

# Dysphagia of Acute Onset Due to Unilateral Capsulothalamic Infarction: Case Report

## Tek Taraflı Kapsülotalamik İnfarkta Bağlı Akut Başlangıçlı Disfaji

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**ABSTRACT** Dysphagia due to unilateral capsulothalamic infarct is a rare clinical presentation. The most common reason for dysphagia is stroke. The incidence of dysphagia after stroke ranges from 23% to 50%. Injury to the swallowing areas of the motor cortex and/or their connections to the brainstem may result in dysphagia. We present a case of an unusual localization of an infarct with accompanying dysphagia that had good recovery. On admission, the patient could not swallow and developed cough at each meal. On neurologic examination, the patient had dysphagia and limited weakness in his right hand. Cranial magnetic resonance imaging revealed an acute left capsulothalamic infarct. Dysphagia resolved in one week. We would like to remind the physicians that unilateral capsulothalamic infarction may present with pseudobulbar symptoms.

**Key Words:** Cerebral infarction; swallowing disorders; dysphagia; internal capsule; thalamus

**ÖZET** Tek taraflı kapsülotalamik infarkta bağlı disfaji nadir bir klinik durumdur. Disfajinin en sık nedeni inmedir. İnmeden sonra disfaji insidansı %23-50 arasında değişir. Motor korteksin yutma merkezinin ve/veya beyin sapına bağlantılarının zedelenmesi disfaji ile sonuçlanabilir. Disfajinin eşlik ettiği düzgün şekilde iyileşen sıra dışı yerleşimli bir infarkt olgusu sunuyoruz. Başvuru sırasında hasta yutamıyordu ve her yemekte öksürük geliyordu. Nörolojik muayenede hastanın disfajisi ve sağ elde sınırlı güçsüzlüğü vardı. Kranial manyetik rezonans görüntülemeye akut sol kapsülotalamik infarkt saptandı. Disfaji bir hafta içinde düzeldi. Doktorlara kapsülotalamik infarktın psödo-bulber semptomlarla karşımıza çıkabileceğini hatırlatmak isteriz.

**Anahtar Kelimeler:** Serebral infarkt; yutma bozuklukları; disfaji; internal kapsül; talamus

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The most common reason for dysphagia is stroke and the its incidence after stroke ranges from 23 to 50%.<sup>1</sup> It has been identified as an independent predictor of morbidity and mortality.<sup>2</sup> Dysphagia can be accompanied by a life-threatening complication such as pulmonary aspiration or malnutrition.<sup>3-6</sup>

Dysphagia is commonly associated with brainstem strokes. Current magnetic resonance imaging (MRI) techniques including diffusion, may identify other localizations responsible for the dysphagia. Recently, there are some reports about the supratentorial acute ischemic lesions associated with dysphagia.<sup>2</sup>

The cerebral cortex plays an important role in regulation of swallowing. Swallowing is a voluntary action that involves the integrity of the motor areas of the cerebral cortex. The reflexive component of swallowing

depends on swallowing centers in the brainstem. Injury to the swallowing areas of the motor cortex and/or their connections to the brainstem may result in dysphagia. The internal capsule is an important area in the relay of information from the brainstem to the cortex. It is hypothesized that strokes in this location may result in an acute disconnection between cortical swallowing centers and the central pattern generator for swallowing in the rostral medulla.<sup>2</sup>

We report a patient who developed acute onset dysphagia due to a unilateral capsulothalamic infarction.

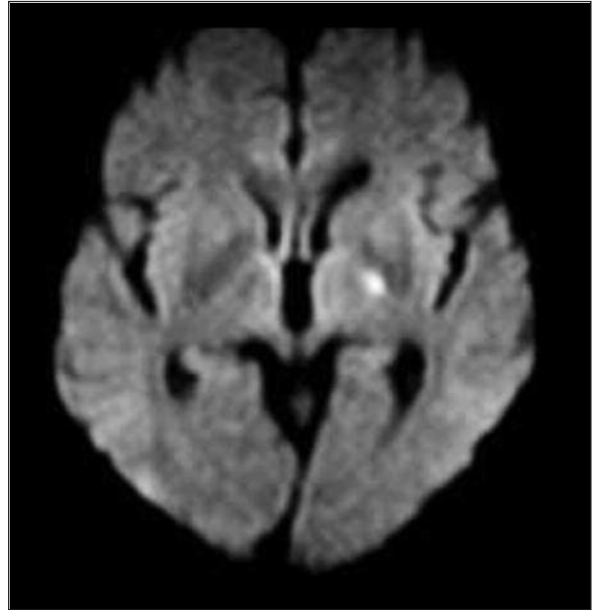
## CASE REPORT

A 56-year-old man who is right handed with acute dysarthria admitted to the emergency department of our hospital. The patient had a history of type 2 diabetes mellitus for 7 years. He was on oral antidiabetics. There were no other systemic or neurological diseases in his medical history. A neurologic examination revealed dysarthria, dysphagia and 4/5 right upper extremity paresis. The palatoglossal arch was symmetrically elevated with the uvula in the midline. He had a normal gag reflex. There was no deviation of the tongue. Deep tendon reflexes were normal and there was no pathological reflex. Other neurological examination findings were normal. He was unable to swallow 5 to 10 ml water bolus. Due to his defective swallow, cough developed at each meal and thus he was given nasogastric feeding. The swallowing deficit resolved one week later.

