



IMPACT OF SPEECH INTELLIGIBILITY IN VARIOUS PHASES OF DYSPHAGIA SECONDARY TO CERBRO VASCULAR ACCIDENT (CVA)

Speech & Hearing

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ABSTRACT

Neurological abnormalities in the brain due to CVA have the impairment in restricted speech sound production which affects speech intelligibility. There are limited studies have been carried out in identifying the speech intelligibility at types of Dysphagia. The main aim of doing this presentation is to find the impact of speech intelligibility in various phases of Dysphagia secondary to CVA. Bedside evaluation to find out the phases of Dysphagia and Ali yawar Jung National Institute of Hearing Handicapped (AJYNIHH) 5 point speech intelligibility rating scale were administered for all the participants. The percentage of speech impairment at types of Dysphagia were documented, in which the Esophageal Dysphagia shows 12% Impairment of speech intelligibility and Oro preparatory shows more impairment of speech intelligibility and affected by 26% followed by Oro-pharyngeal with 24% of reduced speech intelligibility. The pharyngeal phase had 18% of reduced speech intelligibility which is lesser than an Oral phase of Dysphagia (20%). Patients with types of Dysphagia have demonstrated reduced speech intelligibility in which Oro Preparatory phase have severe impairment in speech intelligibility following by Oro Pharyngeal phase, Oral phase, Pharyngeal phase and Esophageal phase.

KEYWORDS

Dysphagia, CVA, speech intelligibility, Pharyngeal, Esophageal, Oral and oropreparatory, AJYNIHH

INTRODUCTION:

Cerebro Vascular Accident (CVA) is one of the most common and devastating disorder. According to WHO Global health Observatory Data Repository, CVA is one of the leading cause of death contributing to 12 percent of mortality worldwide. Dysphagia is the one of the most common symptoms followed by CVA, affecting swallowing functions. The high incidence for dysphagia and aspiration pneumonia is a consistent finding of patients with stroke. (Martino et al., 2005). CVA affects the groups of muscles involved both in swallowing and Speech functions. The Labial, Lingual, Pharyngeal, Laryngeal and esophageal muscle predominantly corodnrites and responsible for the physiological functions of speech production and deglutition. Some swallowing problems are Visible like drooling, coughing or choking. Others may be harder to see. These weaknesses in the oral musculature also have impairment in speech sounds with results in poor speech intelligibility. Speech and swallowing disorders frequently co-occur in neurologically impaired adults. Impairment is greater with more than one of the three phases of swallowing (oral, pharyngeal, and esophageal) (Aguilar, Olson, & Shedd, 1979). Speech and swallowing are regulated through a combined network of brain regions and other neural processes that are modulated on the basis of specific task demands so that they have impairment also in the speech intelligibility.

The most often noted clinical identifiers of dysphagia are dysarthria, abnormal volitional cough, and abnormal gag reflex (Steven lender, Julian F Espinosa, 2002). Following a stroke, weakened muscles in the mouth or throat, a loss of sensation in the tongue, poor muscle coordination, or the inability to cough can all impair swallowing. Weakened muscles may also delay swallowing or result in an incomplete swallow. A stroke may also make it difficult for a person to communicate any trouble in swallowing functions (American Heart Association). General comments about function, such as "patient aspirates" "patient is intelligible," provide inadequate bases to know how the client is impaired after CVA. "Muscles of voice and swallowing share many similar central and peripheral neural control elements as well as a cross-system interaction with respiratory functions" (McFarland, D. H., & Lund, J. P. 1993). The idea of cross system interactions is further supported by evidence for the co-occurrence of swallowing and voice/speech disorders within

individuals (Nishio, M., & Niimi, S., 2004). It been a strong cordication between the airway protective mechanism and deglutition and most of the time incoordination of these two mechanism leads laryngeal aspirations (Logemann J. A. 1995).

Need for the study:

The oro peripheral mechanism musculature system have the unique physiological functions for both speech and deglutition Any neurological abnormalities in brain which is caused due to CVA have the impairment in restricted speech sound production which affects speech intelligibility. In the current research areas there is a demand in identifying the speech intelligibility in various phases of dysphagia. Hence taking this into consideration the present study is an attempt to understand the impairment of speech intelligibility in various phages of dysphagia caused secondary to CVA mostly based on the dysphagia symptoms irrespective to linguistic consideration.

Aim of the presentation:

The main aim of this study is to find out an impact of speech intelligibility in various phases of dysphagia secondary to CVA.

Methodology:

Subjects:

In the present study, 50 individuals were included with the diagnosis of Dysphagia due to CVA. Individuals diagnosed with aphasia were excluded from the present study

Test used:

All individuals included in the study were administered WAB, FDA to know about the speech and language impairments which have a direct effect on speech intelligibility. Swallowing assessments both bedside and instrumental investigations were carried out to confirm the phases of dysphagia. General bedside investigation and available FEES, VLS and MBS report were taken in to diagnose the phases of dysphagia.

