

*Case Report***Bidirectional Translation Disorder with Flaccid Dysarthria as an Impact of Extra Cranial ICA Aneurysm**Daly Sebastian¹, B S Premalatha²

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*Received: 05/08/2015**Revised: 27/08/2015**Accepted: 08/09/2015***ABSTRACT**

Extra cranial internal carotid artery aneurysms are rare. Atheroembolic stroke and compression of adjacent structures are the non-hemorrhagic consequences of unruptured aneurysm. The current case study investigated speech and language disorder in an individual with saccular aneurysm of extra cranial internal carotid artery Aneurysm. The individual had a history of atheroembolic stroke. Detailed clinical evaluation was done by using a test battery approach. Multilingual considerations were also taken during the clinical evaluation. Oromotor examination, cranial nerve evaluation, Frenchay Dysarthria Assessment, Western Aphasia Battery and Bilingual Aphasia Tests were the various clinical procedures followed. Flaccid dysarthria and bidirectional translation disorder were identified by using appropriate clinical strategies. Clinical correlation was done for speech disorder as well as language deficits. The study is unique due to the rare nature of cause, comorbidity and clinical features. The study highlights the need for considering cross linguistic deficits in multilingual individuals with similar histories. The study also gives insight into the role of lesioned areas in multilingual language processing. Tackling the exact nature of language deficit is crucial for offering a better rehabilitation.

Key words: Extracranial ICA aneurysm, Atheroembolic stroke, Dysarthria, translation deficit.

INTRODUCTION

Aneurysm of the extracranial internal artery is a rare condition with incidence of 0.8-1% of all aneurysms. [1] It can give rise to serious complications such as haemorrhage due to rupture, stroke and thromboembolism. It can be partially or completely thrombosed thereby causing embolisation and ischaemic events. Compression of nerves and ruptures are other complications. [2] The common causes are atherosclerosis, trauma and infections. In

rare cases ICA aneurysms causes thromboembolic events. This is the non-hemorrhagic consequences of cerebral aneurysm. The embolic stroke can be anywhere in the territory of internal carotid artery. Depending on the site of lesion in the intracranial course of ICA the language deficits also varies. Aphasia is the common neurolinguistic deficit associated with ICA occlusion.

The current study highlights various consequences of extra cranial ICA

aneurysm. The primary consequence was the size and position of unruptured aneurysm and its impact on the subsystems of speech. The secondary consequence was atheroembolic stroke and neurolinguistic deficit associated with the same. Since the participant was a multilingual tackling the nature of neurolinguistic disorder was challenging. Therefore, clinical evaluation was comprehensive to identify the exact diagnosis for a better management.

CASE REPORT

Mr. DP was 32 year old male came to our clinic with the primary concern of not able to speak. Medical reports revealed atheroembolic stroke and atherosclerotic aneurysm of extracranial internal carotid artery. MRI report revealed recent onset infarct within right periventricular region, chronic ischemic foci within bilateral frontal and parietal periventricular, centrum semiovale and left corona radiata. Old lacunar infarcts noted within the left periventricular and external capsule. In order to study CNS circulation, CT Carotid angiography was performed. The test was performed through intra cranial and extra cranial vessels by injecting 60ml of 350 mg% Optiray intravenously. Results revealed wide necked saccular aneurysm measuring 14 * 8mm (length * width) arising from side wall of extra cranial ICA ~1.5cms from the origin, neck measures 4.8mm. Aneurysmal wall is mildly thickened, however lumen is well opacified with contrast. Hypo plastic Right Vertebral Artery also reported. Basilar arteries were

normal in course and calibre. The aneurysm was unruptured and situated in the neck region. The aneurysm was yet to be removed once BP level stabilizes.

Demographic details revealed that Mr. DP is an in service government employ (Senior Auditor) and his speech problem interfere with his job related tasks. Language history revealed Mr. DP is multilingual. A detailed assessment was carried using informal and formal test procedures.

Oro Motor Integrity: Detailed oral peripheral mechanism examination was carried out. Weakness and restricted movements were observed for lips, tongue and velum. OPME revealed abnormality in oral reflexes. Gag reflex was absent even with repeated stimulation. Cough reflex was weak and swallow reflex was delayed. Speech motor integrity was assessed by using oral diadochokinetic rate (DDK). Both alternate motion rate (AMR) and simultaneous motion rate (SMR) were slow (less than three syllables). Imprecise consonants were observed during the DDK task performance.

