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THE NECESSITY OF SPEECH AND LANGUAGE COMPREHENSIVE ASSESSMENT IN ADULT NEURO COMMUNICATION DISORDER: A CASE STUDY

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ABSTRACT Adult Neurogenic Communication Disorders (ANCD) associated with stroke comprises one of the major populations across any healthcare set up. Given the wide variety of etiologies leading to ANCD, speech language pathologist (SLP) many a times encounter challenges to formulate an adequate diagnosis, leading to 8% to 15% of diagnostic errors (Scott, 2020). The present case study aimed to investigate the key role of differential diagnosis as an integrative step in the comprehensive assessment of neurogenic communication disorders from a SLP perspective. Comprehensive evaluation was conducted on a 22yrs old Hindi speaking male individual post-acute ischemic stroke with right sided hemiparesis. Tests used for assessment included Montreal Cognitive Assessment-Hindi (MoCA-H), Western Aphasia Battery – Hindi (WAB-H), Frenchay Dysarthria Assessment (FDA) and Gugging Swallowing Screen (GUSS) for assessing alertness, cognition, language, motor speech profiling, and dysphagia respectively. Task based speech and non-speech characteristics were observed clinically, along with perceptual analysis of voice, articulation and speech intelligibility. Accumulating the evidences from the comprehensive evaluation, the subject was differentially diagnosed with neuro cognitive deficit associated with nonfluentaphasia, mixed (flaccid-ataxic)dysarthria and slight dysphagia secondary to stroke. Most individuals with stroke face a breakdown in communication during the course of the disease. Thus, a comprehensive assessment considering differential diagnosis should be done, so that SLPs can arrive at an appropriate diagnosis and address the communicative needs.

KEYWORDS : ANCD, aphasia, dysarthria, dysphagia

INTRODUCTION

A communication disorder is any disorder that affects an individual's ability to comprehend, detect, or apply language and speech to engage in dialogue effectively with others (Collins, 2011). This encompasses deficiencies in verbal and non-verbal communication styles (ASHA, 1993). Studies have reported higher prevalence rates of communication disorders in healthcare settings than in the general population. Moderate or severe difficulties in at least one aspect of speech and language have been reported in over two-thirds of people in a mental health unit (Emerson and Enderby, 1996). A high prevalence of communication impairment was reported for patients in critical care facilities (Sanderson et al., 2019).

Communication skills are particularly vulnerable to the effects of neurodegeneration. Acquired neurogenic communication disorders (ANCD) are caused by the damage to the central or peripheral nervous system. Individuals with these disorders at one period of time had normal communication abilities however the difficulty may have occurred after an acute event or appeared gradually as part of a progressive disorder. It constitutes of a complex array of communication disorders which co-occurs with various physical and sensory deficits in adults as a result of a disturbance of the neurologic system. The major neurogenic communication disorders include cognitive-communicative disorders as a result of brain injury, disease, or pathology might include aphasia, related neurobehavioral disordersand the motor speech disorders including dysarthria and apraxia of speech (Jani & Gore, 2014). A comprehensive speech and language assessment, together with formal neurological evaluation, can identify specific problems or patterns of problems, as well as propose solutions (Williams & McLeod, 2012).

Speech-language pathologists (SLP) working in healthcare settings evaluate adults who have acquired neurogenic communication disorders. They play a significant role to prevent, in screening, formal assessment, diagnose, and rehabilitate speech, language, social communication, cognitive-communication, and swallowing disorders (Dilworth, 2008). Determining whether a language disorder is present is not always a simple task. Language impairments may coincide with speech impairments, such as dysarthria or apraxia of speech, and/or with nonverbal cognitive impairments. The combination of impairments in these domains can affect communication in many ways. Hence SLPs encounter diagnostic challenges, given the wide variety of etiologies leading to language disturbances in adults and the likelihood of also having accompanying speech, swallowing and/or cognitive deficits (Batson & Avent, 2011). Diagnostic errors comprise of 8% to 15% of which most are preventable. Failure to formulate an adequate differential diagnosis leads to such errors (Scott, 2020). Thus, there is a need to use differential diagnosis in comprehensive assessment of neurogenic communication disorders.Differential diagnosis helps SLP to classify communication disorders according to the current diagnostic criteria and terminology, and to differentiate it from other conditions that may affect communication, such as cognitive, motor, or sensory impairments. The present case study aimed to investigate the key role of differential diagnosis as an integrative step in the comprehensive assessment of adult neurogenic communication disorder.

