PHARMACIST'S LETTER / PRESCRIBER'S LETTER

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PHARMACIST'S LETTER / PRESCRIBER'S LETTER
March 2011

Compounding KI for Radiation Exposure

Background

Iodine can be used to protect the thyroid from nuclear radiation. Iodine can be taken orally in the form of potassium iodide (KI).[1] Potassium iodide is commercially available as tablets (*Iosat*, *ThyroSafe*, *RadBlock* [Canada]); solutions (*ThyroShield*, Lugol's, SSKI, etc); and as a powder that can be used to compound oral formulations (i.e., solutions or capsules). Tablets are usually the most convenient dosage form. This document describes options other than potassium iodide tablets, with volumes for doses of different concentrations of potassium iodide solutions.

Dosing of Potassium Iodide for Nuclear Radiation

Potassium iodide 130 mg contains approximately 100 mg of elemental iodine.[6] The recommended oral doses of potassium iodide and elemental iodine for nuclear radiation emergencies are as follows:[1]

- Adults: 130 mg potassium iodide (100 mg elemental iodine);
- Children between 3 and 18 years of age: 65 mg potassium iodide (50 mg elemental iodine) (children weighing ≥150 lbs [68.2 kg] should take the full adult dose);
- Children between 1 month and 3 years: 32 mg potassium iodide (25 mg elemental iodine) (for both nursing and non-nursing infants/children);
- Birth to 1 month: 16 mg potassium iodide (12.5 mg elemental iodine) (for both nursing and non-nursing infants).

NOTE: A single dose of potassium iodide protects the thyroid gland for 24 hours.

Potassium Iodide Oral Solutions

Dosing potassium iodide oral solutions can be confusing since there are several different concentrations available.

Lugol's solution, or **strong iodine solution 5%-10%**, contains iodine 5% (50 mg/mL) plus potassium iodide 10% (100 mg/mL). The volumes of Lugol's solution that provide doses recommended for nuclear radiation as listed in the previous section are as follows:

- 0.8 mL Lugol's = 100 mg elemental iodine;
- 0.4 mL Lugol's = 50 mg elemental iodine;
- 0.2 mL Lugol's = 25 mg elemental iodine;
- 0.1 mL Lugol's = 12.5 mg elemental iodine.

SSKI (potassium iodide solution) has potassium iodide 1000 mg/mL. The volumes of SSKI that provide doses for nuclear radiation as listed in the previous section are as follows:

- 0.13 mL SSKI = 130 mg potassium iodide;
- 0.065 mL SSKI = 65 mg potassium iodide;
- 0.0325 mL SSKI = 32.5 mg potassium iodide;
- 0.0163 mL SSKI = 16.25 mg potassium iodide.

Since these doses can be very small volumes, the smaller doses may not be measurable with reasonable accuracy in some situations. SSKI can be mixed in water, fruit juice, or milk.[2]

***ThyroShield* (potassium iodide solution)** contains potassium iodide 65 mg/mL. Note that *ThyroShield* is the only potassium iodide SOLUTION that is FDA-approved for protection against nuclear radiation.[3] The volumes of *ThyroShield* that provide doses for nuclear radiation listed are as follows:

- 2 mL *ThyroShield* = 130 mg potassium iodide;
- 1 mL *ThyroShield* = 65 mg potassium iodide;
- 0.5 mL *ThyroShield* = 32.5 mg potassium iodide;
- 0.25 mL *ThyroShield* = 16.25 mg potassium iodide.

More. . .

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Other Considerations

In an emergency situation, if only **potassium iodide tablets** are available for children, they can be crushed and mixed with liquids, such as milk, orange juice, flat soda, etc.[5] A mixture of potassium iodide with raspberry syrup disguises the salty taste the best. Mixtures with low fat chocolate milk, orange juice, and flat soda have an acceptable taste.[5]

Topical iodine solutions should not be used orally because they contain isopropyl alcohol, which is not safe for oral consumption.

Recipes for Potassium Iodide Solution

Following is a recipe for mixing **100 mL of potassium iodide saturated solution (1000 mg potassium iodide/mL**, same concentration as SSKI), in a pinch:[4]

- Potassium iodide 100 g
- Sodium thiosulfate 50 mg
- Purified water qs 100 mL

Here is another recipe, which makes **100 mL of a 65 mg/mL potassium iodide solution**:[7]

- Potassium iodide 1000 mg/mL (SSKI) 6.5 mL
- *Ora-Sweet*, simple syrup, or other vehicle qs 100 mL (Note that butterscotch, caramel, licorice, or raspberry are good options for masking the salty flavor of KI. Any of these could be mixed 1:1 with simple syrup as a vehicle.)

Add sodium thiosulfate 50 mg as a preservative if solution is not to be used immediately.

Note that in general, beyond-use dates for water-containing products prepared from ingredients in solid form is up to 14 days when the compound is stored in the refrigerator.[4]

Users of this PL Detail-Document are cautioned to use their own professional judgment and consult any other necessary or appropriate sources prior to making clinical judgments based on the content of this document. Our editors have researched the information with input from experts, government agencies, and national organizations. Information and Internet links in this article were current as of the date of publication.

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