



RADIOACTIVE IODINE

Radiation protection after a nuclear accident

BACKGROUND

Radioactive iodine, specifically I-131, is the major radiation product released from a nuclear accident. The most recent accident was the nuclear reactor damage from the Tsunami in Japan. When radioactive iodine is released into the atmosphere, it can then be absorbed into the body. Eating contaminated foods is another way for radioactive iodine to get into the body. Once in the body, the radioactive iodine is taken up by thyroid cells. When thyroid cells absorb too much of the I-131 radioactive iodine, it can cause thyroid cancer. Babies and young children are at highest risk. The risk is much lower for people over age 40. Indeed, the rates of thyroid cancer were higher near Chernobyl, Russia after the nuclear accident there in 1986. Potassium iodide is the same form of iodine used to iodize table salt. Potassium iodide floods the thyroid with iodine, thus preventing radioactive iodine from being absorbed. Taking potassium iodide immediately after a nuclear accident appears to lessen the risk of developing thyroid cancer. Sodium perchlorate is a chemical that causes the thyroid to release any iodine that is stored in the thyroid cells. Thus, taking sodium perchlorate after a nuclear accident may cause the thyroid to release any radioactive iodine that the thyroid cells have already taken up. This study was to see if taking sodium perchlorate might also lower the chance of thyroid cancer after a nuclear accident.

THE FULL ARTICLE TITLE:

Hänscheid H et al Facing the nuclear threat: thyroid blocking revisited. *J Clin Endocrinol Metab.* August 24, 2011 [Epub ahead of print].

SUMMARY OF THE STUDY

This was a study of 27 healthy volunteers who did not have any thyroid problems. Each volunteer received a small (not harmful) dose of radioactive iodine, then different amounts of either potassium iodide or sodium perchlorate. The volunteers then had a radioactive iodine uptake (RAIU) test to see how long the radiation stayed in the thyroid. The authors found that 100 mg of either potassium iodide or sodium perchlorate was able to decrease radioactive iodine levels by almost 90%. However, younger people may need higher doses of these protective agents after a nuclear accident.

WHAT ARE THE IMPLICATIONS OF THIS STUDY?

The results suggest that both potassium iodide and sodium perchlorate lower radioactive iodine levels to the thyroid after a nuclear accident. Decreasing radioactive iodine exposure is important for lowering thyroid cancer risk. Both are relatively safe to take as a single dose following a nuclear accident. Currently, potassium iodide is the main compound to take after a nuclear accident and is stockpiled in areas that have nuclear power plants in the United States. Since thyroid effects of low levels of perchlorate in the U.S. environment are controversial, it is unlikely that it will be made available to the general U.S. public following a nuclear accident. However, it is another compound that can be used in this situation.

—Angela Leung, MD

ATA THYROID BROCHURE LINKS

Thyroid cancer: http://thyroid.org/patients/patient_brochures/cancer_of_thyroid.html

ABBREVIATIONS & DEFINITIONS

Ionizing radiation: Radiation that can damage cells, causing cell death or mutation. It can originate from radioactive materials, x-ray tubes or specialized machines. It is invisible and not directly detectable by human senses.

Radioactive iodine uptake (RAIU): This is a measurement of activity of the thyroid gland and is reported as the percent of a dose of radioactive iodine that is retained in the thyroid gland 24 h after the dose is given.

Potassium iodide: This is the same form of iodine used to iodize table salt. Taking potassium iodide immediately after a nuclear accident appears to lessen the risk of developing thyroid cancer. This is because potassium iodide floods the thyroid with iodine, thus preventing radioactive iodine from being absorbed.

Sodium perchlorate: This chemical causes the thyroid to release any iodine that is stored in the thyroid cells. This is also a component of rocket fuel that can be found in the environment. The thyroid effects of low levels of perchlorate in the U.S. environment are controversial.