudowords, (g) written spelling to dictation, (h) spoken word-picture verification (ie, auditory comprehension), and (i) written word-picture verification (ie, written word comprehension).

Main Outcome Measure: Discharge to a setting other than home.

Results: Of 152 cases, 88 were discharged home and 64 to another setting. Among stroke subjects discharged to a setting other than home, 63.6% had auditory comprehension deficits compared with 42.9% of those discharged home ($P = .03$). Deficits in auditory and reading comprehension and oral spelling to dictation were significantly associated with increased odds of discharge to a setting other than home after adjustment for age and PT/OT recommendations.

Conclusions: Cases with deficits in auditory comprehension, reading comprehension, and oral spelling to dictation had increased odds of being discharged to settings other than home. Early evaluation of these language deficits and prompt treatment may allow patients who would otherwise be discharged to an institution to go home. Further research is needed to design and evaluate individualized treatment protocols and their effect on discharge recommendations.

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Fundamental to the rehabilitation process is the ability to learn, carry over, and communicate new information. Any disturbances of memory, comprehension, and language will predictably affect outcomes in the rehabilitation setting. Aphasia presents a challenge to the stroke rehabilitation process and often results in reduced participation in society because major forms of communication occur through spoken and written language.[1,2] Aphasia occurs in more than 33% of stroke survivors[3] and has direct consequence on functional recovery.[4,5] Aphasia has been shown to impact both the Barthel and Rivermead Mobility Indexes.[6] Likewise, Gialanella et al[7] recently reported that patients with aphasia had lower motor-FIM and cognitive-FIM scores both at admission and at discharge than did those without aphasia. Aphasia also played a role in discharge destination after stroke in the aforementioned study.[7] The presence of aphasia may be a hindrance to the documentation or assessment of motor recovery and may increase the risk of depression, anxiety, and memory impairments.[5,6]

The ability to predict outcomes of stroke provides the rehabilitation team a platform to tailor treatment for each individual, ensuring that the patient's rehabilitation is maximized, that realistic goals are set, and that resources are allocated appropriately.[8] Studies have shown that evaluating patient and stroke factors such

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as demographics, stroke risk factors, clinical examination findings, clinical scales, laboratory tests, neuroimaging, stroke severity, and motor deficits[9-11] provide important information that can assist the clinician in predicting stroke outcomes. However, few studies have investigated functional outcomes and discharge disposition (home vs other settings) in stroke patients with aphasia.[7]

Studies on the role of aphasia in the determination of appropriate post−acute care setting can help clinicians, families, and health care systems allocate resources appropriately. Aggressive therapies should be provided in the appropriate setting to maximize functional outcome and successful reintegration in the community.[12-15] Deficits in language and processing skills (the ability to plan and perform a task when prompted) have been shown to be better predictors of rehabilitation cost after stroke compared with motor deficits.[16] In contrast, Maehlum et al[17] found that the presence of aphasia did not significantly affect rehabilitation outcomes in a retrospective study of 277 patients admitted to a stroke rehabilitation program. Similar findings have been reported by Carod-Artal et al[18] and Giaquinto et al.[19]

The aims of this study were to evaluate specific language deficits in the acute phase of stroke and their association with a patient's post−acute care in a setting other than home. To our knowledge, previous studies have focused on the presence or absence of aphasia but have not focused on the specific language deficits present. Identifying specific language functions that, if affected, may result in discharge to a setting other than home is important to tailor early interventions.

We hypothesized that deficits in specific language domains (primarily affecting comprehension) would be associated with discharge to settings other than home even when taking into account physical therapy (PT) and occupational therapy (OT) needs.

Methods

Study sample

Subjects were selected from a 235 subjects sample of cases enrolled in our laboratory's study on the Neural Basis of Language and Cognitive Deficits in Acute Stroke. This study was approved by the institutional review board. Subjects with a diagnosis of transient ischemic attack (TIA) or left hemisphere stroke were included in the study. Cases were classified as stroke or TIA on the basis of their original magnetic resonance imaging (MRI) (diffusion weighted images) and are described separately in our analysis. Patients with TIA had similar demographics as did those with strokes but had normal brain MRI and normal neurologic examinations at the time of testing.

Language testing—primary predictors

Specific language tests were used to evaluate language deficits that constitute aphasia. Each language deficit was quantified as the proportion of errors (% error). Language tests were administered within 24 hours of stroke (or within 24h of admission in the case of TIA). To evaluate the underlying cognitive-linguistic deficits, the following experimental language tasks were administered: (a) oral naming of pictured objects, (b) written naming of pictured objects, (c) oral naming of objects with tactile input (tactile naming), (d) oral reading of words and pseudowords, (e) oral spelling to dictation of words and pseudowords, (f) written spelling to dictation, (g) spoken word-picture verification (ie, auditory comprehension), (h) written word-picture verification (ie, written word comprehension), and (i) repetition of words and pseudowords. Spelling and writing tasks are administered only to cases with at least 10 years of education. Multiple testing sessions (within the 24-h period of interest) were allowed, as requested by the subject, to reduce fatigue and optimize performance. These experimental tasks were used for the original protocol and have been described in detail elsewhere.[20] Normative data obtained from healthy controls (neurologically intact) demonstrated that subjects have no more than 10% error rate when performing these tasks.[21]

List of abbreviations:

MRI magnetic resonance imaging
OT occupational therapy
PT physical therapy
TIA transient ischemic attack

Discharge location—primary outcome variable

We examined the medical records of patients enrolled in the study and abstracted from each subject's discharge paperwork, when available, the location to which each person was discharged immediately after the acute stroke admission. From the original prospective cohort, 152 subjects who had a clear discharge location were identified (88 home, 50 acute rehabilitation unit, 14 nursing home or other institutional setting). For the purpose of this study, discharge location was dichotomized as home versus other (hereafter referred to as home or other setting).

Other variables

Demographic characteristics (age, sex, race) and the presence of PT or OT recommendations for care after discharge were examined to determine whether these variables may be associated with the primary outcome of interest (discharge location) and confound the association between specific language deficits and discharge location.

Statistical analysis

Sample characteristics are described for stroke and TIA cases on the basis of the location they were discharged to (home vs other setting). *T* tests, Fisher's exact tests, and 2-sample tests of proportions were used to determine statistical significance as applicable. Performance on language tasks was recorded as the proportion of errors (% error) and was dichotomized for analysis as normal or abnormal. A percent error of more than 10% was considered abnormal on the basis of normative data.[21]

A logistic regression model was used to adjust for age and the presence of PT or OT postdischarge recommendations because, based on the results of bivariate analysis, there was a potential association between this variable and discharge location (*P* on bivariate analysis .19). Models were generated for language functions with a clinically significant difference in language deficits by discharge location and with a *P* value of $<.20$ on bivariate analysis. Data were analyzed using Intercooled Stata 11.[a]