

## Speech, Cognitive, and Perceptual Difficulties Based on Stroke Location

JACQUELINE SCULLY, PT, DPT

Stroke is the 5th leading cause of death in the United States, but over recent decades, survival rates have increased, making stroke the leading cause of long-term disability (Centers for Disease Control & Prevention, 2019). Although motor and sensory issues after stroke can result in physical deficits, these impairments may not be the most limiting factors for patients and caregivers. Speech, cognitive, and perceptual difficulties appear to be just as impactful. A stroke survivors' cognitive/perceptual deficits are associated with greater depres-

marily of the face and upper extremities but often exhibits similar issues in the contralateral lower extremities to a lesser degree. Occlusion of the left versus the right artery results in varied presentations. Left MCA infarcts result in aphasias more often than right MCA infarcts. Blockage of the superior branch of the left MCA may cause Broca's or expressive aphasia; the patient has full understanding of what is being said to them but has difficulties producing speech. Blockage of the inferior branch of the left MCA may cause Wernicke's or receptive

damage, apraxia and aphasia commonly coexist (Gross & Grossman, 2008). There are two major types of apraxia—ideomotor and ideational. Ideomotor apraxia is the inability to perform a gesture or movement on request or to imitate a gesture. Mimicking an exercise or performing a request such as "Lift your arms over your head" could be difficult for a patient with an ideomotor apraxia. Ideational apraxia is the inability to sequence a multistep task, especially when a tool or object is involved. Using a spoon to eat a bowl of cereal may be difficult to execute with an ideational apraxia despite having the physical ability to perform the task. Apraxias can limit the patient's ability to perform basic activities of daily living and to participate in functional activities; when paired with speech limitations due to aphasia, a higher level of care may be required.

In comparison to a left MCA, an infarct in the right MCA will exhibit different signs and symptoms. Some patients who have experienced a right MCA infarct will have a left visuospatial neglect. This neglect can be a safety issue as well as a hinderance to function. An additional safety concern common to right-sided infarcts are perceptual agnosias—the inability to process sensory information despite intact sensory systems. Although issues with depth perception and spatial awareness

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sive symptoms, greater physical burden, and decreased mental quality of life in caregivers as compared with motor/functional deficits (Freytes et al., 2021). Clinical findings related to these domains are important when assessing the needs of this population. A comparison of speech, cognitive, and perceptual sequelae specific to an ischemic stroke occurring in the middle cerebral artery (MCA), anterior cerebral artery (ACA), and posterior cerebral artery (PCA) are discussed.

The most common site of ischemic stroke is the MCA, resulting in contralateral hemiparesis/hemisensory loss pri-

marily of the face and upper extremities but often exhibits similar issues in the contralateral lower extremities to a lesser degree. Occlusion of the left versus the right artery results in varied presentations. Left MCA infarcts result in aphasias more often than right MCA infarcts. Blockage of the superior branch of the left MCA may cause Broca's or expressive aphasia; the patient has full understanding of what is being said to them but has difficulties producing speech. Blockage of the inferior branch of the left MCA may cause Wernicke's or receptive

aphasia; the patient has a difficult time understanding what is being said but has intact speech production. Patients with left MCA infarcts can be overly cautious in their actions due to damage in the area of the brain responsible for reasoning and analytical thought, sometimes limiting their progress with therapies. Another common finding with a left MCA infarct is apraxia. Apraxia is the inability to carry out a voluntary, skilled movement not explained by loss of strength, coordination or sensation, abnormal tone, cognitive decline, or uncooperativeness. With left hemisphere

are often a result of visual issues, a patient with a right MCA infarct may have perceptual agnosias rendering them unable to process visual input, resulting in balance impairments and poor ability to navigate through the home. Adding to this perceptual awareness issue, patients are easily distracted, have poor judgment, and are impulsive due to limitations of intuition and insight which are controlled by the right side of the brain. This combination can lead to safety issues such as falls.

