

COMPREHENSIVE EVALUATION OF SPEECH AND LANGUAGE DISORDERS IN STROKE PATIENTS

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Abstract

Introduction: Disturbances of speech and language are one of the most serious and disabling manifestations of brain dysfunction in general and stroke in particular. A number of disorders of speech and language can occur in the post stroke period like dysarthria, aphasia, alexia, agraphia and acalculia. Adequate rehabilitation of stroke patients needs complete understanding of these various disorders, their frequency, evolution, remission and persistence of these deficits which modify over a period of time.

Materials and Methods: The present study is a prospective single center study starting from March 2017 incorporating patients with acute stroke who were admitted to our hospital in the Neurology department. Almost all were native Telugu speakers, except for 11 patients whose native tongue was different but spoke Telugu fluently. All the participants were informed about the procedures and purpose of the study.

Results: The study included 105 consecutive patients with acute stroke (57 male, 48 female; mean age 60 ± 17 years, range 28-82 years). Of the 105 patients assessed at admission, 33.3 % had aphasia, 17.1 % not assessed, 40.3% had dysarthria and 5.7% had other disorders of language. Of the 95 patients assessed within 7 days of stroke, 20.7% were aphasic. At 4 weeks, when over 90% of survivors were tested, 16% of those tested had aphasia. At 6 months only 12% of survivors had significant aphasia and at the end of one year, there were no patients who showed further improvement. Of those aphasic within 7 days, 40% remained so at 6 months; 60% of those aphasic at 4 weeks remained so implying that most of the patients recovered within a month, those who did not improve at the end of one month continued to have more persistent deficits.

Conclusion: Impaired communication is a major impediment to stroke rehabilitation [12]. Although spontaneous recovery is the rule, a targeted early and high intensity language therapy is important in the clinical aphasia rehabilitation. Very early mobilization is suggested to be one reason for the positive effect of stroke unit care. Of the four major components of aphasia viz. fluency, comprehension, naming and repetition, it is comprehension which is very essential from a management perspective. Fortunately, this is a function which recovers early in most patients. Persistence of this deficit even in its milder form can be an obstacle in the overall neuro rehabilitation process.

Key Words: speech, Neurology, aphasia, dysarthria, stroke rehabilitation.

INTRODUCTION

Disturbances of speech and language are one of the most serious and disabling manifestations of brain dysfunction in general and stroke in particular^[1]. A number of disorders of speech and language can occur in the post stroke period like dysarthria, aphasia, alexia, agraphia and acalculia. Adequate rehabilitation of stroke patients needs complete understanding of these various disorders, their frequency, evolution, remission and persistence of these deficits which modify over a period of time^[2].

Aphasia was first described around 2800 Bc, and some treatment strategies were discussed by Paul Broca in 1865. It was Theodore Weisenberg and Katherine Mcbride in US who first published a concise discussion of aphasia in 1935 after the first world war^[3].

As a part of treating head injury victims after the second world war, aphasia management became mandatory.

A well structured speech re-education programme was designed by Alexander Luria in Russia which was based on his concepts of on the organization of higher cortical functions^[4]. A growing body of evidence emerged since then on the rehabilitation of aphasia patients imparting a long and rich tradition to this subject.

Patients with disturbances of speech and language have not only increased mortality rate but also decreased rate of recovery from functional impairments with resultant socioeconomic consequences^[5]. However , it is a well established fact that even patients with severe language disorders can recover either spontaneously or maximally with a goal directed rehabilitation programme^[6]. To achieve this, it is obligatory that the treatment is started as early as possible. Also, initial screening of the language dysfunction should be followed by a more detailed and repeated formal assessment of stroke survivors complemented by adequate management of the stroke syndrome and educating the caregivers.

In a limited resource setting where trained speech therapists are not available, there is a need to develop strategies that can support the patient so that appropriate therapeutic modifications can be made to optimize the stroke survivor's speech rehabilitation. Understanding the various factors that influence the occurrence, severity, and outcome of patients with aphasia and other disturbances of communication should precede any targeted interventions or service provisions to address improvements in the lives of people with aphasia^[7].

