## Hydroxocobalamin

<table>
<thead>
<tr>
<th>Brand names</th>
<th>Cyanokit, generic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medication error potential</strong></td>
<td>None reported by ISMP or USP(^{(1,2)})</td>
</tr>
</tbody>
</table>

### Contraindications and warnings

**Contraindications:** Should not be used in patients with hypersensitivity to the drug or any of its components.\(^{(3)}\)

**Warnings:** Treatment of cyanide poisoning must also include supportive emergency care, including airway management, oxygenation, hydration, cardiovascular support, and control of seizure activity.\(^{(4)}\)

Use with caution in patients with known anaphylactic reactions to hydroxocobalamin or cyanocobalamin.\(^{(4)}\) (See the Infusion-Related Cautions section.)

Use will result in red discoloration of the skin and urine. Patients have also reported photosensitivity. Patient should be instructed to avoid sun exposure until the red discoloration disappears (up to 2 weeks).\(^{(4)}\) Urine discoloration may persist for up to 5 weeks.\(^{(4)}\)

The use of folic acid alone in megaloblastic anemia due to vitamin B\(_{12}\) deficiency may result in irreversible neurologic damage.\(^{(3)}\) The use of vitamin B\(_{12}\) alone in megaloblastic anemia due to folic acid deficiency may prevent the correct diagnosis since it will improve symptoms of folic acid deficiency.\(^{(3)}\)

### Infusion-related cautions

Allergic reactions, which may include anaphylaxis, chest tightness, edema, urticaria, pruritus, dyspnea, rash, and angioneurotic edema have occurred with hydroxocobalamin administration.\(^{(4)}\)

Increased blood pressure has occurred after initiation of the infusion, with the greatest increase occurring toward the end of the infusion.\(^{(4)}\) Increased blood pressure was transient; a return to baseline should be expected within 4 hours of completing the infusion.\(^{(4)}\)

### Dosage

Hydroxocobalamin (vitamin B\(_{12a}\)) is a precursor to cyanocobalamin (vitamin B\(_{12}\)).\(^{(5)}\) Two hydroxocobalamin products are available: a lyophilized powder for IV administration (25 mg/mL when reconstituted) to be used for cyanide poisoning, and a sterile solution of 1000 mcg/mL for IM administration to be used for anemias and vitamin B\(_{12}\) deficiency.\(^{(3,4)}\)

#### Cyanide poisoning (hydroxocobalamin product for IV injection)\(^{(4,5)}\)

- **Adults:** 5 g over 15 minutes repeated once; another dose of 5 g may be given if the first doses are ineffective.
- **Pediatric patients:** 70 mg/kg (up to 5 g) over 30 minutes as a single infusion; an additional dose of 70 mg/kg may be administered based on clinical response.

#### Anemia, vitamin B\(_{12}\) (hydroxocobalamin product for IM administration)\(^{(3,5)}\)

Cyanocobalamin preferred over hydroxocobalamin due to potential for antibody formation to the hydroxocobalamin-transcobalamin complex.\(^{(5)}\)

- **Children with vitamin B\(_{12}\) deficiency:** 100 mcg/day for 10–15 days (total dose of 1–5 mg), then 30–50 mcg/mo maintenance has been cited.\(^{(3,5)}\)
- **Schilling test:** 1000 mcg once\(^{(5)}\)

### Dosage adjustment in organ dysfunction

No information available

### Maximum dosage

5 g in pediatric patients and 10 g in adults.\(^{(4)}\) Ten adult patients with smoke inhalation from fire or cyanide poisoning by ingestion or inhalation have received total doses of up to 20 g; only one of the 10 survived with unspecified neurologic sequelae.\(^{(4)}\)
Hydroxocobalamin

Additives
Hydroxocobalamin for IM administration contains 4.34% cobalt, 1.5 mg/mL methylparaben, and 0.2 mg/mL propylparaben.\(^3\)

Suitable diluents
NS, D5W, LR (hydroxocobalamin product for IV injection).\(^4\) Hydroxocobalamin for IM administration should not be further diluted.

Maximum concentration
25 mg/mL\(^4\)

Preparation and delivery
Hydroxocobalamin product for IV injection: Available as a single-vial kit of 5 g or two cartons of 2.5 g containing lyophilized hydroxocobalamin. Reconstitute 5-g vial with 200 mL and each 2.5-g vial with 100 mL NS (D5W or LR may be used if NS not available) using transfer spike provided in carton. Rock or rotate vial for 30–60 seconds to mix solution (do not shake). Should be red in color. Discard if not. Use vented IV tubing provided in carton for infusion to patient.\(^4\)

Do not administer blood products or other drugs through the same infusion line with hydroxocobalamin.\(^4\)

Do not administer the IM product via the IV route.\(^3\)

IV push
Not indicated

Intermittent infusion
Infuse the IV product over 15 minutes.\(^4\)

Continuous infusion
Not indicated

Other routes of administration
Hydroxocobalamin for IM administration should only be administered via the IM route.\(^3\)

For cyanide poisoning, IV product may be administered intraosseous in pediatric patients.

Comments
Significant adverse effects: An acneiform rash may occur anywhere on the body within 7–28 days of administration; the rash should resolve on its own within several weeks.\(^4\)

Monitoring: A blood cyanide concentration is recommended by the manufacturer; however, collection of blood cyanide sample should not delay treatment.\(^4\)

Hypokalemia and thrombocytosis may occur when severe megaloblastic anemia is reversed to normal erythropoiesis by B\(_12\) administration; monitor potassium and platelet count closely.\(^3\)

Laboratory interference: Hydroxocobalamin has a dark red color, and its use may interfere with laboratory analysis with colorimetric assays (chemistry panels, hematologic and coagulation tests, and urinalysis).\(^4\) The interference may result in increased, decreased or unpredictable concentrations and duration of interference may occur for up to 48 hours after hydroxocobalamin administration.\(^4\) Please see manufacturer’s labeling for more specific information on tests that may be affected.\(^4\)

Other: For cyanide poisoning, hydroxocobalamin may be advantageous over other antidotes (amyl nitrate, sodium nitrite, and sodium thiosulfate) in that it requires administration of a single antidote and does not result in methemoglobinemia.

In patients with concomitant carbon monoxide poisoning, sodium thiosulfate should be added to treat the carbon monoxide poisoning.\(^6,7\)

Empiric treatment with hydroxocobalamin of cyanide toxicity secondary to smoke inhalation has been proposed.\(^8\)