MATERIALAND METHOD

A Hindi speaking right-handed male aged 22yrs, reported to speech language pathology department with a complaint of inability to speak following acute ischemic stroke associated with a right sided hemiparesis. Poststroke MRI results suggested of multiple chronic infracts with gliosis in left occipital lobe, both halves of the pons, & bilateral posterior inferior cerebellum hemisphere with volume loss.

Communication deficit was reported post stoke with a hemiparesis (both fore and hind limb) in right side resulting in dependency in activities of daily living. Assessment was performed focusing on cognition, speech, language and swallowing aspects from a SLP perspective. Perceptual analysis included assessment of level of consciousness using Glassgow Coma Scale (GCS), cognitive functioning (executive functioning, attention, language, visuospatial and orientation) based on Montreal Cognitive Assessment-Hindi (MoCA-H), and linguistic skills (spontaneous speech, auditory verbal comprehension, naming, repetition) using Hindi version of Western Aphasia Battery(WAB-H). Additional assessment for the functions of reading, writing and praxis were also conducted. Frenchay Dysarthria Assessment (FDA) was assessed for the identification of the nature and patterns of oromotor movements associated with different types of dysarthria. Assessment of saliva swallowing, direct assessment of swallowing (with food) and severity of aspiration risk was screened using Gugging swallowing screening (GUSS) measures. Speech intelligibility rating scale examined the overall intelligibility of speech followed by the assessment of voice quality and articulation.

RESULTS

The scores obtained from Glassgow Coma Scale (GCS) were indicative of adequate level of alertness and awareness. Assessment of speech, language, dysphagia and cognition was done using standardized test measures and the accumulated results assisted in

differential diagnosis. Montreal Cognitive Assessment-Hindi (MoCA-H) evaluated cognitive skills in domains of visuoconstructional skills, naming, memory, attention, language, abstraction, delayed recall and orientation. The obtained score of 21 out of a maximum score of 30representing low scores in visuoconstructional skills,naming and language skills was suggestive of neuro cognitive deficit. The language skills were examined using diagnostic Western Aphasia Battery (Hindi) which consistedof domains spontaneous speech, auditory verbal comprehension, naming, repetition, reading, writing and praxis.The results reported of marked poor scores in verbal responses for repetition, naming and verbal fluency whereas auditory comprehension revealed a comparatively better score as demonstrated in tasks of comprehension of simple commands through verbal and written modalities.Aphasia quotient calculated from the obtained scores of WAB was 30.6 which indicated a severe category of aphasia. Differential diagnosis performed based on the WAB scores suggested of a classification of non-fluent aphasia. The interpretation of the test scores reported of reading and writing deficits however apraxia was not present in the case.

Assessment of the speech skills included cranial nerve examination, which is an integral and important part of a complete neurological examination. Clinical evaluation of cranial nerve assessment revealed affected functioning of trigeminal (CN V), facial (CN VII), vagus (CN X), glossopharyngeal (CN IX), accessory (CN XI), & hypoglossal (CN XII).Diadochokinetic rate (DDK) is a measure of articulatory coordination and sequencing through a hierarchy of productions of increasing length and complexity. Reduced DDK rates of 4.4, 4.1, and 3.2 for /pʌ/, /tʌ/, and /kʌ/, respectively were noted. Productions during the DDK tasks were affected in terms of slowness, rhythmicity and precision.

Oral peripheral structure and function examination reported of lips deviated to the right side and an overall weakness of the tongue at rest. As for strength and mobility of orofacial structures during speech and nonspeech tasks the case presented with slow alternating movements, decreased strength, reduced accuracy and range of movements of jaw, labial and lingual movements. The significant articulatory error noted in articulation test was imprecise consonants.SODA analysis done on the collected speech sample revealed that Hindi velar, fricative and affricate sounds were distorted in isolation, at all word positions and markedly deteriorated at sentence level. Nasalization of speech sounds in continuous speech was evident. Examinationof Hindi blends in connected speech indicated presence of mostly distortion and occasionally omission.Speech intelligibility rating of word, sentence and spontaneous conversation was suggestive of understanding with effort only if context is known (Fig 1). The quality of voice was perceptually rated using GRBAS as hoarse voice handicapness with insufficient maximum phonation duration. The FDA scores obtained confirmed the presence of dysarthia of speech in the present case study. Differential diagnosis classified dysarthria as mixed type (flaccid – ataxia).