All the available studies on aphasia so far dealt with individual components of the language disorders like epidemiological, clinical and outcome aspects. There has been no study with an inception cohort which encompasses all the above mentioned aspects of language disorders in stroke. A comprehensive approach is hence warranted to effectively rehabilitate stroke patients, particularly in a limited resource setting.

AIM OF THE STUDY

The aim of the study is to determine the incidence, clinical characteristics and outcome of Speech and language disorders and factors associated with early improvement in communication in patients with acute stroke.

OBJECTIVES

1. To establish the natural course of speech and language disorders
2. To investigate the morbidity and mortality in patients with Acute stroke and different types of speech and language disorders
3. To assess the factors influencing recovery of speech and language disorders in consecutive unselected patients with acute stroke.

MATERIAL AND METHODS

The present study is a prospective single center study starting from March 2017 incorporating patients with acute stroke who were admitted to our hospital in the Neurology department. Almost all were native Telugu speakers, except for 11 patients whose native tongue was different but spoke Telugu fluently. All the participants were informed about the procedures and purpose of the study.

Inclusion criteria:

- Patients within 48 hrs after onset
- Patients who were not comatose on admission

Exclusion criteria:

- Patients who were on Ventilator
- Patients who were candidates for Revascularization therapy

All the patients in the study population underwent post stroke language assessment with the Boston aphasia examination test (Short version) and neuroimaging was done.

Assessment of Speech and language was performed on admission (day 0), within one week after hospitalization, after one month, at a 6-month and 12 month follow-up. Patients are evaluated for the incidence, severity, and subtypes of speech and language dysfunction.

The Functional Independence Measure (FIM) scores are measured each day during hospitalization and subsequently during every visit. The FIM is a seven-point ordinal scale of function addressing self-care, bladder and bowel, mobility, and social cognition

Their clinical characteristics are examined and correlated with imaging findings and the overall outcome was assessed at discharge, after one month, at the end of six months and 12 months.

RESULTS

The study included 105 consecutive patients with acute stroke (57 male, 48 female; mean age 60 ± 17 years, range 28-82 years). Of the 105 patients assessed at admission, 33.3 % had aphasia, 17.1 % not assessed, 40.3% had dysarthria and 5.7% had other disorders of language.

Of the 95 patients assessed within 7 days of stroke, 20.7% were aphasic. At 4 weeks, when over 90% of survivors were tested, 16% of those tested had aphasia. At 6 months only 12% of survivors had significant aphasia and at the end of one year, there were no patients who showed further improvement. Of those aphasic within 7 days, 40% remained so at 6 months; 60% of those aphasic at 4 weeks remained so implying that most of the patients recovered within a month, Those who did not improve at the end of one month continued to have more persistent deficits.

Clinical correlates:

Age Distribution: Younger patients recovered to a greater extent than older patients (Mean mRS in patients < 45 yrs and in patients > 45 yrs)

The National Institutes of Health Stroke Scale (NIHSS) on admission was a significant and independent factor associated with the presence of Aphasia on admission

(People who were aphasic had mean NIHSS of 9 ± 3 , range 5 – 15 as compared to those without aphasia in whom mean NIHSS was 17 ± 2 , range 16 - 24)

Presence of atrial fibrillation was associated with poorer prognosis (Mean mRS at six months - 2.6 in patients with AF vs 2.8 in those without AF ; r value 0.68)

Mortality among the aphasic patients during the 6 month follow-up was twice that in non-aphasics (36 vs. 16%).

Aphasia scores (On a scale of 0 – 5 where score '0' indicates severe aphasia and score '5' indicates mild aphasia) correlated well with the outcome; when early and late aphasia scores (Mean) were compared, patients with initially severe degree of aphasia continued to have higher scores later also (0.55 & 1.45 vs 3.24 & 4.84 in patients with mild to moderate aphasia)

The aphasia scores in men showed more significant and rapid improvements as compared to women. Mean aphasia score in men improved from 3.26 to 4.04 whereas in women it was 3.54 to 3.93 (r value - 0.6)

The language function became stationary within 2 weeks in patients with mild aphasia, within 6 weeks in those with moderate, and within 10 weeks in those with severe aphasia indicating that the remission curve is steep.

