

DRUG INFORMATION ALERT

Iodide Supplementation after Nuclear Radiation Exposure

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On March 11, 2011 a massive earthquake, registering 9.0 on the Richter Scale, struck the eastern coast of Japan. In addition to the lives, homes, and buildings claimed by the quake and the ensuing tsunami waves, two nuclear reactors sustained damage.¹ Concerns about radiation exposure have subsequently arisen, both in Japan and in the United States. Strategies for reducing the effects of radiation exposure include potassium iodide (KI) supplementation in at-risk individuals and avoidance of potentially radiation-contaminated food products.²

The thyroid gland requires iodine for the production of the thyroid hormones, triiodothyronine (T3) and thyroxine (T4). Common sources of iodine include iodized salt, potatoes, milk, and seafood. After consumption, the thyroid absorbs available iodine from the bloodstream. The thyroid, however, lacks the ability to differentiate between regular iodine and radioactive iodine and will simply absorb any iodine available. Uptake of radioactive iodine by the thyroid increases the risk of thyroid nodules and thyroid cancer.^{3, 4} One measure to prevent the absorption of radioactive iodine into the thyroid is prophylactic KI supplementation. The mechanism by which KI inhibits radioactive iodine absorption is three-fold: saturation of the thyroid's iodide transport system, interference with intrathyroidal iodide use (the Wolff-Chaikoff effect), and dilution of radioactive iodine atoms with non-radioactive iodine atoms.^{4, 5} KI will fill thyroid cells and prevent radioactive iodine absorption for approximately 24 hours. While KI protects only the thyroid from radioactive iodine exposure, this is the organ at greatest risk.⁶

Currently, KI doses of 16 mg to 130 mg once daily are approved by the United States Food and Drug Administration (FDA) for preventing injury following exposure to radioactive isotopes of iodine in adults, children, and pregnant women.⁷ The American Thyroid Association (ATA) also recommends KI use in children and pregnant women, as children and developing fetuses are at the highest risk of exposure.⁶ The risk of developing thyroid cancer after radioactive iodine exposure is negligible in those greater than 20 years old.⁸ The ATA advises that adults over age 40 do not require KI unless they are exposed to extremely high levels of radioactive iodine.⁶ KI should be administered until the risk of radioactive exposure no longer exists under the guidance of physicians and/or public health officials.⁷ Of note, KI prophylaxis should not be initiated unless a clear risk of exposure to hazardous levels of radioactive iodine has been identified because of the potential for KI to cause hypersensitivity reactions, salivary gland swelling, "iodism" (e.g., metallic taste, burning mouth and throat, sore teeth and gums, symptoms of head cold, stomach upset and diarrhea), gynecomastia, as well as hyper- and hypothyroidism.^{4,8} Additionally, KI is contraindicated in patients with iodine allergy.

To allay fears concerning potential radiation exposure in North America following the earthquake in Japan, the American Association of Clinical Endocrinologists, the ATA, the Endocrine Society, and the Society of Nuclear Medicine released a joint statement on



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March 18, 2011, addressing this issue. While the statement highlights pregnant women, fetuses, infants and children as the populations at the highest risk of developing thyroid cancer after exposure, ingesting or hoarding KI is discouraged at this point. Since radioactive iodine decays quickly, current estimates indicate a dangerous amount will not likely reach the United States.⁸ Because food and milk from farmlands near the nuclear reactor accident may become contaminated, Japan has ceased sale of these products and the United States has instituted radiation screening for milk, vegetable, and fruit product importation from areas near the nuclear plant until further notice. 5, 9

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