

Burn injuries rapidly deplete vitamin E

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Severe burn injuries in children have been shown to rapidly deplete the levels of vitamin E in their body's adipose, or fat tissues, a new clinical study has found.

Stored levels of this important antioxidant were reduced more in a few weeks than might normally be possible in years.

An analysis of eight children with third-degree burns over much of their body found they lost almost half of their stored [vitamin E](#) in three weeks, even though they were being given about 150 percent of the recommended daily allowance of vitamin E and other nutrients in a high-calorie diet.

Researchers are not certain what the implication of such rapid vitamin E depletion may be, but concluded in their report that "the depletion of vitamin E may be a very significant problem in patients with burn injury" and other forms of severe trauma.

One particular concern may be the possibility of peripheral neuropathy, since nerve damage is common in patients with severe burn injuries, and has also been associated with vitamin E deficiency in humans. Studies have not yet been done to determine whether heavier supplementation with vitamin E after a burn injury would help address this or other health and healing issues.

The findings of this clinical study were just published in the *American Society for Nutrition*, a professional journal, by scientists from the Linus

Pauling Institute at Oregon State University; the Shriners Hospital for Children in Galveston, Texas; the University of Texas Medical Branch in Galveston, and other researchers.

"This is one of the first studies we've done that measures vitamin E in the body tissues of children," said professor Maret Traber, a principal investigator in the Linus Pauling Institute, and one of the world's leading experts on vitamin E. "Vitamin E in adipose tissue does not fluctuate much on a short-term basis. To find this level of vitamin E loss in such a short time was dramatic, unexpected and somewhat alarming."

Of some concern, Traber said, is that of eight burn patients studied, three of them already had tissue levels of vitamin E that would be considered deficient upon admission to the hospital, shortly after their injury.

Some diet surveys of healthy children have concluded that up to 90 percent of them have vitamin E intake below that which nutrition experts recommend. This essential nutrient is an important antioxidant, plays a role in the immune system, nervous system, and performs many other metabolic functions. It is commonly found in fats, nuts, and some vegetables and seafood products.

"Unfortunately, with the modern American diet too many people are getting most of their vitamin E from foods that aren't particularly good for them, things like ice cream or potato chips," Traber said. "It's probable that most people don't get enough of this vitamin at all, and that's one of the reasons we're looking at people who have suffered severe illness or injury, in which vitamin E deficiencies may complicate other health problems."

With the issue of burn injuries, expert say, one common result is a huge increase in metabolic rate as the body works overtime to deal with the

trauma of burns, skin loss and oxidative stress. The patients in this study all had major injuries, with burns over 29 percent to 93 percent of their body. They were treated at the Shriners Hospital for Children in Texas, however, which has one of the leading burn treatment centers in the world, and all of them survived.

In the United States, about 100,000 people each year suffer burn injuries that are sufficient to require hospitalization, and 5,000 deaths occur as a result. Severe burns are associated with a systemic inflammatory response, increased production of reactive oxygen species and severe depletion of plasma antioxidants, previous research has shown.

Prior to this, it was not known that any mechanism existed that would so rapidly draw down body tissue levels of vitamin E. Low tissue levels of vitamin E are ordinarily observed only after years of inadequate absorption caused by certain genetic defects or diseases.

The report concluded that burn patients may not be receiving adequate vitamin E nutrition, and theorized that increased vitamin E supplementation may decrease the neuropathy, or nerve damage, that is often associated with severe burns. Further studies to address the mechanism and consequences of this issue are planned, they said.

The recommended daily allowance for vitamin E for children ages 4-8 is 10 I.U. per day. Traber said she would recommend performing studies with burn victims and giving them the "tolerable upper limit" of vitamin E as defined by the National Academy of Sciences Institute of Medicine, which would be 400 I.U. per day. This is 40 times higher than the RDA but also a level of supplementation that many people take routinely. Vitamin E, a fat-soluble vitamin, must also be consumed with some amount of fat-containing food in order to be absorbed by the body.

Provided by Oregon State University

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