The proportion with global aphasia decreased from almost 25% acutely to a few per cent after 12 months, that with Wernicke's aphasia from 25% to less than 10%, whereas conduction aphasia increased from 13 to 23% during follow-up.

Across aphasia types, semantic disorder was present in 43%, phonologic disorder was seen in 14 % and syntactic disorder in 43 % of patients. Recovery was late in patients with other disorders of language like Aphemia.

The FIM scores showed significant improvements in patients without aphasia than with aphasia.

The severe the aphasia, severe was also the magnitude of functional disability.

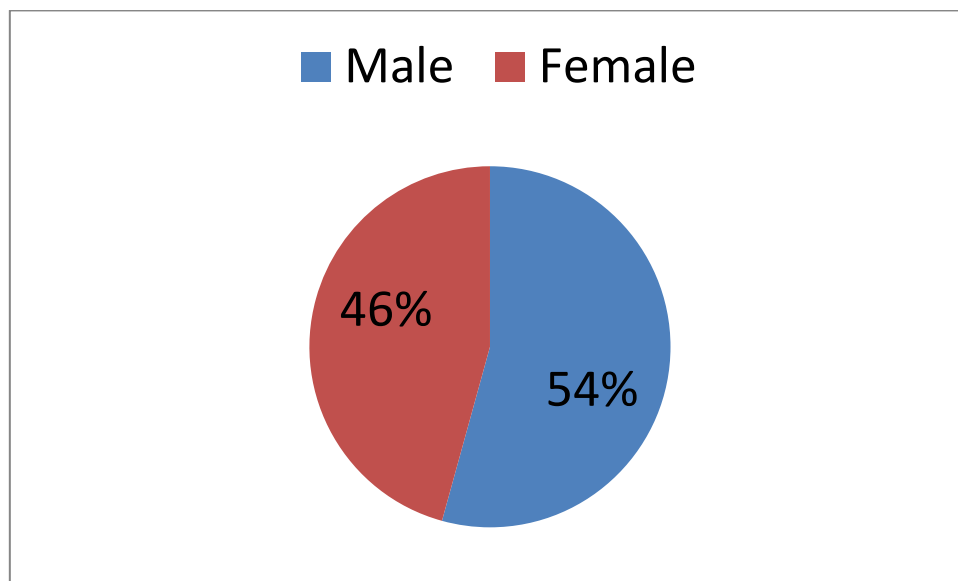
Patients whose level of education was low showed delayed as well as incomplete recovery.

