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## RESEARCH ARTICLE

### A SINGLE CASE STUDY PROFILING THE SPEECH AND LANGUAGE CHARACTERISTICS OF AN INDIVIDUAL WITH APHASIA POST-DIALYSIS

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#### ABSTRACT

Stroke causes debilitating effects on the overall functioning of the individual and its consequence varies widely based on its site of lesion. Among the various factors triggering the incidence of stroke, renal failure followed by dialysis also plays a major role which is constantly overlooked. With emerging awareness, a considerable number of research have been documented targeting the medial profile of an individual who suffered an episode of stroke following dialysis. Due to the dearth of literature in profiling the speech and language characteristics and outcomes in this population, the current study was undertaken. A 65 year old individual with history of diabetes mellitus, hypertension and chronic kidney disease, undergoing dialysis was considered as the participant. Formal evaluation was carried out to profile the speech and language characteristics of the client. The evaluation revealed that the individual had features of anomic aphasia with preserved repetition and normal cognitive skills. Thus, alongside venturing the medical effects of dialysis on stroke, the effect on speech and language characteristics can also be profiled pre and post dialysis CKD, leading to a better understanding of the condition.

#### INTRODUCTION

Stroke is an acquired neurological condition caused due to the deprivation of blood flow to parts of the brain. It causes debilitating effects on the overall functioning of the individual and its consequence varies based on its site of lesion. The predisposing factors such as old age, diabetes, hypertension, atherosclerosis, atrial fibrillation, previous cerebrovascular disease constitute the majority of area under research (Nayak-Rao, 2017). Among the various factors triggering the incidence of stroke, hypertension holds a significant position leading to ischemic and hemorrhagic stroke. Atrial fibrillation leads to increased risk of ischemic stroke and the prevalence of atrial fibrillation is twice higher in case of individuals with chronic kidney disease (CKD) when compared to general population (Go, 2009). Thus, renal failure followed by dialysis also presupposes to be a potent risk factor for the incidence of stroke and is often overlooked (Han, 2015). The probability of stroke varies between 5 to 30% in individuals with CKD undergoing dialysis (Nayak-Rao, 2017). Notably, individuals in stage 3 to 5 of CKD have been reported with diminished functional outcomes following stroke.

**Risk of Stroke in individuals with CKD:** Individuals with end stage renal disease undergoing dialysis have 8–10 times greater incidence of stroke when compared to the population

having normal kidney function (Power, 2012; Seliger, 2003; Wang, 2014). Also the type of Stroke in individuals undergoing dialysis was reported to be notably different than that of the general population with the individuals undergoing dialysis showing a higher prevalence of hemorrhagic stroke. A 22 year single-center study compared about stroke in individuals undergoing hemodialysis to that of normals and reported that the individuals receiving hemodialysis were affected at a much younger age when compared to the counterpart. They also supported the fact that 52% individuals undergoing hemodialysis were subjected to hemorrhagic stroke while 68% of the control group was affected with ischemic stroke, thus documenting a higher percentage of hemorrhagic stroke in individuals undergoing dialysis (Toyoda, 2005). When comparing the subgroups of dialysis, individuals receiving peritoneal dialysis showed a lower risk of hemorrhagic stroke when compared to hemodialysis and no significant difference was noted for risk of ischemic stroke when adjusted for all confounding factors (Wang, 2014). However contradicting to the above results, a European study reported predominance of ischemic over hemorrhagic stroke in individuals undergoing hemodialysis (Power, 2012).

**Causes for stroke in individuals with CKD:** Various vascular risk factors occur as co-morbid conditions in individuals with CKD and these factors have been postulated as the reason behind the association of renal dysfunction with

stroke. Conditions such as hyperlipidemia, diabetes, hypertension and proteinuria are highly prevalent in individuals with CKD. The population also shows features of accelerated arterial sclerosis, pro thrombotic tendency and impaired cerebral auto-regulation. Individuals with CKD also show an increased prevalence of intracranial arterial calcification which in turn increases the risk of stroke. An independent but graded relationship has been established between the risk for stroke and estimated glomerular filtration rate (eGFR). A meta-analytic study reported a 43% risk indication of stroke with eGFR<60mL/min (Lee, 2010], but this risk was further modulated by other co-existing factors. Even in the absence of reduced GFR, the presence of proteinuria itself served as an important risk factor for stroke. A meta-analysis of individuals with proteinuria reported an adjusted risk ratio of 1.71(Ninomiya, 2009).

**Need for the study:** It has been acknowledged from literature that an individual undergoing dialysis, is more prone to suffer from a cerebro-vascular accident than the general population. Although a considerable number of research have been documented targeting the medial aspects of the disorder, there is a dearth of literature profiling the speech and language characteristics and outcomes in this population. Thus the current study attempted to document the communication profile of an individual who suffered an episode of stroke following dialysis.

