

Lead blood levels may increase smokers' risk for kidney cancer

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Higher than normal levels of lead in the blood may signal a risk two times higher than average of developing renal cell carcinoma in smokers, according to medical researchers.

"Past studies (in <u>cadavers</u>) have shown that, compared with kidneys from individuals without cancer, kidneys from individuals with cancer have higher lead <u>levels</u>," said Emily B. Southard, medical student at Penn State College of Medicine. "But prior to this study, the identification of higher lead in <u>blood</u> as a risk factor among healthy individuals before they develop <u>kidney cancer</u> had not been shown."

Southard, working with Robin Taylor Wilson, associate professor of public health sciences at the College of Medicine, analyzed data collected from the Alpha-Tocopherol, <u>Beta-Carotene</u> (ATBC) Cancer Prevention Study to measure levels of blood lead, calcium and vitamin D in stored blood donated by healthy individuals several years before <u>renal</u> <u>cell carcinoma</u> ever developed.

According to the National Institutes of Health, renal cell carcinoma is the most common type of kidney cancer in adults, accounting for 92 percent of kidney cancers. The <u>National Cancer Institute</u> of the NIH predicted that there would be about 56,000 new cases of RCC in 2011 and has reported that nearly 300,000 people in the United States are living with kidney cancer today.

In previous studies involving animals, researchers had found an inverse



correlation between the amount of lead retained in the body and the amount of calcium in the diet. This supports the hypothesis that higher <u>calcium levels</u> in the body can reduce lead retention. While Southard and Wilson also found that levels of calcium were higher in men who had a lower risk of kidney cancer, there was not a strong correlation between blood levels of lead and blood level of calcium or 25-hyrdoxyvitamin D. Therefore, they could not conclude that calcium or vitamin D levels had an influence on the risk observed related to blood lead levels.

Southard and Wilson looked at whether the subjects had ever been in a "high-risk occupation," which would expose the subject to more lead than an average person -- such as mining, asbestos fabric manufacture or oil refining.

"There were no significant differences in occupational history or smoking history between cases and controls in our study that would sufficiently explain the association we observed," the researchers reported online in *Cancer Epidemiology, Biomarkers and Prevention*.

The ATBC study consisted of nearly 30,000 Finnish male smokers between the ages of 50 and 69 years, enrolled from 1985 to 1988. The study was initially conducted to study lung cancer prevention. This study collected blood samples periodically for over two decades. Finland has a cancer registry that tracks patients, making it easier to follow up with patients after diagnosis than it is in the United States.

Southard, Wilson and colleagues looked at a cohort within the ATBC study that included 154 renal cell carcinoma cases, diagnosed after the initial blood collection, and 308 controls. Notably, Southard and Wilson found that among renal cancer cases alone, those with higher blood levels of calcium and vitamin D had a longer period of time before they developed cancer, as measured from blood when they first enrolled in the study as healthy individuals.



"This association suggests that vitamin D and calcium biomarkers may be important clues that can lead us to the early diagnosis of cancer," said Wilson. This is important because there are currently no available screening tests for kidney cancer.

"Studies have shown that people with kidney cancer have higher average lead levels in their kidney tissue, compared with people without kidney cancer," said Southard. "Prior to our study, this was only shown in cadavers and not in living people. Now we have shown that elevated blood <u>lead</u> levels put smokers at higher risk for renal cell carcinoma."

Further work is in progress by Penn State investigators to identify risks among women and non-smokers to find early detection biomarkers.

Provided by Pennsylvania State University

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