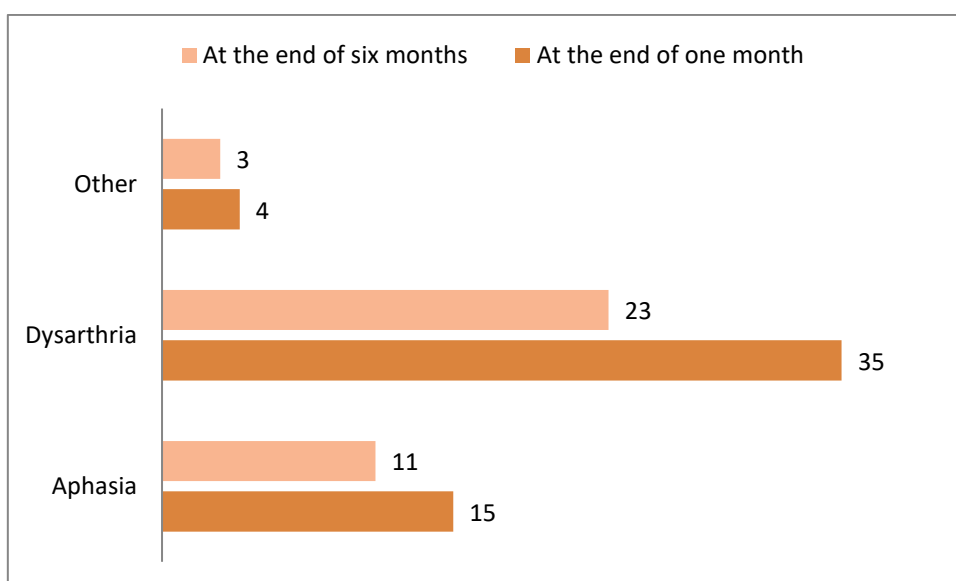
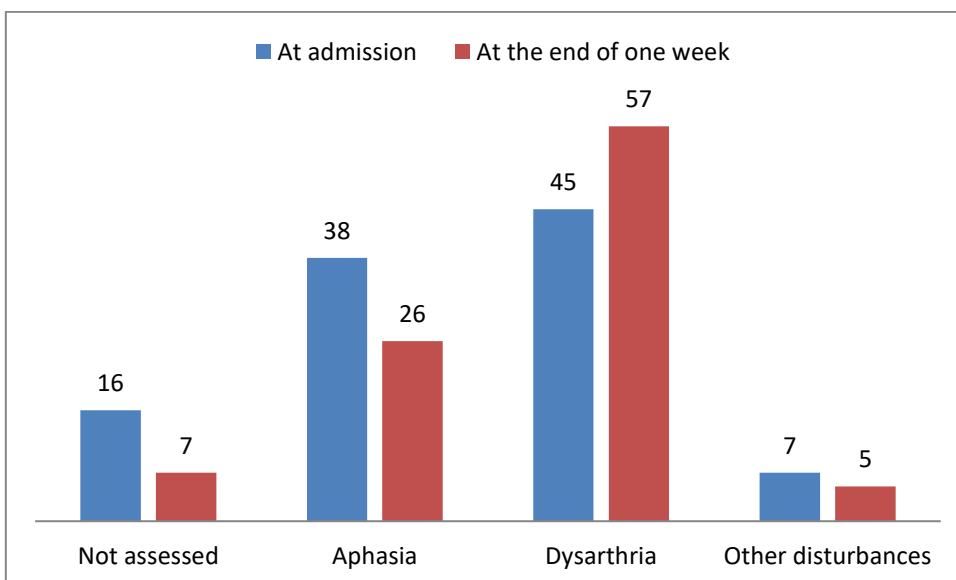
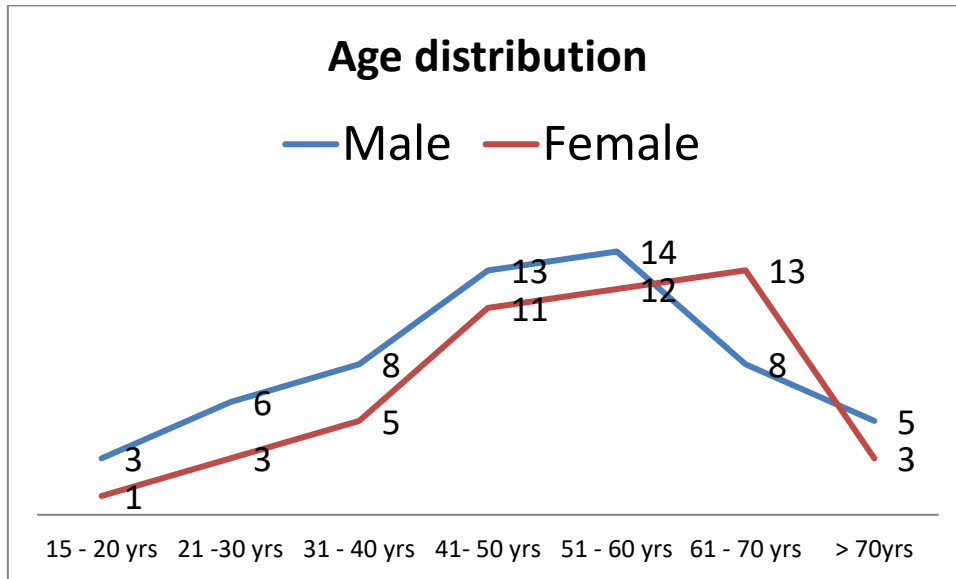
Patients with aphasia secondary to intracerebral hemorrhage had a better recovery rate than aphasia due to cerebral infarcts of similar size (At the end of 4 weeks, 64% of patients with intracerebral haemorrhage showed more than one point recovery in aphasia scores as against 45 % patients of ischemic stroke)