Cranial Nerve Assessment: Cranial nerves V, VII, IX, X and XII are most critical for speech production. Mr. DP was asked to perform various tasks to assess the cranial nerve functioning. He exhibited difficulty in performing those tasks. And the observations of cranial nerve assessment are summarized in table 1. It can be seen from the table that the functions of cranial nerves V, VII, IX, X and XII are affected.

Cranial nerves	Impression
Trigeminal nerve	Reduced strength of masseter muscle towards right
Facial nerve	Reduced strength of lips and cheek muscle towards right
Vestibulo cochlear nerve	Normal hearing and vestibular functioning
Glossopharyngeal nerve	Absent gag reflex and hyper nasality
Vagus nerve	Delayed swallow reflex
Hypoglossal nerve	Restricted tongue movements and imprecise consonants

Subsystems of speech: Since there was a history of neurological involvement and reduced speech intelligibility, it was crucial to test for dysarthria using Frenchay Dysarthria Assessment. [3] FDA results are depicted in figure1. It can be seen from picture that the movement of tongue, lips and velum are affected during speech as well as non-speech task. Comparatively preserved laryngeal mechanism was also seen. Impaired speech breathing was evident from the reduced breath groups. Reduced maximum phonation of vowels /a/, /i/ and /u/ indicated impaired ability to sustain vowel phonation. However, pitch and intensity components were perceptually adequate. It can be observed from the FDA that the movement of velum is affected during speech as well as non-speech tasks. Hyper nasality was suggestive of affected resonance subsystem. Weakness of lips, tongue and velum compromised the function of articulatory subsystem. Imprecise consonants resulted in impaired speech intelligibility.



Figure1. Score sheet of Frenchay Dysarthria Assessment

Objective evaluation of voice:

Stroboscopic examination revealed normal vocal cord structure and function. This was correlating with the perceptual observations on FDA under laryngeal subsystem.

Clinical evaluation of language: A detailed clinical evaluation was done by using test battery approach.

Western Aphasia Battery (WAB): WAB [4] was administered in English as well as in Tamil and Kannada. Scores were within the normal limits. Fluency was reduced in Tamil and Kannada. Since language manifestations were different in DP’S known languages, it was critical to perform a language evaluation with detailed multilingual considerations. It can be seen from the table 2 that DP obtained maximum Aphasia Quotient (AQ) for English task when compared to Tamil and Kannada.

WAB	English	Tamil	Kannada
Information content	8	7	7
Fluency	9	6	5
Auditory Verbal Comprehension	9.9	9	8
Naming	8.8	8	8
Repetition	9	8	8
Aphasia Quotient	73.4	62	58

Language proficiency charting: In order to identify the exact nature of language disorder of DP, a detailed language proficiency charting was done in comparison of pre and post morbid conditions. It can be seen from the table 3 that there is a difference in the pre morbid and post morbid status of language proficiency.

Languages	Proficiency		Communication situation
	Pre morbid	Post morbid	
L1-Tamil	Very good	Average	At home
L2-English	Very good	Good	Friends outside home
L3-Kannada	Very good	Average	Educational or occupational
L4-Hindi	Good	Average	Friends
L5-Malayalam	Poor	Poor	Friends

Evaluation of translational abilities:

Parallel administration of WAB revealed scores within normal limits. It was relevant to know the presence of cross linguistic deficits by considering the language background of DP. Therefore, DP's translation abilities were also tested. Translation tasks of Bilingual aphasia tests in Tamil-English, [5] Kannada-English, [6] and Hindi English [7] combinations were used to study the translation disorder. Results are depicted in table 4.

Translation	Scores
Kannada to English	2/5
English to Kannada	2/5
English to Tamil	1/5
Tamil to English	2/5
English to Hindi	2/5
Hindi to English	3/5

Informal translation tasks also performed to check the translation abilities in Tamil-Kannada, Kannada- Hindi and Hindi-Tamil Language pairs. It can be seen from table 4 and table 5 that DP exhibit bidirectional translation disorder.

