

# Women less likely to be routed to comprehensive stroke centers for large vessel acute ischemic stroke

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Despite having worse stroke symptoms and living within comparable distances to comprehensive stroke centers, women with large vessel occlusion acute ischemic stroke are less likely than men to be routed to

the centers, according to a new study from UTHealth Houston.

Led by corresponding author Sunil Sheth, MD, associate professor of neurology and director of the vascular neurology program with McGovern Medical School at UTHealth Houston, and senior author Youngran Kim, Ph.D., assistant professor of management, policy, and community health with UTHealth Houston School of Public Health, the study was published today in the *Journal of the American Heart Association*.

Large vessel occlusion [stroke](#) occurs when a major artery in the brain is blocked. They are considered one of the more severe kinds of strokes, accounting for an estimated 24% to 46% of acute ischemic strokes.

"Timely treatment of stroke is incredibly important; the faster a doctor is able to get the vessel open, the better the patient's chance of having a good outcome. These routing systems in hospitals are designed to get patients to the best care as quickly as possible," Sheth said.

"We don't know exactly why women were less likely than men to be routed to comprehensive stroke centers, but we do know that gender is an implicit bias. Getting to the granular level of what went into a hospital's routing decision will be very important for future studies."

Researchers identified consecutive patients with large vessel occlusion [acute ischemic stroke](#) from a prospectively collected multi-hospital registry for the Greater Houston area from January 2019 to June 2020. They compared prehospital routing of men and women to centers capable of performing endovascular therapy to remove the clot blocking the artery. Among 503 patients, 82% were routed to comprehensive stroke centers. Women made up 46% of the study participants.

Compared with men, women with large vessel occlusion acute ischemic

stroke were older (73 versus 65) and presented with a greater National Institutes of Health Stroke Scale (NIHSS) Score (14 versus 12), meaning their symptoms were worse. After adjusting for differences in stroke type, age, travel distance, and other relevant factors, women with large vessel occlusion acute ischemic stroke were approximately 9% less likely than men to be routed to [comprehensive stroke centers](#).

"The greater NIHSS score in women may be partially attributed to their [older age](#), as age itself is a known contributing factor to sex differences in stroke severity," Kim said. "Moreover, [elderly women](#) are more likely to live alone and experience [social isolation](#), which can result in delayed recognition of stroke symptoms and subsequent delays in seeking medical attention."

Additionally, patients living within a 10-mile distance of the nearest comprehensive stroke center were 38% more likely to be routed to one.

Stroke is the fifth-leading cause of death for women, according to the Centers for Disease Control and Prevention, and because women generally live longer than men, more women have strokes over their lifetimes.

Previous studies have shown that women with acute ischemic stroke were [less likely](#) than men to receive the clot-busting intravenous tissue-plasminogen activator (tPA) treatment, and that women with stroke are 33% more likely to be [misdiagnosed](#) with non-stroke related issues, such as headache or dizziness.

"Older age at onset and severe stroke in women, compounded by a higher likelihood of age-related risk factors, can contribute to the higher rate of death from stroke and higher risk for disability after stroke in women," Kim said. "Therefore, appropriate triage and prehospital routing can be even more critical for women. Whether large vessel

occlusions in women are less likely to be identified using current screening tools due to older age, premorbidity, or nontraditional symptoms needs to be investigated."

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