In patients with left hemispherical lesions, the predictor of aphasia severity was the lesion location ($P = 0.011$) whereas in right hemispherical lesions, age of the patient ($P = 0.010$) and lesion size ($P = 0.020$) were found to be contributory.

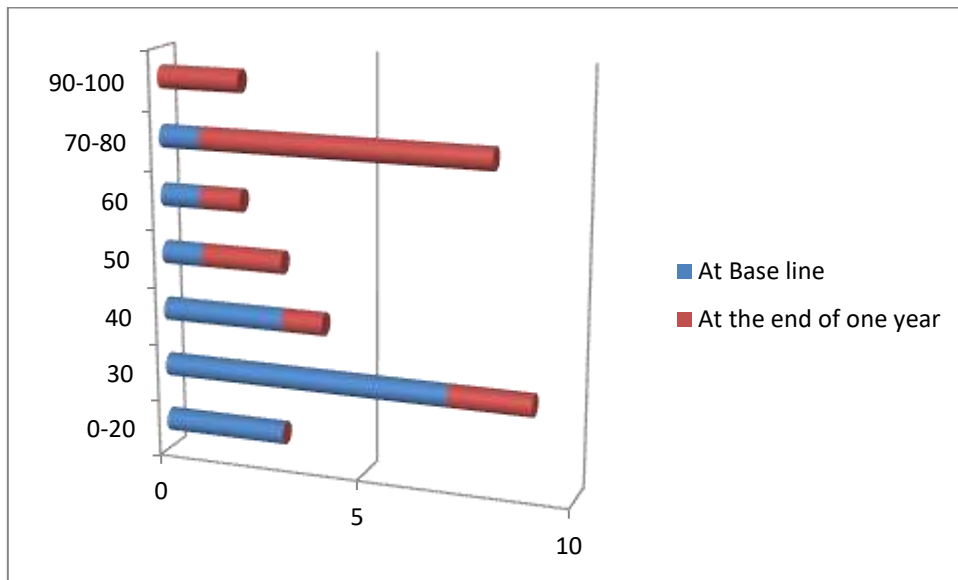
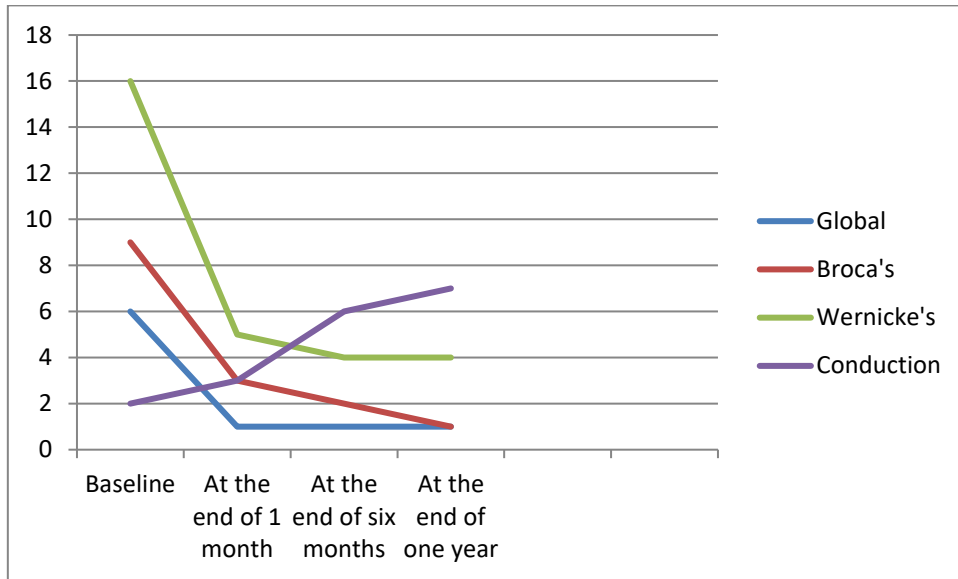
This study was basically conducted in patients who are from resource poor setting where motivation, knowledge and practice helped in the speedy recovery of the aphasic patients. None of the patients were lost to follow up and this is indeed an ongoing study. Outcomes used validated HRQL measures (for quantitative data), established ways of analyzing data (for qualitative data), and systematic methodology (for reviews). Quality assessment of our study has been done using tools of External and internal validity as well as statistical validity.

