

# Research shows decline in subarachnoid hemorrhage fatality rates

February 6 2012

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(Medical Xpress) -- The fatality rate from subarachnoid hemorrhage in a five-county area of Greater Cincinnati and Northern Kentucky has declined significantly since 1988, research conducted at the University of Cincinnati (UC) shows.

The research is being outlined in an oral presentation Friday, Feb. 3, at the American Stroke Association's International Stroke Conference 2012 in New Orleans. The presenting author is Jason Mackey, MD, who conducted the research as a neurology fellow at UC and is currently an assistant professor of neurology at the Indiana University School of Medicine. An additional 12 UC faculty members and research associates assisted in the study.

Information was drawn from the Greater Cincinnati/Northern Kentucky Stroke Study, which identifies all hospitalized and autopsied cases of stroke and transient ischemic attack (TIA) in a five-county region of southwestern Ohio (Hamilton and Clermont counties) and Northern Kentucky (Boone, Campbell and Kenton counties). Total population base is about 1.3 million, with the residents of the area considered to be representative of the entire U.S. for age and economic status.

"Few population-based studies—and none in the United States—have examined outcomes in the same population over time," says Mackey.

"Thanks to the Greater Cincinnati/Northern Kentucky Stroke Study, we were able to do that."

In addition, there have been few studies with large numbers of subarachnoid [hemorrhage](#) in African-Americans. The UC study was biracial (African-American participants ranged from 20 to 30 percent over the four time periods that were examined).

Brett Kissela, MD, and Dawn Kleindorfer, MD, professors in the neurology department and members of the UC Neuroscience Institute, a specialty center within UC Health, are co-principal investigators for the Greater Cincinnati/Northern Kentucky Stroke Study, which is funded by the National Institutes of Health. The study being presented at the ISC is also funded by an NIH grant.

The Greater Cincinnati/Northern Kentucky Stroke Study was begun in 1993 by Joseph Broderick, MD, its first principal investigator and now Albert Barnes Voorheis Chair of Neurology at UC. Since its inception, at least 20,000 people have contributed to the understanding of stroke through the study.

Subarachnoid hemorrhage, a type of bleeding [stroke](#), occurs when blood seeps into the subarachnoid space between the brain and the skull. It is commonly caused by bleeding from a cerebral aneurysm or arteriovenous malformation (AVM).

The UC team identified a total of 350 subarachnoid hemorrhages in patients 20 or older in four study periods: 1988 (79), 1993-94 (85), 1999 (95) and 2005 (91). Of those, 327 were diagnosed in an emergency department or hospital setting, and 23 were diagnosed on autopsy alone.

While incidence of subarachnoid hemorrhage remained stable across the four study periods, fatalities within a 30-day period declined steadily: from 46 percent of cases in 1988 (36 of 79) to 34 percent in 1993-94 (34 of 85), 33 percent in 1999 (31 of 95) and 28 percent in 2005 (25 of 91).

Fatalities over 90 days also declined significantly: from 49 percent in 1988 (39 deaths) to 42 percent in 1993-94 (36), 34 percent in 1999 (32) and 31 percent in 2005 (28).

The declines came during a period when a number of care characteristics for subarachnoid hemorrhage changed, including increased use of magnetic resonance imaging (MRI) for proper diagnosis, increased use of mechanical devices to close an aneurysm and reduce the risk of further bleeding and increased access to a hospital with a neurointensive care unit available with 24-hour EEG monitoring. (UC Health University Hospital is the only site in the region that offers continuous, 24/7 video EEG monitoring in every ICU.)

"Incremental advances in surgical and medical management, along with systems-based improvements, have likely led to reduced fatalities for subarachnoid hemorrhage," says Mackey.

"The study does not attempt to validate the reasons why such a significant decline in fatalities has occurred," adds Kleindorfer. "But as a clinician during this period, I have observed advances in post-bleed care, including the introduction of specialized neurocritical care units, more urgency in fixing aneurysms that bleed so they don't have time to get worse and better prevention of medical complications."

Mackey says future studies should explore the impact of specific factors and processes of care related to improved fatality rates.

Provided by University of Cincinnati

Citation: Research shows decline in subarachnoid hemorrhage fatality rates (2012, February 6) retrieved 2 May 2024 from

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