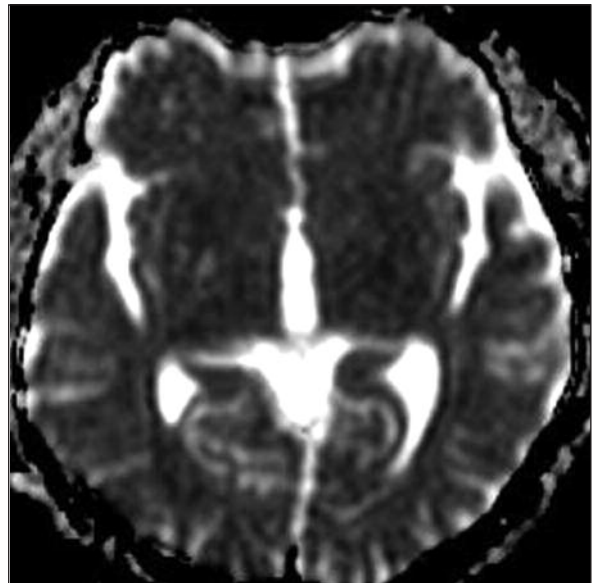
Brain diffusion MRI demonstrated an acute capsulothalamic infarct (Figures 1, 2). The patient was given low molecular weight heparin bid (5000 U/day subcutaneously). A pharyngo esophagography showed that some of the contrast material had been aspirated into the tracheobronchial tree. His mild, right-sided paresis resolved in several weeks.

## DISCUSSION

Swallowing is generally thought to be under bilateral control; however, one hemisphere may be dominant.<sup>4</sup> In patients with unilateral hemispheric



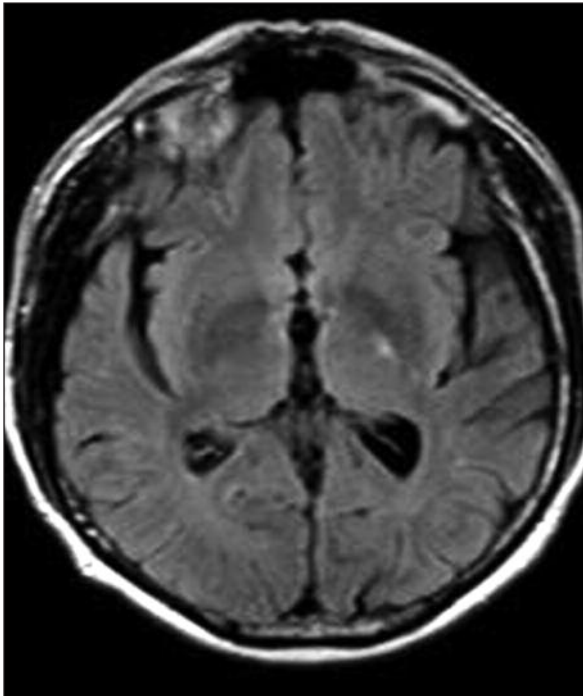
**FIGURE 1:** Axial diffusion-weighted magnetic resonance imaging shows an acute left capsulothalamic infarct.



**FIGURE 2:** ADC (apparent diffusion coefficient) mapping confirms decreased signal in the infarct.

stroke, 40% or more may have swallowing difficulties.<sup>3</sup> Neural control of swallowing is an afferent system consisting of fibers from cranial nerves V, IX, and X, which provide sensory feedback; the brainstem holds the swallowing center, which reflexively coordinates swallowing via the V, IX, X, and XII motor nuclei and higher brain centers including the frontal cortex that initiate and modu-

late volitional swallowing. Fibers originating in the cortex and terminating in the brainstem nucleus may be affected by an infarct<sup>4</sup>. We found a few report about unilateral internal capsule and capsulothalamic infarction with dysphagia.<sup>2,6</sup> There were also two reports about bilateral infarction of the internal capsule and dysphagia.<sup>7,8</sup> Rousseaux et al. reported a case with a unilateral pseudobulbar syndrome consequent to unilateral capsulothalamic infarction.<sup>6</sup> That patient underwent a cranial computed tomography scan, which demonstrated a capsular and antero-external thalamic infarction. Our case is similar this report. However, their case had velar and pharyngeal palsy and these reflexes were initially weak. This case was reported in 1987. Since the time of that report, neuroimaging techniques have greatly advanced, and small cerebral lesions can be diagnosed with MRI. In the current patient, MRI showed an acute unilateral capsulothalamic infarct; there were no lesions on the other sites of the brain and brainstem (Figure 3). In addition, Gonzalez-Fernandez et al. reported supratentorial regions of acute ischemia associated with swallowing disorders.<sup>2</sup> In this study, there were 29 acute supratentorial ischemic stroke cases with first



