

Table 1. Alternatives to pantoprazole injection for specific clinical situations

Clinical Situation	Recommendations
Patient with indications for intravenous histamine H₂-receptor antagonists	
Gastrointestinal bleeding: prevention or treatment ^{14,19-23}	<p>Cimetidine 37.5–100 mg/hour continuous IV infusion</p> <p>Famotidine 20 mg IV every 12 hours <i>or</i> 1.7–4 mg/hour continuous IV infusion</p> <p>Ranitidine 6.25–10 mg/hour continuous IV infusion</p> <p>Esomeprazole IV – dose not established</p>
Hypersecretory conditions ^{*14,20-22,24}	<p>Cimetidine 300–600 mg IV every 6 hours <i>or</i> 300 mg bolus IV followed by 1 mg/kg/hour continuous IV infusion</p> <p>Famotidine 20 mg IV every 6 hours</p> <p>Ranitidine 50 mg every 6–8 hours <i>or</i> 1–2.5 mg/kg/hour continuous IV infusion</p> <p>Esomeprazole IV – dose not established</p>
Other patients	
Patient with large-bore (18-gauge French or larger) gastric or nasogastric feeding tube ^{**15,25-27, 28-30}	<p>Esomeprazole, lansoprazole or omeprazole capsules are effective when given via a gastric feeding tube.</p> <p>Esomeprazole capsules: Open the capsule into a 60 mL syringe and mix with 50 mL of water. Shake syringe for 15 seconds to evenly distribute the granules throughout the suspension. Put the mixture down the nasogastric tube and flush tube with additional water. Clamp the feeding tube for at least 1 hour. Do not administer if pellets have dissolved or disintegrated.</p> <p>Lansoprazole or omeprazole capsules: Open the capsule. Immediately prior to administration, gently mix the intact, nonencapsulated granules with an acidic fruit juice (e.g., apple juice, cranberry juice, orange juice). Pour the mixture down the feeding tube. After administration, flush the feeding tube with additional fruit juice and clamp the feeding tube for at least 1 hour.</p> <p>Lansoprazole orally disintegrating tablets: Place tablet in an oral syringe, then draw water into the syringe. Use 4 mL of water for the 15 mg tablet and use 10 mL of water for the 30 mg tablet. Shake the syringe gently to dissolve the tablet. Put the mixture down the feeding tube within 15 minutes of preparation. After administration, refill the syringe with 5 mL of water, shake gently, and flush the feeding tube and clamp the feeding tube for at least 1 hour.</p> <p>If the patient is receiving an enteral feeding formula, temporarily discontinue the feeding formula while administering the medication, flush with additional fluid after administration, and then resume administration of the enteral formula.</p> <p>Omeprazole powder for oral suspension: Reconstitute powder with 20 mL water and administer immediately. Flush with 20 mL water. Hold continuous enteral feedings for 3 hours prior to and 1 hour after administration.</p> <p>There are no data supporting the administration of pantoprazole or rabeprazole via a feeding tube.</p>
Patient with intestinal feeding tube (e.g., Dobhoff, Miller-Frederick) or small-bore (smaller than 18-gauge French) gastric feeding tube ^{**15,25,26,29,31,32}	<p>Simplified suspensions of lansoprazole or omeprazole are effective when administered via an enteral feeding tube. See Table 2 for preparation instructions.</p> <p>Prior to administration, shake the suspension well. After administration, flush the feeding tube with 5–10 mL of water and clamp the feeding tube for at least 1 hour.</p>

	<p>If the patient is receiving an enteral feeding formula, temporarily discontinue the feeding formula while administering the suspension, flush with water after administration, and then resume administration of the enteral formula.</p> <p>Administration of esomeprazole down a Dobbhoff Size 8 French feeding tube, a 14 French nasogastric tube, and a 20 French gastrostomy tube has been evaluated. Esomeprazole capsules were opened into a 60 mL syringe and mixed with 50 mL of water. The mixture was administered down the nasogastric tubes and flushed with additional water. The percent of pellet delivery through the tubes was 98% for the Size 8 French tube, 99.9% for the Size 14 French tube, and 99.2% for the Size 20 gastrostomy tube. A significant difference ($p < 0.05$) was noted between the Size 8 and Size 14 tubes. The difference in delivery was attributed to reduce delivery of pellets into the tube rather than an increase of pellets stuck within the tubes. In general it is not recommended to administer intact pellets or granules down small-bore tubing because of the potential for clogging the tube.</p> <p>Lansoprazole orally disintegrating tablets may be administered down a nasogastric tube, provided the tube is at least 8-gauge French: Place tablet in an oral syringe, then draw water into the syringe. Use 4 mL of water for the 15 mg tablet and use 10 mL of water for the 30 mg tablet. Shake the syringe gently to dissolve the tablet. Put the mixture down the feeding tube within 15 minutes of preparation. After administration, refill the syringe with 5 mL of water, shake gently, and flush the feeding tube and clamp the feeding tube for at least 1 hour.</p> <p>Pantoprazole tablets have been crushed and mixed with 20 mL of sodium bicarbonate to make a 2 mg/mL pantoprazole suspension. However, the suspension resulted in a 25% lower bioavailability relative to tablet administration. Use of pantoprazole in this manner cannot be recommended.</p> <p>There are no data supporting the administration of pantoprazole or rabeprazole via intestinal feeding tube or small-bore gastric feeding tube.</p>
<p>Patient without a feeding tube who cannot take oral capsules or tablets (e.g., patient with swallowing difficulties)^{25-27,29,31}</p>	<p>Any of the following approaches is effective:</p> <p>Lansoprazole or omeprazole commercially available oral suspension given orally.***</p> <p>Esomeprazole, lansoprazole or omeprazole granules with fruit juice: Immediately before administration, open the capsule and gently mix the intact granules with an acidic fruit juice (e.g., apple juice, cranberry juice, orange juice). Give the mixture orally.</p> <p>Esomeprazole, lansoprazole or omeprazole granules with semisolid food: Immediately before administration, open the capsule and sprinkle the intact granules onto 1 teaspoonful of applesauce or yogurt. Give the mixture orally; instruct the patient to avoid chewing the mixture.</p> <p>Lansoprazole orally disintegrating tablets: place the tablet on the tongue and allow to disintegrate until the particles can be swallowed (usually occurs within 1 minute). Water is not necessary but may be used to aid in dissolution. Instruct the patient to avoid chewing the orally disintegrating tablet.</p>