Ischemic infarcts of the ACA are less common and present a different cluster of signs and symptoms. Contralateral hemiparesis/hemisensory loss frequently observed with an ACA infarct occurs more in the lower extremities in combination with compromised bladder and bowel control. Like those who have had a left MCA infarct, patients may also experience apraxias. Patients with an ACA stroke often appear depressed, unmotivated, apathetic, and exhibit personality changes as an outcome of frontal lobe damage. Although these patients do not usually have speech deficits such as aphasias, they are often impulsive, lack the ability to focus their attention, and tend to perseverate both verbally and physically which can make participation with therapies and their caregivers challenging.

Because the PCA is the primary vascular supply to the occipital lobe, many of the deficits seen with a PCA stroke are related to visual disturbances. Patients with a PCA stroke have a lower risk of disability as compared with patients presenting

with a stroke in other areas of the brain (Ntaios et al., 2011); however, fall risk increases due to impaired depth perception stemming from altered visual input. Visual agnosias or a difficulty recognizing or interpreting visual information are common and include prosopagnosia (difficulty recognizing people) and apperceptive agnosia (difficulty perceiving shapes and forms). Alexia without agraphia (inability to read but can still write) is common to a left PCA infarct, whereas alexia with agraphia is most associated with PCA blood supply compromise to the thalamus. Memory problems, hallucinations, and unprovoked aggression may be observed and can compromise care delivery.

Speech issues, cognitive changes, and perceptual deficits observed across stroke locations can reduce a patient's interactions with caregivers and increase the burden of care. These deficits may also limit a patient's ability to participate in their community and diminish quality of life. Knowledge of the potential presentations associated with varied stroke

locations, ongoing assessment, and targeted interventions to address and reduce the burden of these deficits should be part of the therapist's home care plan. ■

**Jacqueline Scully, PT, DPT**, is a Special Instructor, Physical Therapy Program, School of Health Science, Oakland University, Rochester, Michigan.

The author declares no conflicts of interest. Address for correspondence: Jacqueline Scully, PT, DPT, Physical Therapy Program, School of Health Sciences, Oakland University, Human Health Bldg., 433 Meadowbrook Road, Rochester, MI 48309 (scully@oakland.edu).

#### REFERENCES

- Centers for Disease Control and Prevention. (2019). *Top 5 causes of death in the US*. <https://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm>
- Freytes, I. M., Sullivan, M., Schmitzberger, M., LeLaurin, J., Orozco, T., Eliazar-Macke, N., & Uphold, C. (2021). Types of stroke-related deficits and their impact on family caregiver's depressive symptoms, burden, and quality of life. *Disability and Health Journal*, 14(2), 101019–101019.
- Gross, R. G., & Grossman, M. (2008). Update on apraxia. *Current Neurology and Neuroscience Reports*, 8(6), 490–496.
- Ntaios, G., Spengos, K., Vemmou, A. M., Savvari, P., Koroboki, E., Stranjalis, G., & Vemmos, K. (2011). Long-term outcome in posterior cerebral artery stroke. *European Journal of Neurology*, 18(8), 1074–1080.

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## Misdirected antibodies linked to severe COVID-19

NIH: An international project called the COVID Human Genetic Effort has been searching for genetic and molecular differences that may increase the risk of severe COVID-19. Two recent studies from the project found that some severe cases of COVID-19 could be linked to problems with immune-system proteins called type I interferons (IFNs) which are needed to fight off viral infections. Antibodies that mistakenly targeted the IFNs were found in the blood of people with severe or fatal COVID-19.

The team found that 20% of people hospitalized with severe COVID-19 had high or intermediate levels of autoantibodies to type I IFNs. Autoantibodies were also found in at least 18% of people who died from the disease. In contrast, people with no or mild symptoms had very low levels of these autoantibodies. The researchers estimate that the autoantibodies may account for about 20% of total fatal COVID-19 cases. The risk of having such autoantibodies increased with age.