Potassium Iodide and Iodine (Lexi-Drugs)

Pronunciation  (poe TASS ee um EYE oh dide & EYE oh dine)

Pharmacologic Category  Antiseptic, Topical; Antithyroid Agent

Dosing: Adult

Antiseptic: Topical: Apply directly to area(s) requiring antiseptic.

Thyroidectomy preparation (off-label use): Oral: 5 to 7 drops (0.25 to 0.35 mL) 3 times daily; administer for 10 days before surgery; if not euthyroid prior to surgery, consider concurrent beta-blockade (eg, propranolol) in the immediate preoperative period to reduce the risk of thyroid storm (Ross 2016)

Thyroid gland protection during radiopharmaceutical use (off-label use): Oral: 20 drops 3 times daily has been recommended (Bexxar prescribing information 2012)

Note: Initiate 1 to 48 hours prior to radiopharmaceutical exposure and continue after radiopharmaceutical administration until risk of exposure has diminished (treatment initiation time and duration is dependent on the radiopharmaceutical agent used, consult specific protocol or labeling.

Thyrotoxic crisis/thyroid storm (off-label use): Oral: 4 to 8 drops every 6 to 8 hours; initiate therapy at least 1 hour following the initial dose of antithyroid drug therapy (eg, propylthiouracil, methimazole) (Nayak 2006; Ross 2016)

Dosing: Geriatric  Refer to adult dosing.

Dosing: Renal Impairment: Adult  There are no dosage adjustments provided in the manufacturer’s labeling.

Dosing: Hepatic Impairment: Adult  There are no dosage adjustments provided in the manufacturer’s labeling.

Dosing: Pediatric  Thyrotoxic crisis (off-label use): Oral: 4 to 8 drops 3 times daily; initiate therapy preferably 2 hours following the initial dose of antithyroid drug therapy (eg, propylthiouracil, methimazole) (Eyal 2008)

Dosing: Renal Impairment: Pediatric  There are no dosage adjustments provided in the manufacturer’s labeling.

Dosing: Hepatic Impairment: Pediatric  There are no dosage adjustments provided in the manufacturer’s labeling.

Use: Labeled Indications  Antiseptic: Topical antiseptic

Use: Off-Label

Thyroidectomy preparation  Level of Evidence [G]

Based on the American Thyroid Association and American Association of Clinical Endocrinologists guidelines for the management of hyperthyroidism and other causes of thyrotoxicosis, potassium iodide and iodine is recommended in the immediate preoperative period in patients with Graves’ disease undergoing thyroidectomy to reduce thyroid blood flow, vascularity, and intraoperative blood loss. Iodine therapy is not recommended in the preoperative setting in patients with thyrotoxicosis caused by a toxic adenoma or toxic multinodular goiter due to the risk of exacerbating hyperthyroidism.

Thyroid gland protection during radiopharmaceutical use  Level of Evidence [G]

Based on the European Association of Nuclear Medicine (EANM) procedure guidelines for 131 I-meta-iodobenzylguanidine (131 I-mIBG) therapy, potassium iodide and iodine is effective and recommended for thyroid gland protection during radiopharmaceutical use.

Thyrotoxic crisis/thyroid storm (adults)  Level of Evidence [C, G]
Clinical experience suggests the utility of potassium iodide and iodine following the initial dose of either propylthiouracil or methimazole in the management of adults experiencing thyrotoxic crisis\[1\]. Additional data may be necessary to further define the role of potassium iodide and iodine in the management of this condition.

Based on the American Thyroid Association and American Association of Clinical Endocrinologists guidelines for the management of hyperthyroidism and other causes of thyrotoxicosis, potassium iodide and iodine (Lugol’s solution) is an acceptable alternative to saturated solution of potassium iodide (SSKI) in the management of adults with thyrotoxic crisis/thyroid storm.

\[\textbf{Thyrotoxic crisis/thyroid storm (children)}\text{ Level of Evidence [C]}

Clinical experience suggests the utility of potassium iodide and iodine following the initial dose of either propylthiouracil or methimazole in the management of children and adolescents experiencing thyrotoxic crisis\[1\]. Additional data may be necessary to further define the role of potassium iodide and iodine in the management of this condition.

