RSNA® Radiological Society of North America

820 Jorie Blvd
Oak Brook, IL 60523
TEL 1-630-571-2670
FAX 1-630-571-7837
RSNA.org

NEWS

RSNA Press Release

High Altitude Climbers at Risk for Brain Bleeds

Released: November 28, 2012

Media Contacts:	**RSNA Newsroom**	**1-312-949-3233**
Before 11/24/12 or after 11/29/12:	**RSNA Media Relations:**	**1-630-590-7762**
	Linda Brooks 1-630-590-7738 lbrooks@rsna.org	Maureen Morley 1-630-590-7754 mmorley@rsna.org

At A Glance

- Mountain climbers who experience a certain type of high altitude sickness have traces of bleeding in the brain years after the initial incident.
- High altitude cerebral edema is a severe and often fatal condition that can affect mountain climbers, hikers, skiers and travelers at high altitudes.
- Mountaineers who have experienced HACE in the past should acclimatize to the altitude very slowly.

CHICAGO—New magnetic resonance imaging (MRI) research shows that mountain climbers who experience a certain type of high altitude sickness have traces of bleeding in the brain years after the initial incident, according to a study presented today at the annual meeting of the Radiological Society of North America (RSNA).

High altitude cerebral edema (HACE) is a severe and often fatal condition that can affect mountain climbers, hikers, skiers and travelers at high altitudes—typically above 7,000 feet, or 2,300 meters.

Michael Knauth, M.D., Ph.D.

HACE results from swelling of brain tissue due to leakage of fluids from the capillaries. Symptoms include headache, loss of coordination and decreasing levels of consciousness.

"HACE is a life-threatening condition," said Michael Knauth, M.D., Ph.D., from the University Medical Center's Department of Neuroradiology in Goettingen, Germany. "It usually happens in a hostile environment where neither help nor proper diagnostic tools are available."

Dr. Knauth and colleagues at the University Hospitals in Goettingen and Heidelberg, Germany, compared brain MRI findings among four groups of mountaineers: climbers with

Copyright © 2015 Radiological Society of North America (RSNA)

well documented episodes of HACE; climbers with a history of high altitude illness; climbers with a history of severe acute mountain sickness (AMS); and climbers with a history of isolated high altitude pulmonary edema (HAPE), a life-threatening accumulation of fluid in the lungs that occurs at high altitudes. Two neuroradiologists assessed the brain MRI findings without knowing the status of the mountaineers and assigned a score based on the number and location of any microhemorrhages.

"In most cases, these microhemorrhages are so small that they are only visible with a special MRI technique called susceptibility-weighted imaging," Dr. Knauth said. "With this technique, the microhemorrhages are depicted as little black spots."

The MRI results showed brain microhemorrhages almost exclusively in HACE survivors. Of the 10 climbers with a history of HACE, eight had evidence of microhemorrhages on MRI. The other two had uncertain results. Only two of the remaining 26 climbers were positive for microhemorrhages.

"It was previously thought that HACE did not leave any traces in the brains of survivors," Dr. Knauth said. "Our studies show that this is not the case. For several years after, microhemorrhages or microbleeds are visible in the brains of HACE survivors."

Survivors of the most clinically severe cases of HACE had the most prominent evidence of microhemorrhages on MRI. The bleeds were found predominantly in the corpus callosum, the thick band of nerve fibers that connects the right and left halves of the brain, and showed a characteristic distribution different from other vascular diseases like vasculitis, or blood vessel inflammation.

"The distribution of microhemorrhages is a new and sensitive MRI sign of HACE and can be detected years after HACE," Dr. Knauth said. "We will further analyze our clinical and MRI data on patients with acute mountain sickness, which is thought to be a precursor of HACE."

In the meantime, Dr. Knauth does not think HACE survivors need to give up climbing.

"We cannot give such a strong recommendation," he said. "However, mountaineers who have already experienced HACE once should acclimatize to the altitude very slowly."

Coauthors are Kai Kallenberg, M.D., Peter Bartsch, M.D., and Kai Schommer, M.D.

# # #

Note: Copies of RSNA 2012 news releases and electronic images will be available online at *RSNA.org/press12* beginning Monday, Nov. 26.

RSNA is an association of more than 50,000 radiologists, radiation oncologists, medical physicists and related scientists promoting excellence in patient care and health care delivery through education, research and technologic innovation. The Society is based in Oak Brook, Ill. (*RSNA.org*)

Editor's note: The data in these releases may differ from those in the published abstract and those actually presented at the meeting, as researchers continue to update their data right up until the meeting. To ensure you are using the most up-to-date information, please call the RSNA Newsroom at 1-312-949-3233.

For patient-friendly information on MRI of the brain, visit *RadiologyInfo.org*.

Copyright © 2015 Radiological Society of North America (RSNA)