Informal Translation tasks	Scores
Tamil to Kannada	4/10
Kannada to Tamil	3/10
Kannada to Hindi	2/10
Hindi to Kannada	4/10
Tamil to Hindi	3/10
Hindi to Tamil	3/10

Clinical correlation: Clinical diagnosis as 'Bidirectional translation disorder with Flaccid Dysarthria' was done. The diagnosed condition was a very rare combination of speech and language disorders. Generally spastic dysarthria is the common combination along with aphasic syndromes. Existence of this rare combination is the peculiarity of the current study. Weak/ absent oropharyngeal reflexes (hyporeflexia), weakness on oromotor structures, hypernasality and reduced speech

intelligibility contributed to the diagnosis of flaccid dysarthria. We assign the probable cause to the large saccular aneurysm situated in the neck. The compression of facial, glossopharyngeal and hypoglossal nerves by the aneurysm can be a reason for observed flaccid dysarthria features. Absent gag reflexes and reduced sensation on right side of the tongue support the impact on right glossopharyngeal nerve. Reduced tongue movements on right side indicated hypoglossal nerve involvement. Weakness on lip and cheek support facial nerve weakness on right side. However from the stroboscopic evaluation result of normal voice, it can be inferred that the aneurysm had no effect on recurrent laryngeal nerve.

The diagnosis of the existence of a language disorder in DP was challenging. DP's language performance was normal within a particular language. However the real deficit was in cross linguistic task. Therefore, the current study highlight the relevance of translation assessment to tackle the language disorder in multilingual. Difference in pre morbid and post morbid language proficiency, difference in Difference in information content and fluency across languages (on WAB scores) and the existence of bidirectional translation deficit supported the diagnosis of Multilingual Aphasia.

DISCUSSION

Aneurysms of the extracranial internal carotid artery are rare. The spontaneous progression of these aneurysms is generally associated with an increased risk of neurologic manifestations due to cerebral embolization from the intra-aneurysm thrombus. [8] In some cases they act as the source of emboli formation and causes cerebro embolic stroke. In present case study also it can be seen that the atherosclerotic aneurysm developed in the extra cranial course of ICA lead to the

atheroembolic stroke in the intra cranial course of ICA. These aneurysms may occasionally reach a diameter of 05 cm and cause compression of surrounding structures but rarely progress into rupture. [9,10] In the current study also, we presume that the saccular aneurysm of the extra cranial course of ICA compressed cranial nerves. This can be the possible reason for the manifestations of flaccid dysarthria in DP. Speech and language manifestations of embolic stroke following the aneurysms vary depending on the site and size of lesion.

Language disorder may have different manifestation in multilingual population. [13] It was evident from the current study that diagnosing language disorder is a challenging task and it require clinical procedures different from that of mono lingual population. In the present study also DP's language disorder was confined to translation deficit. There are different types of translation disorder reported in literature such as unidirectional translation disorder, paradoxical translation disorder [11] compulsive translation disorder and bidirectional translation disorder. [12] In the present study, DP's language disorder was characterized bidirectional translation disorder. The study emphasizes the utility of BAT and informal translation task in tackling the language disorder in DP. If we had dependent only on the WAB scores, the major language disorder in DP would have unidentified.

The lesion correlation indicates the role of bilateral cortical structures and white matter pathways in multilingual language processing. DP' MRI finding indicated that the infarct was present within right periventricular region, chronic ischemic foci within bilateral frontal and parietal periventricular, centrum semiovale and left corona radiate. Old lacunar infarcts were seen within the left periventricular and

external capsule. It can be inferred from the MRI findings and clinical language profile that the lesioned brain areas have something to do with translation task. The study emphasize that the lesion sites play a major role in translation task and cross linguistic processing. However, the data and methodology in the current study is insufficient enough to make the confirmatory statements.

CONCLUSION

The study aimed to investigate the speech and language disorders in an individual with extra cranial ICA aneurysm and atheroembolic stroke. Detailed speech and language evaluations were carried out. Special clinical protocols were performed to identify the deficits in cross linguistic processing. The test battery approach facilitated the exact clinical diagnosis. Clinical and lesion correlations were also done. Rare etiology, rare combination of clinical conditions and presence of bidirectional translation disorder are the highlights of the current study.

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