\section*{Level of Evidence Definitions}

\begin{itemize}
  \item \textbf{Level of Evidence Scale}
  \begin{itemize}
    \item \textbf{A} - Consistent evidence from well-performed randomized, controlled trials or overwhelming evidence of some other form (eg, results of the introduction of penicillin treatment) to support the off-label use. Further research is unlikely to change confidence in the estimate of benefit.
    \item \textbf{B} - Evidence from randomized, controlled trials with important limitations (inconsistent results, methodological flaws, indirect or imprecise), or very strong evidence of some other research design. Further research (if performed) is likely to have an impact on confidence in the estimate of benefit and risk and may change the estimate.
    \item \textbf{C} - Evidence from observational studies (eg, retrospective case series/reports providing significant impact on patient care), unsystematic clinical experience, or from potentially flawed randomized, controlled trials (eg, when limited options exist for condition). Any estimate of effect is uncertain.
    \item \textbf{G} - Use has been substantiated by inclusion in at least one evidence-based or consensus-based clinical practice guideline.
  \end{itemize}
\end{itemize}

\section*{Clinical Practice Guidelines}

ATA, "Guidelines for Diagnosis and Management of Hyperthyroidism and Other Causes of Thyrotoxicosis," 2016.

\section*{Administration: Oral}

Has been used orally (off-label route)

\section*{Administration: Topical}

Apply topically directly to area(s) requiring antiseptic.

\section*{Storage/Stability}

Store at room temperature of 15°C to 30°C (59°F to 86°F). Protect from light and keep container tightly closed.

\section*{Medication Patient Education with HCAHPS Considerations}

- Discuss specific use of drug and side effects with patient as it relates to treatment. (HCAHPS: During this hospital stay, were you given any medicine that you had not taken before? Before giving you any new medicine, how often did hospital staff tell you what the medicine was for? How often did hospital staff describe possible side effects in a way you could understand?)

- Have patient report immediately to prescriber severe abdominal pain, severe nausea, vomiting, or diarrhea (HCAHPS).

- Educate patient about signs of a significant reaction (eg, wheezing; chest tightness; fever; itching; bad cough; blue skin color; seizures; or swelling of face, lips, tongue, or throat). \textbf{Note:} This is not a comprehensive list of all side effects. Patient should consult prescriber for additional questions.

\section*{Intended Use and Disclaimer}

Should not be printed and given to patients. This information is intended to serve as a concise initial reference for health care professionals to use when discussing medications with a patient. You must ultimately rely on your own discretion, experience, and judgment in diagnosing, treating, and advising patients.

\section*{Medication Safety Issues}
Sound-alike/look-alike issues:

Potassium iodine and iodine (Strong Iodide Solution or Lugol's solution) may be confused with potassium iodide products, including saturated solution of potassium iodide (SSKI®).

Other safety concerns:

Dosage volume: Dosing errors have been reported during the prescribing, dispensing, and administration of potassium iodide-containing solutions (eg, Lugol's, SSKI). Errors have occurred when mL doses were administered, when only drops were indicated for the dose. Carefully review dosage and administration information; appropriate oral dosage is most commonly expressed as drops to provide doses less than 1 mL. Dispensing unit doses is also highly recommended; pharmacists should never dispense quantities that could be lethal if consumed as a single dose. (ISMP, 2011).

Contraindications

Hypersensitivity to iodine or any component of the formulation; active tuberculosis; dermatitis herpetiformis; hypocomplementemic vasculitis; nodular thyroid disease with heart disease.

Warnings/Precautions

Concerns related to adverse effects:

- Hypothyroidism: Prolonged use can lead to hypothyroidism.
- Skin reactions: Can cause acne flare-ups and/or dermatitis.

Disease-related concerns:

- Cardiac disease: Use with caution in patients with cardiac disease.
- Renal impairment: Use with caution in patients with renal impairment.
- Thyroid disease: Use with caution in patients with a history of hyperthyroidism; use is contraindicated in nodular thyroid conditions with heart disease.
- Tuberculosis: Use with caution in patients with tuberculosis.

Concurrent drug therapy issues:

- Drug-drug interactions: Potentially significant interactions may exist, requiring dose or frequency adjustment, additional monitoring, and/or selection of alternative therapy. Consult drug interactions database for more detailed information.

Geriatric Considerations

Elderly may have reduced renal function and require close monitoring of serum potassium. It may also be recommended to check serum magnesium.

Pregnancy Risk Factor

D (potassium iodide)

Pregnancy Considerations

Iodine crosses the placenta (may cause hypothyroidism and goiter in fetus/newborn). Use for protection against thyroid cancer secondary to radioactive iodine exposure is considered acceptable based upon risk:benefit, keeping in mind the dose and duration. Repeat dosing should be avoided if possible. Refer to Iodine for additional information.

Breast-Feeding Considerations

Skin rash in the nursing infant has been reported with maternal intake of potassium iodide. Refer to Iodine monograph for additional information.

Briggs' Drugs in Pregnancy & Lactation

- Iodine
- Potassium Iodide
Adverse Reactions

Frequency not defined.

