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# Profiling a Case of Wallenberg Syndrome: An SLP's Perspective

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## ABSTRACT

Wallenberg syndrome, a lateral medullary infarction commonly resulting from occlusion of the vertebral artery or Posterior Inferior Cerebellar Artery (PICA), is characterised by complex swallowing, voice, and sensory deficits due to the involvement of brainstem. This case report outlines the speech-language pathology management of a 58-year-old female with right lateral medullary syndrome. She presented with severe oropharyngeal dysphagia, hypernasality, hoarseness, and cranial nerve impairments. Initial assessment revealed presence of aspiration and pyriform sinus pooling, while language was preserved but oral motor function was impaired. The patient received 12 sessions of 45-minutes each (6 days/week), with targeted interventions that showed marked recovery. Post-therapy assessment revealed safe oral intake, no aspiration, normalized oxygen saturation, improved voice quality with better glottic closure, and reduced hypernasality. Nasogastric tube removal enabled full oral feeding independence. The findings highlighted the value of early, multidisciplinary speech language pathologist driven rehabilitation in dysphagia associated with lateral medullary syndrome, addressing a gap in India-specific evidence.

***Keywords:*** *Wallenberg syndrome, dysphagia, voice therapy, NMES, lateral medullary infarction*

## INTRODUCTION

Wallenberg syndrome, also known as lateral medullary syndrome or posterior inferior cerebellar artery (PICA) syndrome, is a neurological disorder resulting from an infarction in the lateral region of the medulla oblongata, most commonly due to occlusion of the vertebral artery or PICA. Clinical presentation of PICA typically includes motor, sensory, speech, language, and perceptual impairments, reflecting the multifocal involvement of neural pathways within this brainstem region. In India, the stroke incidence is about 105-152 per 100,000 annually, with register-based age-standardised rates of 103.4 overall, higher in males (125.7) than females (80.0).[1] Prevalence ranges from 45-487 per 100,000 in urban areas and 55-388 per 100,000 in rural regions, with tribal populations like Gadchiroli reporting rates as high as 536 per 100,000.[2] Thirty-day case fatality is

reported between 18-46%, with a male preponderance (~64.5%) and most cases occurring above 50 years of age.[3] Dysphagia complicates nearly half of stroke (pooled prevalence ~47-50%), with pneumonia in ~20% of cases and a 9-fold higher risk compared to those without dysphagia.[4] While Wallenberg syndrome is recognized as the most common posterior ischemic stroke syndrome, India-specific epidemiological data are still limited.

There is limited India-specific evidence on rehabilitation for dysphagia in Wallenberg Syndrome. Few case reports document therapy outcomes, with most studies focusing on diagnosis rather than long-term rehab effectiveness. Standardized rehabilitation protocols for Wallenberg Syndrome are lacking, and the use of adjunct therapies like NMES and combined voice-swallow therapy remains underexplored.

Wallenberg Syndrome is an uncommon stroke subtype with variable features depending on lesion extent. Dysphagia is invariably present and often severe. However, there is limited research on rehabilitation approaches for dysphagia and voice disorders in Wallenberg Syndrome, highlighting the need for reporting detailed therapy outcomes through case documentation.

This case report aims to present the swallowing and voice characteristics of an individual with Wallenberg Syndrome. The objectives of the study include (1) identifying and describing the dysphagia profile, (2) assessing voice and resonance deficits, (3) implementing targeted therapy strategies, and (4) highlighting rehabilitation outcomes, with a view to generate clinical evidence on effective dysphagia and voice management in Wallenberg Syndrome.

## MATERIALS & METHODS

This study followed a single case study design.

**Patient Information**

A 58-year-old female with a prior history of right lateral medullary infarction was referred for evaluation due to persistent swallowing difficulties. Coughing during meals and discomfort while eating was reported. Neurological assessment revealed right-sided facial weakness along with facial deviation to the left and bulbar palsy. Vomiting, Giddiness, Headache, Swaying was also reported. There was no history of earlier neurological diseases or structural lesions.