Limitations of our study were small sample size, inclusion of all types of stroke, ischemic or haemorrhagic and usage of a single battery of tests due to which a small percentage of patients could not be assessed at admission (16 %). A combination of different and adjusted aphasia tests might provide the possibility to assess almost all acute aphasic patients.

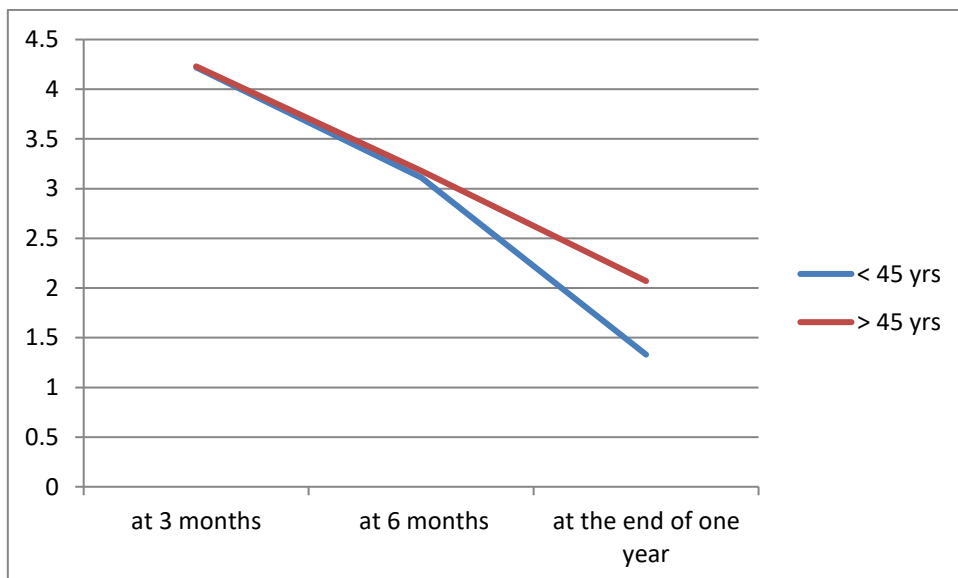




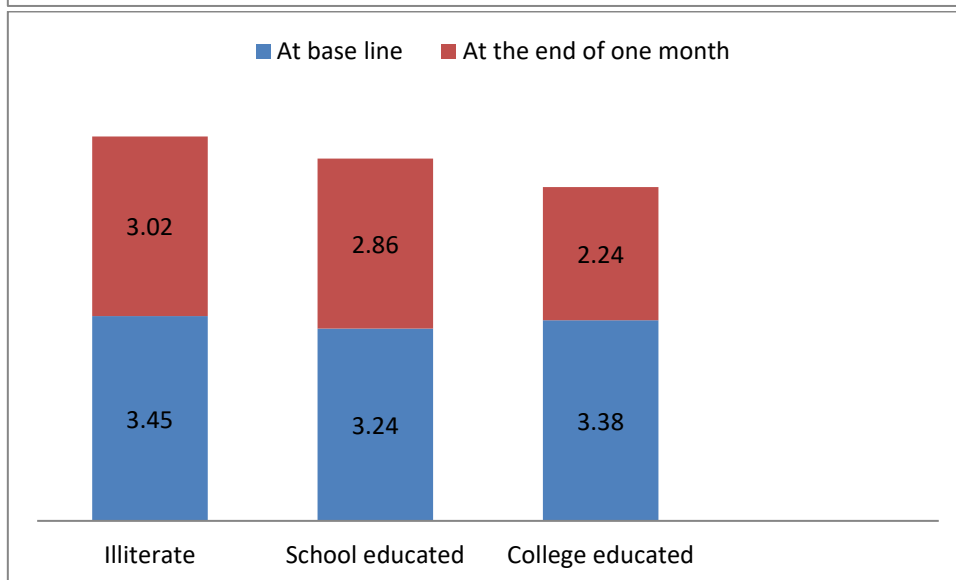
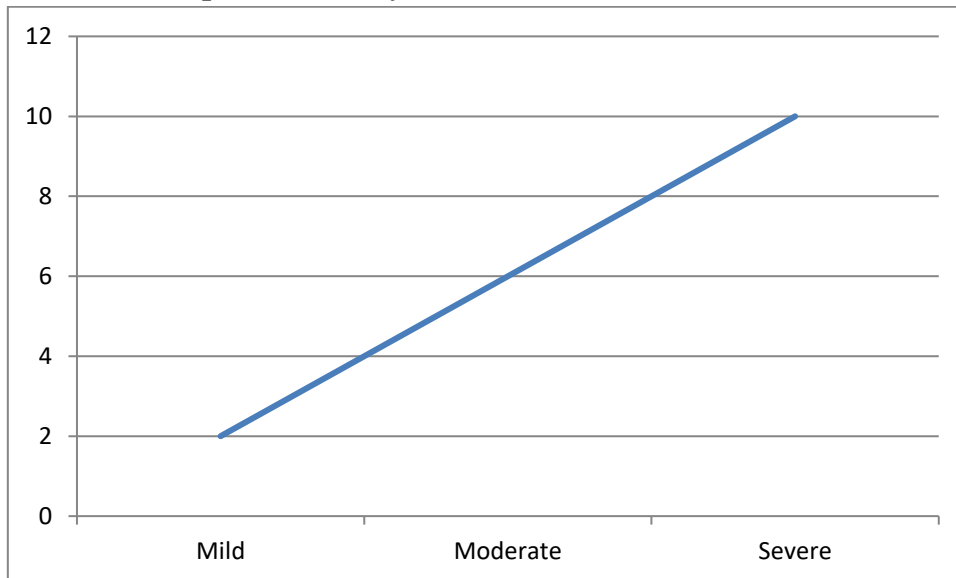
Temporal course of subtypes of aphasia



Influence of age on mean mRS



Aphasia severity & Remission in no. of weeks



Mean aphasia scores and education

DISCUSSION

Neurorehabilitation incorporating language disorders has its roots as early as 18th century. However, the magnitude of aphasia as a chronic and severely disabling condition was not targeted as a tool of research in the beginning and management of aphasia was based on pragmatism alone.

The fact that aphasia leads to severely impaired quality of life has led to significant progress in the clinical study of aphasia in recent years and showed that rapid improvements in language performance are possible even in patients with severe language dysfunction^[8].

In the acute phase of stroke in our study, we have observed that global aphasia was most common and as the patients recovered, other disorders of language dysfunction prevailed. This is in collaboration with other studies^[9].

In our study, about one third (36%) of the patients had aphasia as compared to 15.2 – 38 % in literature^[10], probably accounted for by the timing of aphasia evaluation, the tests used and other factors like literacy .

Aphasic patients had more severe disability than non aphasic stroke survivors and required to stay longer in the hospital.