Cardiovascular: Cardiac arrhythmia, myxedema

Central nervous system: Confusion, fatigue, metallic taste, numbness, tingling sensation

Dermatologic: Skin rash

Endocrine & metabolic: Goiter, hyperthyroidism, hypothyroidism

Gastrointestinal: Diarrhea, enlargement of salivary glands, gastric distress, gastrointestinal hemorrhage, nausea, salivary gland disease (tenderness), stomach pain, vomiting

Hematologic & oncologic: Adenopathy, thyroid adenoma

Hypersensitivity: Hypersensitivity reaction (angioedema, cutaneous and mucosal hemorrhage, serum sickness-like symptoms)

Neuromuscular & skeletal: Arthralgia, weakness

Respiratory: Pharyngeal edema

Miscellaneous: Drug overdose (with prolonged treatment/high doses), fever, iodism

Metabolism/Transport Effects None known.

Drug Interactions

Aliskiren: Potassium Salts may enhance the hyperkalemic effect of Aliskiren. Risk C: Monitor therapy

Angiotensin II Receptor Blockers: Potassium Salts may enhance the hyperkalemic effect of Angiotensin II Receptor Blockers. Risk C: Monitor therapy

Angiotensin-Converting Enzyme Inhibitors: Potassium Salts may enhance the hyperkalemic effect of Angiotensin-Converting Enzyme Inhibitors. Risk C: Monitor therapy

Cardiac Glycosides: Antithyroid Agents may increase the serum concentration of Cardiac Glycosides. Risk C: Monitor therapy

Eplerenone: May enhance the hyperkalemic effect of Potassium Salts. Management: This combination is contraindicated in patients receiving eplerenone for treatment of hypertension. Risk D: Consider therapy modification

Heparin: May enhance the hyperkalemic effect of Potassium Salts. Risk C: Monitor therapy

Heparins (Low Molecular Weight): May enhance the hyperkalemic effect of Potassium Salts. Risk C: Monitor therapy

Lithium: Potassium Iodide may enhance the hypothyroid effect of Lithium. Risk C: Monitor therapy

Nicorandil: May enhance the hyperkalemic effect of Potassium Salts. Risk C: Monitor therapy

Potassium-Sparing Diuretics: Potassium Salts may enhance the hyperkalemic effect of Potassium-Sparing Diuretics. Risk D: Consider therapy modification

Sodium Iodide I131: Antithyroid Agents may diminish the therapeutic effect of Sodium Iodide I131. Management: Discontinue antithyroid therapy 3-4 days prior to sodium iodide I-131 administration. Risk X: Avoid combination

Theophylline Derivatives: Antithyroid Agents may increase the serum concentration of Theophylline Derivatives. Exceptions: Dyphylline. Risk C: Monitor therapy

Vitamin K Antagonists (eg, warfarin): Antithyroid Agents may diminish the anticoagulant effect of Vitamin K Antagonists. Risk D: Consider therapy modification

Test Interactions Iodide may alter thyroid function tests.

Monitoring Parameters Thyroid function tests, signs/symptoms of hyperthyroidism; thyroid function should be monitored in pregnant women, neonates, and young infants if repeat doses are required following radioactive iodine exposure
Nursing Physical Assessment/Monitoring

See individual agents.

Dosage Forms Considerations

Lugol's 5% oral solution (potassium iodide 10% and iodine 5%) contains potassium iodide 100 mg/mL and iodine 50 mg/mL and provides 6.25 mg iodide/iodine per drop.

Dosage Forms  Excipient information presented when available (limited, particularly for generics); consult specific product labeling.

Solution, External:

Generic: Potassium iodide 10% and iodine 5% (8 mL)

Solution, Oral:

Generic: Potassium iodide 10% and iodine 5% (14 mL, 473 mL)

Tincture, External:

Generic: Potassium iodide 5% and iodine 7% (30 mL, 480 mL)

Generic Available (US)  Yes

Mechanism of Action  In hyperthyroidism, iodine temporarily inhibits thyroid hormone synthesis and secretion into the circulation; use also decreases thyroid gland size and vascularity. Serum T4 and T3 concentrations can be reduced for several weeks with use but effect will not be maintained.

Following radioactive iodine exposure, potassium iodide blocks uptake of radioiodine by the thyroid, reducing the risk of thyroid cancer.

Pharmacodynamics/Kinetics

Onset of action: Hyperthyroidism: 24-48 hours

Peak effect: 10-15 days after continuous therapy

Local Anesthetic/Vasoconstrictor Precautions  No information available to require special precautions

Effects on Dental Treatment  Key adverse event(s) related to dental treatment: Metallic taste.

Effects on Bleeding  No information available to require special precautions

Related Information

- Iodine
- Potassium Iodide

Index Terms  Iodine and Potassium Iodide; Lugol's Solution; Potassium Iodide/Iodine; Strong Iodine Solution

References


**Brand Names: International** Gemstain (HK)

*Last Updated 10/3/18*