**Evaluation**

**Radiological Evaluation**

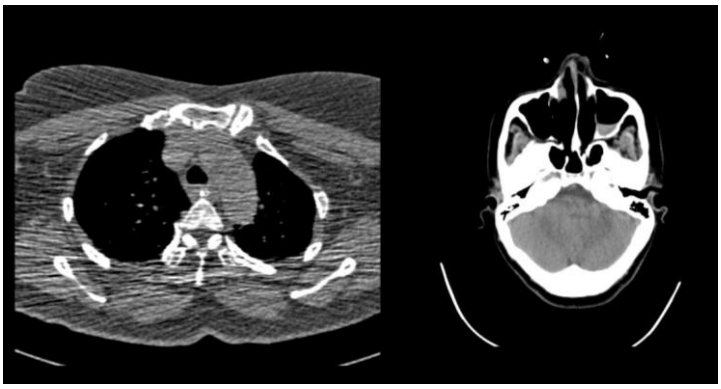

***Figure 1: Radiological images of the case***

An axial computed tomography (CT) image at the level of the cervicomedullary junction demonstrates the airway centrally with surrounding soft tissue and osseous structures, without obvious evidence of hemorrhage, mass effect, or gross asymmetry on this slice (figure 1). CT imaging revealed a right acute lateral medullary infarct. CT imaging has limited sensitivity in detecting acute ischemic changes in the posterior fossa, particularly in conditions such as Lateral Medullary

Syndrome. Infarctions involving the lateral medulla are often not well visualized on routine CT scans, especially in the early stages. Therefore, despite a relatively unremarkable CT appearance, clinical suspicion of lateral medullary involvement should prompt further evaluation using magnetic resonance imaging (MRI), with diffusion-weighted imaging (DWI) being the modality of choice for confirming acute infarction in the posterolateral medulla.

**Speech and Language Assessment**

Oral Peripheral Mechanism Examination revealed velopharyngeal (VP) inadequacy, Voice assessment indicated hoarseness with a phonatory gap, suggestive of glottic insufficiency. Resonance evaluation revealed hypernasality, attributable to velopharyngeal (VP) inadequacy, which further contributed to nasal regurgitation during feeding. Language assessment revealed intact comprehension, expression, repetition, and naming, indicating preserved language skills, suggesting no cortical involvement. Higher-level cognitive abilities were preserved.

**Swallowing Assessment**

Clinical examination showed reduced hyolaryngeal elevation, absent gag reflex, and impaired proprioceptive feedback. Fiberoptic endoscopic evaluation of swallowing (FEES) revealed aspiration with pooling of material in the pyriform sinuses and vallecula. Upon swallowing, patient exhibited an immediate cough, there was a drop in the oxygen saturation levels. Also, a hoarse and wet voice was observed after swallowing, suggesting an impaired airway protection. **Speech intelligibility was** Rated as 1 on the Speech Intelligibility Rating Scale (SIRS), indicating speech is clear and intelligible in all contexts, even to unfamiliar listeners.

**Cranial Nerve Examination**

**Table 1. Cranial Nerve Examination Findings**

| Cranial Nerve | Findings |
|---|---|
| V Trigeminal | No weakness of jaw observed or reported; jaw movements restricted |
| VII Facial | Inadequate intraoral buccal muscle performance (IOBP); taste normal on anterior two-thirds of the tongue |
| IX Glossopharyngeal | Reduced taste sensation at posterior one-third of the tongue on the right side |
| X Vagus | Gag reflex absent; loudness range restricted |
| XII Hypoglossal | Reduced tongue strength; inadequate tongue movements (elevation, lateralization, retraction, protrusion) |

**Table 2. Comparison of Pre- and Post-Intervention Outcomes**

| Category | Pre-Intervention (Initial Assessment) | Post-Intervention (After 12 Sessions) |
|---|---|---|
| Swallowing Function | Severe oropharyngeal dysphagia; aspiration with pooling in pyriform sinuses and vallecula (FEES findings); reduced hyolaryngeal elevation; absent gag reflex | Safe and efficient swallowing; no aspiration episodes; notable recovery in laryngeal motor function (video laryngoscopy) |
| Clinical Symptoms | Coughing during meals; oxygen desaturation during deglutition; vomiting, giddiness, and swaying | No coughing during swallowing; normal oxygen saturation during meals; symptoms resolved |
| Feeding Method | Feeding via nasogastric tube; FOIS Level 1 | Full oral intake achieved; nasogastric tube removed; FOIS Level 7 |
| Voice Quality | Hoarseness with phonatory gap (glottic insufficiency); restricted vocal loudness range | Improved voice quality; better glottic closure achieved |
| Resonance | Hypernasality (velopharyngeal inadequacy); nasal regurgitation during feeding | Significant reduction in hypernasality; improved resonance |
| Oral Motor Status | Impaired jaw and tongue movements; reduced IOBP; absent gag reflex | Progressive improvement in muscular coordination and oropharyngeal strength |
| Functional Status | Dependent on tube feeding; high risk of aspiration pneumonia | Independent oral intake; improved quality of life and swallowing safety |

**Findings:** Oropharyngeal dysphagia with hypernasality and dysphonia, consistent with lower cranial nerve involvement (nucleus ambiguus damage) secondary to the medullary infarct.