Procedure:

Once the phases of Dysphagia are diagnosed. Ali yawar Jung National Institute of Hearing Handicapped (AJYNIHH- 5 point rating scale) intelligibility rating scale was used to assess the speech intelligibility of the client during normal conversations by the clinician. The clinician gives the rating from 0-5 based on the severity of speech

intelligibility using the AJYNIHH speech intelligibility rating scale in which shows normal speech intelligibility and 5 shows the severe deviation in speech intelligibility from normal. Dysphagia was rated for each consistency of food and liquid in terms of the following parameters: 1) Oral spillage point 2) Mastication on solid diet texture 3) Presence of lingual sweep 4) swallow onset time 5) Degree of oral and pharyngeal residue 6) Aspiration/penetrations scale 7) Presence of Laryngeal elevations (Time/Delay) 8) Duration to complete the task

Statistical Analysis:

Appropriate statistical tests were carried out through IBM statistically package for social science (SPSS) statistics 22 software and results indicated that the significant difference $P=0.0036(p<0.05)$ was noticed in identifying impact of speech intelligibility in various phases of dysphagia. The mean and standard deviation for all the parameters were calculated using descriptive statistics

χ^2 Calculations
Two-way Contingency Table

	Chi square test						
	1	2	3	4	5		
oro pre	0 1.56 (1.56)	0 3.12 (3.12)	1 2.08 (0.98)	4 2.34 (1.18)	5 2.34 (3.02)	3 1.56 (1.33)	13
oral	2 1.20 (0.53)	5 2.40 (2.82)	2 1.60 (0.10)	1 1.60 (0.36)	0 1.60 (1.80)	0 1.20 (1.20)	10
oro pxi	0 1.44 (1.44)	1 2.88 (1.23)	2 1.92 (0.52)	2 2.16 (0.91)	4 2.16 (1.57)	3 1.44 (1.68)	12
pxi	1 1.08 (0.91)	3 2.16 (0.33)	3 1.44 (1.89)	2 1.62 (0.59)	0 1.62 (1.62)	0 1.08 (1.58)	9
oeso	0 0.72 (1.22)	0 1.44 (1.89)	0 0.96 (0.96)	0 1.08 (1.58)	0 1.08 (1.58)	0 0.72 (0.72)	6
	6	12	8	9	9	6	50

$\chi^2 = 41.078$, $df = 20$, $\chi^2_{df} = 2.05$, $P(\chi^2 > 41.078) = 0.0036$

Table 1: The impairment of speech intelligibility in various phases of Dysphagia. (Oro Pre : Oro preparatory Dysphagia , Oral : Oral phase Dysphagia , Oro Pxl: Oro pharyngeal Dysphagia , Pxl: Pharyngeal phase Dysphagia , Oeso: Oesophageal phase Dysphagia)

RESULTS:

It proven from this study that CVA affect the swallow functions and also affect the speech intelligibility of the persons with various phases of Dysphagia such as Oral preparatory, Oral, Oro-pharyngeal, Pharyngeal, Esophageal dysphagia. Speech intelligibility was observed to be more severe in the oral preparatory phase of Dysphagia. Patients with Esophageal phase Dysphagia had minimal impairment in the intelligibility of speech (12%) and Patients with Oro preparatory phase Dysphagia had the maximum impairment in speech intelligibility (26%) followed by Oro-pharyngeal phase Dysphagia (24%). Patients with the Pharyngeal phase had 18% of reduced speech intelligibility which is lesser than an Oral phase of dysphagia (20%). The esophageal phase shows no significant impairment in intelligibility. Oral and Pharyngeal phases had more impact on impairment in speech intelligibility. The above results are confirmed with statistical analysis. In figure 2, the bar diagram shows the percentage of speech impairment in various types of Dysphagia.

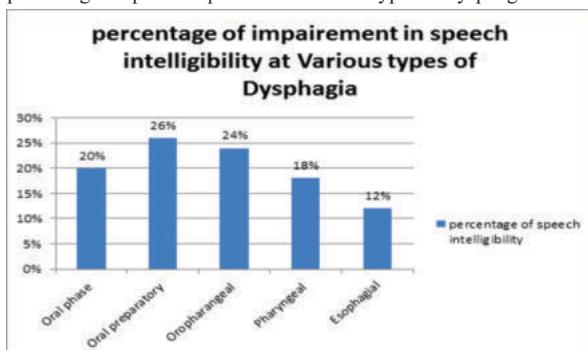


Figure 2 : Impairment of speech intelligibility at different types of dysphagia

CONCLUSIONS

The following conclusions can be drawn from the results of the present study. Patients with Dysphagia have reduced speech intelligibility in which Oro Preparatory phase have severe impairment in speech intelligibility followed by Oro Pharyngeal phase, Oral phase, Pharyngeal phase and Esophageal phase.

Limitation:

- The findings of the present study could not be generalized due to small sample size.
- Speech and language impairments were not taken into consideration.

Clinical Implication:

- Management of Dysphagia and the treatment techniques to improve the overall swallowing functions will have an impact on speech intelligibility. Hence the muscular system involved both in swallowing functions and speech productions are unique. By strengthening the swallowing functions the speech mechanism also improves and overall speech intelligibility gets better.

Future Recommendations:

- The study could be carried out with different medical conditions which causes Dysphagia
- This can also be done with more samples size.

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