UT SOUTHWESTERN MEDICAL CENTER NEWS

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UT Southwestern doctor's expertise helped trapped Chilean miners during pressured half-mile-deep rescue

DALLAS – Oct. 18, 2010 – When rescuers needed to determine how to safely extract Chilean miners without their fainting and suffering a potentially devastating loss of blood to the brain, they turned to a UT Southwestern Medical Center scientist whose expertise typically is focused on astronauts in space, not mine workers trapped underground.

"That all 33 men made it out of the mine without fainting is extraordinary," Dr. Benjamin Levine, professor of internal medicine at UT Southwestern, said of the dramatic rescue that captured worldwide attention. "I'm glad I was able to help."

After being contacted by NASA consultants in September, Dr. Levine, the cardiovascular team leader for the National Space Biomedical Research Institute, and two NASA flight surgeon colleagues created the protocols for the men's safe return to the surface. Communications and a supply line were established with the miners on Aug. 22, but relief shafts of more than 2,000 feet took weeks to dig after the Aug. 5 collapse.

The biggest health concern as the retrieval operation commenced was that men would faint during the long ride to the surface. The rescue capsule wasn't wide enough for a passenger to fall down in, and it was feared that the heart of a miner who had fainted might not be able to pump blood up to the brain. Without oxygen reaching the brain, the miner could die. And the rescue trips, originally estimated to take four hours, wound up lasting less than an hour per individual.

Ultimately, medical-science discoveries earmarked for use in the heavens freed the miners from their earth-bound tomb.

Dr. Levine is the principal investigator of the largest outside grant on the effects of long duration space flight on the cardiovascular system and has done other consulting work for NASA. He has participated in rescue clinics in the high altitudes of Nepal and Alaska.

"Two-thirds of astronauts will faint when standing still after being confined on even a short duration space flight," said Dr. Levine, director of the Institute for Exercise and Environmental Medicine, a collaboration between UT Southwestern and Texas Health Presbyterian Hospital Dallas. "Prolonged confinement in a small space brings similar concerns, whether someone is in space or underground."

(MORE)

Mine-rescue protocol – 2

Most of his time currently is spent studying the adaptive capacity of the heart including effects of extreme conditions like space flight or high altitude, as well as aging and exercise training on the heart and blood vessels. His protocols used in the Chilean rescue haven't yet been published.

One aspect of the protocols was built on the work of Dr. Donald Seldin, professor of internal medicine and longtime former chairman of the department. Because of Dr. Seldin's work on aldosterone, Dr. Levine's team suggested that the miners take a synthetic form of the hormone to help them retain salt and water.

Protocols also included making sure the capsule was wide enough for the men to cross their legs and having them squeeze their thighs and buttocks together in order to push blood back up to their hearts. The men wore compression stockings and were trained to cough heartily along the way if they got lightheaded, because that could force blood to the brain, a procedure called "cough CPR."

Dr. Levine actually continued with his daily duties during the time of the actual rescue, but he did check the Internet for updates.

"NASA flight surgeons and the other doctors involved did a remarkable job keeping the men healthy under extreme conditions," Dr. Levine said. "I'm just glad I could help their efforts toward a successful rescue."

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