Parameter	Aphasics	Non aphasics	P value
Mean duration of hospital stay	18 days	5.6 days	< 0.001
Patients who developed Post stroke complications	42%	18 %	< 0.001
Long term Mortality	12%	3%	< 0.001
Attainment of acceptable QOL scores at 3 months	29%	68%	< 0.001
Mean FIM scores	3.4	4.8	< 0.001

Once discharged from the hospital, patients with persistently severe language dysfunction had more post stroke complications like aspiration, infections and bedsores.

Also, there was high long-term mortality among aphasics in our study probably related to cardiovascular status.

When compared with stroke patients without aphasia, aphasic patients in our study reported a lower quality of life, were more distressed, and participated in fewer activities. In a majority of our patients (19 %), there is a considerable spontaneous recovery in aphasia during the first month after stroke onset, but more than half of the patients still had aphasia at 6 months and 12 months (12 %), although in a milder form.

The demographic factors which influenced early recovery in our study are found to be younger age and socioeconomic background (Level of education, occupation etc.). Also men recovered faster than women probably ascribed to level of education and other social factors. In the previously published data, the influence of age and gender was minimal^[11] and there has been no study on the influence of socioeconomic status on recovery in post stroke language dysfunction.

The severity of initial aphasia scores correlated with recovery, higher the score, slower is the recovery.

Location of the lesion correlated partially with the severity of aphasia. More severe as well as uncommon disorders like aphemia are seen in patients with watershed infarcts between anterior and posterior circulation.

In Patients without aphasia, right hemisphere damage caused specific language and communication problems which affected quality of life albeit to a lesser extent than aphasia.

Hypophonia, difficulty with speech initiation (increased speech latency) and dysarthria was found in those with involvement of basal ganglion, probably due to the caudate nucleus and putamen damage. This reinforces the concept of language networks producing congruent symptoms.

However, anatomical predictors still need to be established.

Of all the observed variables, initial severity of aphasia was the most significant and clinically relevant predictor of aphasia outcome. Among those with initial mild aphasia, 70% recovered completely. Great improvement was observed in patients with initial low degree of speech function. However irrespective of type and degree of aphasia, significant improvements were seen in almost all aphasic patients. Even patients with severe speech impairment showed considerable recovery, particularly in the first 3 months after stroke.

Considering all these factors, a valid prognosis of aphasia could be made within 1 to 4 weeks after the stroke. Such information is vital to further the development of language therapy, without which the influence of the many factors that play a role in the recovery of language function remains unclear.

A supervised speech rehabilitation programme by the caretakers tailored to the needs of individual stroke patients could be designed in the absence of a trained speech therapist in our resource poor setting.

CONCLUSION

Impaired communication is a major impediment to stroke rehabilitation [12]. Although spontaneous recovery is the rule, a targeted early and high intensity language therapy is important in the clinical aphasia rehabilitation [13]. Very early mobilization is suggested to be one reason for the positive effect of stroke unit care [14]. Of the four major components of aphasia viz. fluency, comprehension, naming and repetition, it is comprehension which is very essential from a management perspective [15]. Fortunately, this is a function which recovers early in most patients. Persistence of this deficit even in its milder form can be an obstacle in the overall neuro rehabilitation process. To deal effectively with the devastating consequences of speech and language disorders, a prolonged rehabilitation program specifically aimed to improve the individual patient's sense of well-being and quality of life needs to be designed [16]. The impact of disease from the patient's perspective should be captured by incorporating the health related quality of life assessments in evaluation [17]. A more widespread evaluation of other cognitive domains might contribute to the understanding of the symptoms presented by the patients and the characterization of these associated deficits can help in the rehabilitation efforts [18]. Impairment focused therapies aimed to tackle the linguistic and interactional behaviour need to be implemented which will be complementary to other aspects of rehabilitation. Interacton based intervention which involves training the communication partner is another strategy that can produce positive changes in commucication. This method is already in vogue not only as a research tool but also as a model for rehabilitation in everyday clinical practice [19]. Hence , aphasia rehabilitation today is more than treating the language disorder [20].

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