

New study finds a 67% increase in neurovascular imaging use for headache and dizziness in the emergency department

March 29 2024



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New research demonstrates that the use of CT angiography (CTA) for patients with headache or dizziness increased dramatically over five

years in the emergency department (ED) of a large medical center. Simultaneously the rate of positive findings on those same exams decreased.

The [study](#), published in the journal *Internal and Emergency Medicine*, raises concerns about whether the 67% increase in CTA from 2017 to 2021 reflects necessary and appropriate care.

CTA is an advanced neurovascular imaging scan that detects damaged [blood vessels](#) such that rapid treatment for conditions such as brain injuries, aneurysm and/or stroke can be initiated. As such, it can be lifesaving.

The examination requires injection of a contrast dye intravenously to produce pictures of blood vessels and tissues. According to American College of Radiology Appropriate Use Criteria, the use of CTA is not clinically appropriate in many cases of headache and dizziness, which are common complaints in the ED.

The study was conducted by researchers at Medically Engineered Solutions in Healthcare Incubator, Innovation in Operations Research Center (MESH IO) at Massachusetts General Brigham in collaboration with the Harvey L. Neiman Health Policy Institute. ED admissions for headache and/or dizziness, and associated CTA exams, were examined in data from a level 1 trauma center that evaluates approximately 110,000 ED patients each year.

The researchers found that CTA rates for headache and dizziness increased from 7.89% of ED visits in 2017 to 13.24% in 2021; a 67.4% increase over these five years.

On average, a given patient with headache and/or dizziness was 15% more likely to have a CTA in 2021 vs. 2017. To glean whether the

increased use was driven by greater severity in ED patients, the researchers also evaluated the rate of positive findings on these CTAs. They found that over the same period, the rate of positive findings dropped by 38%.

"Although the total number of CTA exams increased from 422 in 2017 to 662 in 2021, the number of patients with an abnormality detected actually dropped slightly from 71 to 69, accounting for the lower positivity rate," said Dr. Marc Succi, co-senior author, emergency radiologist, and Executive Director of the MESH Incubator.

"This finding suggests the [increasing trend](#) does not reflect increasing need, and that hospitals should take steps to ensure that imaging is appropriately used."

Co-Senior Author, Dr. Karen Buch a neuroradiologist at Massachusetts General Hospital shared concerns about observed disparities in the data, saying, "Unfortunately, our results also revealed potential biases in the use of CTA for certain patient groups. Specifically, patients with [private insurance](#) were more likely to have a CTA, whereas the likelihood of a CTA was less for Black compared to White patients."

The published study was limited to a single medical center, so the researchers cannot say whether the results would be mirrored in other ED settings, nor whether the imaging was or was not appropriate. However, increasing utilization was expected.

"The observed trends in neurovascular imaging mirror broader trends of increasing intensity and technologically advanced care. There are competing pressures in the ED to make a quick and conclusive diagnosis to increase the turnover of beds. However, missing a diagnosis places patients at risk, and exposes the hospital and attending physician to potential litigation and penalty," explains Dr. Joshua Hirsch, senior

affiliate research fellow at the Neiman Policy Institute and Vice Chair of Procedural Services at MGH.

Hirsch continues, "The solution isn't to restrict access to valuable advanced imaging such as CTA, but to provide referring physicians with a frictionless way to evaluate the appropriateness of imaging."

In the ED workflow, imaging is ordered by the evaluating provider—a physician or, in a growing number of cases, a nurse practitioner or physician assistant.

In recognition of the need to equip providers with easy-to-access guidance for imaging appropriateness, the 2014 Protecting Access to Medicare Act of 2014 (PAMA) requires consultation of appropriate use criteria (AUC) via a qualified clinical decision support mechanism for advanced diagnostic imaging orders for Medicare patients.

While the implementation of the PAMA AUC provisions is currently paused, many sites have adopted these programs as a means of reducing unnecessary or low-value imaging.

"Clinical decision support can provide a seamless way to reduce the growing trends in advanced imaging in the ED without jeopardizing patient care or workflow efficiency," said Dr. John Jordan, a neuroradiologist and Chair of the ACR Commission on Neuroradiology.

"It also helps us to be good stewards of limited resources. While imaging offers ED providers assurance of an accurate diagnosis, it comes at a cost to patients—both in the expense of the imaging, as well as the exposure to radiation that may increase cancer risk. Weighing the benefits and risks is complicated, but worthwhile to ensure safe and cost-effective care."

More information: Grant H. Rigney et al, Trends in non-focal neurological chief complaints and CT angiography utilization among adults in the emergency department, *Internal and Emergency Medicine* (2024). [DOI: 10.1007/s11739-024-03569-9](https://doi.org/10.1007/s11739-024-03569-9)

Provided by Harvey L. Neiman Health Policy Institute

Citation: New study finds a 67% increase in neurovascular imaging use for headache and dizziness in the emergency department (2024, March 29) retrieved 2 May 2024 from <https://medicalxpress.com/news/2024-03-neurovascular-imaging-headache-dizziness-emergency.html>

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