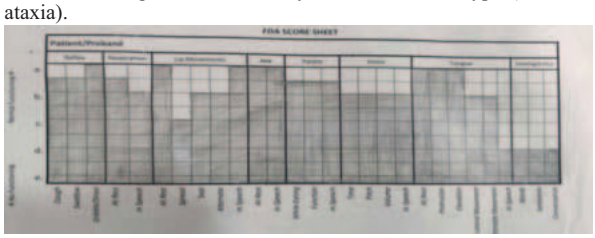

Fig 1. FDA profile

The result of Gugging swallowing screening (GUSS) of direct swallowing test found swallowing difficulties in solid textures with a score of 18 indicating a severity of slight dysphagia associated with low risk of aspiration.

On accumulating the evidences and results the present case was provisionally diagnosed from a speech language pathologist (SLP) perspective as having neuro cognitive deficit associated with nonfluent aphasia, dysarthria of speech, slight dysphagia and reading, writing deficit.

DISCUSSION

In the present study the domains of cognition, speech, language and swallowing was assessed using casehistory, radiological tests, standardized speech and language measures.The results obtained were analyzed from a SLP perspective, using a differential diagnosis framework (anatomical, physiological and clinical). Poststroke radiological investigation reports of multiple chronic infracts with gliosis inboth halves of the pons, & bilateral posterior inferior cerebellum hemisphere with volume loss.Speech and language test results led to a provisional diagnosis of neuro cognitive deficit associated with nonfluent aphasia, dysarthria of speech (flaccid – ataxic type), slight dysphagia and reading, writing deficits. SLPs require to have knowledge of all domains of cognition and how cognitive domains interrelate and influence language performance to diagnose effectively. The present case on examination portrayed a mild cognitive deficit associated with nonfluent aphasia post stroke. Schmahmann and Sherman (1998) defined a new clinical entity of Cerebellar Cognitive Affective Syndrome (CCAS), as an impairment in four areas of cognitive functioning: (1) executive functions (2) visuospatial functions (3) personality (4) language functions. De Smet et al., (2013) stated that language functions influenced by the cerebellum included verbal fluency, lexical retrieval, syntax, and in some cases also reading and writing supporting the results of the present study. Numerous research studies have reported of reduced verbal fluency, grammatical/syntactic impairment and agrammatic speech as commonly reported language impairment associated with cerebellar pathology (Silveri et al., 1994; Hassid,1995; Zettin et al.,1997).Impairments in reading, writing and mathematical operations have also been observed following a right cerebellar vascular lesion (Hassid,1995). Mariën et al. (1996)identified that cerebellar lesions may provoke an aphasic syndrome which results from a disconnection of the neuronal circuits connecting the right cerebellar hemisphere to Broca's area (Brodmann areas 44 and 45) and the supplementary motor area.

Articulatory errors, phonatory problems and poor speech intelligibility was noted in the present case having dysarthria of speech (Flaccid-ataxia). Considering the speech aspects, results of previous research studies found that acute or chronic cerebellar lesions may provoke alterations both in phonation and articulation supporting the findings of the present study. Additionally, individuals with cerebellar lesion have slow verbal expression, monotonous, speech,alterations of prosodic aspects and consonants tend to have a nasal character (Fabbro et al., 2000). Reduced diadochokinetic rates as depicted in the present case have been proven particularly sensitive to cerebellar involvement (Ziegler, 2002; Ziegler & Wessel, 1996).Elyas (2011) specified that multiple pontine infarcts primarily result in pseudobulbar palsy which includes severe dysphagia and dysarthria. The present case with a radiological involvement of pontine infarction was on the same line, depicting dysarthria of speech (Flaccid – Ataxic type) and dysphagia. Clinical presentation of a pontine infarction can vary, ranging from theclassical crossed syndrome (ipsilateral cranial nervepalsy and contralateral motor and/or sensory impairment) to the less common pure motor hemiparesis or hemiplegia or pure sensory stroke (Kumral et al.,2002).

CONCLUSION

The presented data of the case study suggest that ANCD affects cognition, speech and language domains, swallowing and reading, writing behavior. Assessment of patients with neuro communication disorders begin with background information about the patient followed byvarious testing measures. Thus, the information provides a context from which the SLP makes predictions about the nature and severity of the patient's disability and decides standardized measures likely to be most appropriate. Ideally, it explores the nature of the speech and language impairment and indicates presence of comorbid behaviours. The assessment steps are extensive and challenging and have a high rate of diagnostic errors. Thus, from a SLP perspective a comprehensive assessment using differential diagnosis is required for a precise diagnosis which in turn leads to intervention appropriateness.

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