**Aim:** To analyze the speech, language and communication characteristics of an individual affected by stroke triggered by dialysis.

## MATERIALS AND METHODS

A 65 year old individual with an incidence of stroke following dialysis was selected as the participant for the study. The client had a medical history of diabetes mellitus, hypertension and chronic kidney disease and was undergoing dialysis for the same. The incidence of stroke was reported on the day of second episode of dialysis which was confirmed by means of MRI scan. Detailed evaluation was carried out using Western Aphasia Battery to assess the language characteristics of the individual. The calculation of Aphasia Quotient (Kertesz, 1974] and Language Quotient (Shewan, 1986) was done to check the severity of aphasia. Intelligibility rating was done using AYJNIIH rating scale and cognitive skills were evaluated using Mini Mental Status Examination (MMSE) (Kurlowicz, 1999). Profiling of feeding, swallowing and oromotor structures was also done. Subjective assessment of these parameters was done by two trained Speech Language Pathologists.

## RESULTS AND DISCUSSION

**MRI findings:** MRI scan revealed multifocal chronic infarcts with gliosis noted in the bilateral cerebellum, right parieto-occipital, right frontal and left fronto-temporal regions. Subtle hemorrhagic transformations seen in right occipital and left fronto-temporal infarcts. Multiple chronic ischemic lacunae seen in bilateral periventricular white matter, centrum semiovale and subcortical regions. Periventricular ischemic changes were also noted.

**Language Skills:** Client had good comprehension and was able to follow complex sentences and stories without

repetition. Expression was reasonably fair and comprehensible, with few phonologic paraphasias. Client had poor naming skill with predominant word finding difficulties marked with circumlocutions. Impaired naming is a common finding in individuals with cerebellar (Mariën, 2014) and fronto-temporal lesions. The naming skills improved when visual and phonemic cues were given. Verbal repetition skill was also noted to be good. Client was able to repeat complex words with very few syllable omission or substitution errors. Writing skill was observed to be poor with incompletely formed letters and the spacing between the letters and words were inadequate with poorly maintained margins. Reading aloud was affected while reading comprehension was intact.

**Western Aphasia Battery:** Based on the revised scores of Aphasia quotient, among the 8 subsections, auditory verbal comprehension had the highest score followed by repetition and spontaneous speech.

Spontaneous speech	Information Content	Fluency	88
Comprehension			
Yes/No Questions			57
Auditory word recognition			55
Sequential Commands			56
Repetition			80
Naming			
Object Naming			36
Word Fluency			6
Sentence Completion			2
Responsive Speech			6
Reading and Writing			
Reading			60
Writing			57
Aphasia Quotient			58.8
Language Quotient			61.2

**Speech skills:** Speech fluency was fair with a harsh voice quality. Intelligibility was rated as 1 (AYJNIIH Rating scale) which stated that speech can be understood without difficulty, however feels that speech is not normal. Client showed groping when attempting to imitate speech sounds.

**Oral peripheral mechanism examination:** The examination revealed that all the oral structures were structurally normal. Functionally, reduced strength, speed and range of motion of all oral structures was reduced. Intra-oral breath pressure was also noted to be reduced. Difficulty was observed when following commands through imitation and features of groping was present during assessment of non-speech oral activities.

**Feeding and Swallowing:** Feeding requires assistance as the upper limbs are paralysed. Oral transport phase is affected as the tongue strength was not adequate for elevation and propulsion of the food backward into the pharynx.

**Cognitive skills:** Client was alert and oriented. No issues in memory, reasoning or problem solving abilities noted. MMSE revealed a score of 24, stating that the cognitive system of the client was intact.

**Summary and Conclusion:** The prevalence of stroke is high in individuals with CKD and the risk further increases due to various co-morbid conditions which occurs in combination with CKD. The current study aimed at profiling the speech, language and communication characteristics of an individual who suffered an episode of stroke following dialysis. A 65 year old individual formally diagnosed as having stroke based on MRI findings was considered as the subject. The language features resembled that of an anomic aphasia. OPME revealed

that oral functions were affected. Speech was relatively fluent with harsh voice quality and features of groping were present. Feeding and oral transport phase of swallowing was affected. No issues in cognition reported and observed. Stroke following dialysis can cause a significant impairment in speech, language and communication skill based on the site of lesion. Thus, alongside venturing the medical effects of dialysis on stroke, the effect on speech and language characteristics can also be profiled pre dialysis CKD and post dialysis individuals, leading to a better understanding of the condition. In the multidisciplinary team working for individuals undergoing dialysis, speech language pathologists can also be added as the core members of the team.

Conflict of Interest: Nil

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