**FIGURE 3:** Axial FLAIR (fluid attenuated inversion recovery ) shows no infarctions elsewhere.

ischemic stroke and dysphagia. They found a positive association between swallowing function disorders and internal capsule. They reported that the internal capsule was an important area in the relay of information from the brainstem to the cortex. It was hypothesized that strokes in this location may result in acute disconnection between cortical swallowing centers and the central pattern generator for swallowing in the rostral medulla.<sup>2</sup> The role of subcortical structures in dysphagia is unclear. The models developed by Daniels et al. suggest that subcortical structures such as thalamus and basal ganglia input from cerebral hemispheres, insula and brainstem are critical in the swallowing network.<sup>9</sup> They also suggest that lesions disrupting cortical-subcortical connectivity are more likely to increase the risk of aspiration in stroke patients as compared to isolated cortical or subcortical lesions. Other models suggest parallel networks between cortical areas and the cerebellum.<sup>9,10</sup>

Our patient's dysphagia resolved after one week. It has been known that dysphagia improves within 7 days in half of stroke patients and less than 15% have persistent dysfunction after 6 months. Our patient, like other patients that had unilateral lesion of the capsula interna, compared with a lesion of the brainstem, may have a good prognosis with an early recovery. It may relate with dysphagia resulting from acute disconnection between the cortex, and the brainstem is likely to improve quickly as compared to dysphagia resulting from damage in the brainstem and cortex.<sup>2</sup>

The frontopontine tract is the collection of nerve fibers that arise in the frontal lobe of the cerebrum, traverse the internal capsule and peduncle, and end in the pontine nuclei.<sup>4</sup> As in our case, Bogousslavsky et al. have described a patient with dysarthria and right-sided lingual paresis related to a limited lesion in the genu of the internal capsule.<sup>11</sup> Lesions affecting the unilateral capsular genu can cause dysphagia.

In conclusion, we wish to remind physicians, who specialize in nervous system disorders, that unilateral capsulothalamic infarction may present with pseudobulbar symptoms.

## REFERENCES

1. Singh S, Hamdy S. Dysphagia in stroke patients. *Postgrad Med J* 2006;82(968):383-91.
2. Gonzalez-Fernandez M, Kleinman JT, Ky PK, Palmer JB, Hillis AE. Supratentorial regions of acute ischemia associated with clinically important swallowing disorders: a pilot study. *Stroke* 2008;39(11):3022-8.
3. Hamdy S, Rothwell JC, Aziz Q, Thompson DG. Organization and reorganization of human swallowing motor cortex: implications for recovery after stroke. *Clin Sci (Lond)* 2000; 99(2):151-7.
4. Hamdy S, Aziz Q, Rothwell JC, Crone R, Hughes D, Tallis RC, et al. Explaining oropharyngeal dysphagia after unilateral hemispheric stroke. *Lancet* 1997;350(9079):686-92.
5. Umay EK, Gürçay E, Ünlü E, Ekşioğlu E, Çakçı A. [Functional and nutritional effects of dysphagia in early stroke patients]. *Türkiye Klinikleri J Med Sci* 2010;30(3):925-31.
6. Rousseaux M, Lesoin F, Quint S. Unilateral pseudobulbar syndrome with limited capsulothalamic infarction. *Eur Neurol* 1987;27(4): 227-30.
7. Leys D, Lejeune JP, Bourgeois P, Blond S, Petit H. [Acute pseudobulbar syndrome. Bilateral infarction of the junction of the internal capsule with the corona radiata]. *Rev Neurol (Paris)* 1985;141(12):814-8.
8. Chee MW, Tan CB, Tjia HT. Persistent mutism and dysphagia of acute onset due to bilateral internal capsule infarction. *Ann Acad Med Singapore* 1990;19(3):393-5.
9. Daniels SK, Foundas AL. Lesion localization in acute stroke patients with risk of aspiration. *J Neuroimaging* 1999;9(2):91-8.
10. Mosier K, Bereznaya I. Parallel cortical networks for volitional control of swallowing in humans. *Exp Brain Res* 2001;140(3):280-9.
11. Bogousslavsky J, Regli F. [Hemiparesis with lingual involvement. Hematoma of the genu of the internal capsule]. *Rev Neurol (Paris)* 1984;140(10):587-90.