**Intervention**

The patient received intensive swallowing and voice therapy comprising 12 sessions of 45-minutes each over 6 days per week. The intervention included Neuromuscular electrical stimulation (NMES) at the suprahyoid and infrahyoid regions, combined with oromotor exercises, Shaker's exercise, circumlaryngeal massage, thermal stimulation, gustatory stimulation, and oral sensory integration therapy using the SpeechGears special kit. Therapy progressed to semi-solid trials incorporating super-supraglottic swallow and chin-tuck maneuvers, following a hybrid feeding approach with oral semi-solids and nasogastric (NG) tube liquids. The NG tube was removed once safe swallowing of both consistencies was achieved, with a home exercise program recommended and one follow-up VitalStim session completed.

## RESULT

The case involves a 58-year-old female presented with cough on swallowing, giddiness, headache, vomiting and swaying since the past three days. Clinical and Radiological findings suggested a Right lateral medullary infarction which led to dysphagia and associated symptoms. Early referral to a speech-language pathologist ensured timely initiation of intervention. Gradual improvements were noted across the sessions. By the 6$^{th}$ session, volitional swallowing observed. By the 8$^{th}$ session, partial oral feeding was introduced using compensatory postural strategies. Evident recovery of motor function in the impaired laryngeal structures was noted by the 12$^{th}$ session. The patient showed progressive improvement with safe swallowing and no aspiration. Oxygen desaturation was no longer observed during meals. As a result of better glottic closure, voice quality and resonance improved and hypernasality was reduced. The patient was discharged after showing improvement in swallow safety and efficiency. She was feeding orally without complications, demonstrating safe and efficient swallowing. She continued exercises at home as part of her rehabilitation plan.

## DISCUSSION

A study provides supportive evidence for the present findings, highlighting the effectiveness of combining structured speech therapy with anodal transcranial direct current stimulation (tDCS) applied to the right primary motor cortex in managing dysphagia associated with unilateral laryngeal paralysis.[5]

Findings from another study align with and support the outcomes of the present study. Its investigation demonstrated that an intensive speech-language pathology program, when combined with anodal tDCS targeting the ipsilateral primary motor cortex responsible for oropharyngeal and laryngeal function, resulted in the full restoration of swallowing ability and recovery from ipsilateral laryngeal and pharyngeal paralysis. The authors attributed these improvements to the capacity of anodal tDCS to enhance corticomotor excitability, thereby facilitating motor function recovery.[6] The present findings are further supported by a study, that emphasised the crucial role of multidisciplinary rehabilitation- including physical therapy and speech and swallowing therapy in functional recovery following lateral medullary syndrome (LMS).[7] This aligns with the current study's outcomes, where targeted speech and swallowing interventions contributed significantly to the patient's functional improvement. Notably, their study also reported significant improvements in voice quality following speech and swallowing therapy. These findings further support the current study, in which combined therapeutic approaches contributed not only to improved swallowing function but also to enhanced

vocal outcomes. This case illustrates the importance of the speech-language pathologist in dysphagia management with post-stroke cases. Through intervention techniques such as oropharyngeal strengthening, use of compensatory postures, and various voice therapy techniques were important in rebuilding muscle coordination and ensuring airway protection. This case shows that even in complex cases like brainstem stroke, targeted and intensive swallowing rehabilitation can help restore safe deglutition and enhance quality of life.

## CONCLUSION

The present case shows a patient with right lateral medullary infarction. The patient underwent dysphagia rehabilitation, significant recovery in swallowing and voice was achieved within a relatively short span. Early speech-language pathologist involvement helped minimised medical risks such as aspiration and also helped the patient to regain independence in oral feeding. This emphasizes the benefits of multidisciplinary stroke care, and importance of timely referral and evidence-based intervention can meaningfully improve recovery outcomes and overall quality of life.

This report only presents the results obtained from a single case study with a relatively short intervention period (12 sessions over 2 weeks) and limited follow-up, which limits the generalization of findings to broader populations or long-term outcomes. Future studies (particularly in large cohorts) in the form of randomized controlled trials with extended follow-up periods are required to validate this rehabilitation protocol for patients with dysphagia secondary to Wallenberg Syndrome. India specific studies are particularly needed, incorporating culturally adapted tools, cost effective treatment options like non-invasive muscle electrical stimulation (NMES), transcranial direct current stimulation (tDCS). Development and dissemination of standardized management and treatment guidelines for this rare condition can help enhance evidence-based practice.

***Declaration by Authors***
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**Conflict of Interest:** The authors declare no conflict of interest.

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