

Indoor tanning drives increase in skin cancer - study, Part 1

Basal cell carcinoma is the most common form of cancer. While unlikely to metastasize and therefore associated with low mortality, it can be disfiguring and costly to treat. Typically, it has been seen on the heads of elderly outdoor enthusiasts: think dockworkers, golfers or Sun Belt retirees with blotchy, scabbed facial skin.



Image: Yale University

Imagine, then, dermatologists' bewilderment a couple of decades ago when they began to see this nonmelanoma form of skin cancer in more and more young women, many still in their teens.

Several years ago, Yale dermatologist Dr. David J. Leffell, informed Susan T. Mayne, the C.-E.A. Winslow Professor of Epidemiology and a cancer epidemiologist at the Yale School of Public Health (YSPH), about this development. Curious, she examined Yale's dermatopathology archives. (Due to the sheer volume of these types of cancers, they are not reportable to state registries.)

The Yale data showed that between 1990 and 2004 the number of patients under 40 with BCC had jumped. Between the first and last years, cases in men in that age group had risen by 40%. In women, the case number had nearly doubled. Moreover, the trends echoed other findings, like a Minnesota study that charted a similar rise in BCC in women under age 40 between 1976 and 2003.

"The fact that we saw it in females and not so much in males led us to say, 'This looks really interesting,'" Mayne recalls.

Any number of factors might account for such an increase - holes in the ozone layer, a rise in sunbathing, more-revealing fashions. But the Yale dermatologists had been questioning their patients. A great many, it turned out, were frequent users of indoor tanning.

A strong link

In a case-control study published in 2012 in the Journal of the American Academy of Dermatology, Mayne, postdoctoral researcher Leah M. Ferrucci, and colleagues from the Yale Cancer Center and the Yale School of Medicine investigated

the relationship between skin cancer and indoor tanning. They interviewed 376 non-Hispanic, Caucasian BCC patients under the age of 40 about their history of tanning indoors and compared their answers to those of a control group with benign, non-UV-related skin conditions. Unlike previous studies, which were smaller or focused on older people, a large proportion of their subjects had engaged in indoor tanning.

The researchers discovered that a history of ever having tanned indoors carried a 69% higher risk of early-onset basal cell carcinoma (BCC) than the risk for people who had never tanned indoors.

While correlation doesn't necessarily mean causation, this study suggested several important reasons to suspect a causal relationship. One particularly telling finding was a dose-response relationship between indoor tanning sessions and cancer incidence. Patients who used tanning beds more often were at a higher risk of BCC. (Additionally, the association between indoor tanning and BCC in the study group was stronger in women, the group in which indoor tanning was more common.)

When considered alongside other evidence, a dose-response relationship between two factors strongly suggests that the "dosing agent" has caused the "response," rather than their being merely associated. Another supportive factor for causality was specificity: in the study subjects, a disproportionate number of BCC lesions occurred on the torso and limbs, sites of the body that receive heavy ultraviolet (UV) exposure during indoor tanning sessions but that are less likely to be exposed to regular outdoor sunlight.

And then there is biological plausibility that the exposure is related to the disease. Basic science research has long shown UV light to be a skin carcinogen. In 2006, the International Agency for Research on Cancer (IARC) evaluated the epidemiological data on indoor tanning and skin cancer and found what it called "convincing evidence" in favor of a causal link for melanoma and the second type of nonmelanoma skin cancer, squamous cell carcinoma. (At the time of that review there were few studies of BCC and indoor tanning.) Three years later, in 2009, IARC classified tanning devices that emit UV light as Group 1 carcinogens, in the same category as tobacco smoke, asbestos and X-rays. Then, in 2012, an updated review of the epidemiology studies on BCC and indoor tanning published in BMJ concluded that indoor tanning was associated with an increased risk of BCC. Many health and medical organizations, including the American Cancer Society, the American Academy of Dermatology and the U.S. Food and Drug Administration, have recommended that people avoid indoor tanning altogether.

"We have the biochemistry. We've got a plausible mechanism. It's a known carcinogen," says Mayne of UV light. "We're just looking at it in a new exposure setting. This is about as compelling evidence for causation as you can get in the setting of epidemiologic research."

So is there any safe way to tan indoors?

"As far as we can tell, based upon the data, there wouldn't be," says Ferrucci. "We see an increase in both nonmelanoma skin cancers and melanoma with a history of indoor tanning. That one event seems to be predictive of risk."

Source: Yale University

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