

# Assessment of the Association between Severe Dysphagia and Post-stroke Cognitive Impairment

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## Introduction

One of the frequent but dangerous side effects of stroke is post-stroke cognitive impairment (PSCI), which is thought to occur in roughly 30% of cases. Subjective cognitive decline, moderate cognitive impairment and dementia are the three main categories for the cognitive impairment. Since memory, executive function, attention, language and visuospatial ability make up the majority of cognitive function, cognitive impairment often refers to the impairment of one or more of these stated abilities. The Mini Mental State Examination (MMSE), the Montreal Cognitive Evaluation (MoCA) and the Cognitive Assessment for Stroke Patients are prominent PSCI assessment instruments (CASP). The effectiveness of CASP is greater than MMSE and MoCA for patients with language impairment.

## Description

It is interesting that language dysfunction can occur after a stroke alone and is linked to damage to the language centres. For instance, in the case of a localised brain lesion in the dominant hemisphere, the patient may appear with aphasia (language difficulty), which is not categorised as cognitive impairment. Another frequent consequence following a stroke is post-stroke dysphagia (PSD), which has a high estimated prevalence in the first week and is directly linked to aspiration, pneumonia, malnutrition and dehydration. Gastric tubes are frequently necessary for patients with severe PSD to help them swallow for an extended period of time.

The synchronisation of several brain areas, including the frontal cortex, subcortex and the medulla oblongata, which serves as the brain's primary pattern generator, is necessary for the intricate process of swallowing. These parts of the brain are also in charge of cognitive processes. Some researchers think PSCI is connected to PSD severity and ought to be used as a predictor since the cortical areas connected to cognitive and swallowing processes overlap. This point of view does not, however, seem to be universally accepted. Many individuals had both PSCI and PSD in clinical settings for a considerable amount of time following stroke. Patients with both problems had a higher chance of having a poorer outcome than those with just PSD.

At this time, there is not enough information in the medical literature to make certain statements on the relationship between PSCI and severe PSD. We thus proposed that there was a tight relationship between them. To do so, we first investigated and evaluated the effects of PSCI on the incidence, functioning and treatment results of severe PSD. Second, in order to aid with clinical assessment and therapy, we looked at risk factors for PSCI complicated by severe PSD in more detail.

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This retrospective study's key discovery was the potential link between PSCI and severe PSD. While moderate PSCI showed as pharyngeal phase dysfunction, patients with severe PSCI were more likely to have oral phase dysfunction. Patients with severe PSCI may have less success with swallowing treatment clinically than those without. Further risk factors for PSCI combined with severe PSD included pneumonia, tracheotomies and dysarthria.

We conducted investigations to determine the association between cognitive and swallowing capabilities and discovered that the PSCI was associated with the incidence of severe PSD. Similar results from additional investigations may be discovered, supporting the validity of our initial research. Higher-level nerve centres such as the frontal cortex, insula, anterior cingulate gyrus, etc., particularly the dorsolateral prefrontal cortex, govern swallowing behaviour in addition to the brainstem. Coincidentally, cognitive activities also engage the frontal lobe and cerebral cortex, indicating a potential connection between swallowing behaviour and cognitive function in the neural network. However, it is still unclear how swallowing abnormalities connect to cognitive impairment through these complicated pathways.

In the subgroup analysis, we discovered that patients with moderate PSCI were more likely to present with pharyngeal phase dysfunction, which was consistent with one prior study, whereas patients with severe PSCI were connected to the oral phase of swallowing. The masticatory muscles for jaw closing and opening assist in supporting the mandible during mouth closure and tongue elevation during the oral preparation phase. The preparation phase of swallowing, which includes food intake and rough processing in the oral cavity, may be particularly hampered by severe PSCI. Furthermore, the hospitalised patients with severe PSCI had poor treatment outcomes, perhaps because those without executive dysfunction could work successfully with therapists. Therefore, severe PSCI, particularly executive function, may have had a significant impact on swallowing treatment.

This retrospective study does have some drawbacks. In order to avoid bias in the results, only 331 patients with complete medical records were included in the analysis for risk variables. Second, individuals with PSD often have spontaneous recovery of their swallowing ability in the early stages of a stroke, which might have an impact on the outcomes. Third, due to the sparse data, the current study only included severe PSD patients for further analysis, leaving out mild and moderate PSD patients. To sum up, careful consideration should be given to the analysis and interpretation of the findings and the urgent need for further excellent prospective studies.

According to the study, individuals with a history of dysarthria, tracheotomy, or pneumonia were more likely to have PSCI with severe PSD. First, individuals with lung conditions may experience poor breath-swallowing coordination, which might result in PSD. Second, having had a tracheotomy before may make dysphagia more common since the intrusive procedure may have damaged the muscles and nerves that govern swallowing as well as altered the trachea's biofluid dynamics, which in turn altered the pharyngeal phase. Third, dysarthria has shown to be a significant indicator of dysphagia and advantageous in the treatment of swallowing issues [1-5].

## Conclusion

PSCI may be connected to severe PSD. While moderate PSCI appears as pharyngeal phase dysfunction, patients with severe PSCI are more likely to have oral phase dysfunction. Patients with severe PSCI may have less clinical

effectiveness than those without. Risk factors for severe PSD in conjunction with PSCI were dysarthria, tracheotomy and pneumonia. Further research is required to confirm the relationship between severe PSCI and swallowing difficulty.

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## Conflict of Interest

None.

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## References

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