

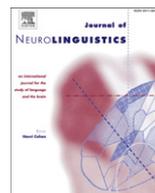


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# Neurogenic stuttering with right hemisphere stroke: A case presentation

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## ABSTRACT

A 29 year old, right-handed male of African origin was admitted to a primary stroke center hospital for left-sided weakness accompanied by stuttering speech of 48 h duration. Results of magnetic resonance imaging brain scan demonstrated a small acute infarction in the right periventricular corona radiata white matter on diffusion weighted sequences. Thorough evaluation of his speech and language skills revealed mild neurogenic stuttering. His symptoms and diagnostic work-up are presented, with a review of the process of differential diagnosis between neurogenic stuttering and psychogenic stuttering.

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## 1. Introduction

### 1.1. Neurogenic stuttering and correlating conditions

Neurogenic stuttering (NS) was defined by Guitar (2006, p. 435) as “stuttering that appears to be caused or exacerbated by neurological disease or damage.” Alternate labels for dysfluent speech resulting from neurologic disease include acquired stuttering and cortical stuttering. NS is characterized by repetition, prolongation, or blocking on sounds or syllables in a manner that interrupts the normal rhythm and flow of speech (Helm, Butler, & Benson, 1978).

A wide range of conditions have been correlated with NS, including stroke (e.g., Jokel, de Nil, & Sharpe, 2007; Sahin, Krespi, Yilmaz, & Coban, 2005), traumatic brain injury (e.g., Ludlow, Rosenberg, Salazar, Grafman, & Smutok, 1987), seizure disorder (e.g., Sechi, Cocco, D’Onofrio, Deriu, & Rosati,

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2006), degenerative central nervous system (CNS) disease (e.g., Mowrer & Younts, 2001), dementia (e.g., Quinn & Andrews, 1977), Parkinsonism (e.g., Leder, 1996), drug usage (see Brady, 1998, for review), and renal dialysis (Rosenbeck, McNeil, Lemme, Prescott, & Alfrey, 1978). Having such a range of neurologic conditions correlate with the syndrome lends uncertainty to the disorder's underlying mechanisms. Of further interest is that despite the number of conditions that may result in NS, it remains a relatively rare diagnosis. One possible reason for this is that it often co-occurs with, or is considered a manifestation of, other communication disorders such as aphasia, apraxia of speech, or dysarthria.

Studies have found that NS resulting from stroke can arise from single, unilateral lesions as well as multifocal or bilateral lesions, and a variety of structures have been implicated. A survey study by Market, Montague, Buffalo, and Drummond (1990) reported that 38% of the cases had left hemisphere damage, 9% had right hemisphere damage, 11% had subcortical damage, and 10% had bilateral lesions; lesions were not identified in 32% of cases. In a study examining NS in relation to site of penetrating brain lesions sustained during the Vietnam War, Ludlow et al. (1987) found that nine of their 10 NS subjects had lesions that involved white matter structures, specifically the pyramidal tract, anterior corona radiata, internal capsule, external capsule, or various combinations of the above. In their study, five of the 10 subjects had sustained right hemisphere injury, four had sustained left hemisphere injury, and one had bilateral injury. NS has been documented in several cases of right hemisphere damage where aphasia and apraxia of speech are absent (e.g., Ardila & Lopez, 1986; Soroker, Bar-Israel, Schechter, & Solzi, 1990).

## 1.2. Characteristics of neurogenic stuttering

In addition to questions surrounding the nature of the underlying mechanisms of acquired stuttering, there is some disagreement in the literature in regards to characterization of the speech patterns of NS. Six diagnostic characteristics of NS are often referred to in the relevant literature and are distinctive from developmental stuttering (see Helm-Estabrooks, 1999; Ringo & Dietrich, 1995). These are as follows: (1) dysfluencies occur on grammatical words nearly as frequently as on substantive words, (2) repetitions, prolongations, and blocks may not be limited to initial syllables of words and utterances, (3) stuttering occurs relatively consistently across various types of speech tasks, (4) the speaker may be annoyed by his/her dysfluencies, but does not appear anxious, (5) secondary symptoms such as facial grimacing, eye blinking, or fist clenching are not associated with moments of dysfluency, and (6) adaptation effect is not observed. However, these characteristics are generally regarded as guidelines rather than definitive criteria of NS. Several studies on subjects with NS have reported findings that did not conform to those characteristics (e.g., Mowrer & Younts, 2001; Sahin et al., 2005). Additionally, Van Borsel and Taillieu (2001) asked a panel of professionals who regularly treated individuals with fluency disorders to differentiate whether the disorder was neurogenic or developmental based upon taped speech samples; results showed that the judges misidentified individuals with NS as having developmental stuttering as often as they correctly identified individuals with developmental stuttering, indicating that differential characteristics of the two fluency disorders may be difficult to reliably discern.

## 1.3. Neurogenic stuttering versus psychogenic stuttering

In addition to neurogenic stuttering, acquired stuttering-like behavior can also be psychogenic in origin, further complicating the diagnosis. The major identifying feature of psychogenic stuttering as defined by Guitar (2006, p. 441) is that it typically begins after a prolonged period of stress or after a traumatic event. Guitar further specified that unlike malingering or faking, psychogenic stuttering is involuntary. A diagnosis of neurogenic versus psychogenic stuttering can be difficult to make, and it is important to note that psychogenic stuttering can be present with coexisting but unrelated neurologic disease (Roth, Aronson, & Davis, 1989).

### 1.3.1. Characteristics of psychogenic stuttering

There has been some disagreement in the literature as to the defining characteristics of psychogenic stuttering. Deal (1982) identified eight speech characteristics associated with psychogenic stuttering,

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