Proton pump inhibitors–subcutaneous administration

Red–for medicines normally initiated and used under specialist guidance.

Introduction

This guide is intended for use in secondary care to support the management of patients receiving subcutaneous proton pump inhibitors (PPIs). Subcutaneous PPIs may be prescribed if the patient is no longer able to take oral medication and requires ongoing treatment for management of severe symptoms.

Subcutaneous PPIs should only be started under specialist palliative care guidance and patients require ongoing specialist supervision.

Description: Injectable PPIs include esomeprazole, omeprazole and pantoprazole**.**

Preparations

Note: Administration via the subcutaneous route is unlicensed.

Injection	Esomeprazole 40 mg injection	Single vial or pack of 10 vials. Powder for reconstitution.
	Omeprazole 40 mg injection	Pack of five vials. Powder for reconstitution.
	Pantoprazole 40 mg injection	Pack of five vials. Powder for reconstitution.

ALKALINE PH: Do not mix in continuous subcutaneous infusion (CSCI) with other drugs.

DILUENT: 0.9 % sodium chloride.

Please refer to local formulary for guidance on which PPI is available in your health board. Some products may be available in primary care, but most products are hospital pharmacy only.

Indications

- May be recommended by a palliative care specialist for treatment of symptoms from cancer-related bowel obstruction, severe reflux symptoms, treatment of a gastrointestinal bleed or for gastroprotection in high-risk patients.

Cautions

Contraindicated in patients with known allergy to PPIs, substituted benzimidazoles or any excipient.

Drug interactions:

PPIs increase gastric pH.

- Absorption will be reduced for the following medications:
  - antiviral protease kinase inhibitors
  - tyrosine kinase inhibitors, and
  - some antifungals (including itraconazole capsules, posaconazole suspension and ketoconazole).
- Absorption of digoxin can be increased with concomitant use (high doses in the elderly).

Esomeprazole and omeprazole are CYP2C19 inhibitors and interactions with substrates can be clinically relevant:

- inhibition of citalopram and escitalopram metabolism increases the risk of QT prolongation, a reduced maximum daily dose may be required
- inhibition of the metabolism of diazepam, and
- inhibition of the metabolism of warfarin metabolism.

Tacrolimus and methotrexate levels can be affected when administered with a PPI.

Liver impairment:

In severe liver impairment, dose reduction may be required. Refer to the specific medicine SPC.

Renal impairment:

Dose adjustment is not required in patients with impaired renal function.

Monitoring:

Monitoring required to determine:

- clinical benefit
- site irritation, and
- is the subcutaneous route still appropriate? Switch back to oral when possible.

Side effects

- Commonly caused side effects: headache, abdominal pain, constipation, diarrhoea, flatulence, nausea or vomiting, site reactions.
- Gastrointestinal infections, such as clostridium difficile, are more prevalent in patients treated with PPIs as a result of the increased gastric pH.
- Hypomagnesaemia, vitamin B12 deficiency and hyponatraemia (risk of syndrome of inappropriate antidiuretic hormone secretion with PPI use).

Dose and administration

Esomeprazole

Continuous subcutaneous infusion (CSCI)

- Reconstitute and dilute the 20 mg or 40 mg dose to a minimum of 17 ml with sodium chloride 0.9% and infuse over 24 hours via a syringe pump.[2,3]

Omeprazole

Short subcutaneous Infusion (SSCI)

- Reconstitute a 40 mg vial and dilute to 100 ml sodium chloride 0.9%. Infuse subcutaneously over 3 to 4 hours as a single daily dose.[4]

Pantoprazole

Continuous subcutaneous infusion (CSCI)

- There is one published case report of pantoprazole administered as a CSCI.[5] In some centres in Scotland pantoprazole is used when the above are not available.
- Reconstitute and dilute a 40 mg vial in maximum available volume of sodium choloride 0.9% and infuse over 24 hours via a syringe pump.

Discontinuing subcutaneous PPIs:

Discontinue subcutaneous PPIs if:

- the treatment is ineffective
- the patient is experiencing side effects, or
- the oral or IV route for administration is recovered.

Rebound acid hypersecretion and dyspepsia can occur after stopping long term PPIs.

Practice points

Important: PPI injectable solutions are alkaline and are usually given alone via a separate syringe driver. Do not mix with other medications without specialist advice.

Esomeprazole may have a yellow colouration to the diluted solution.

All PPI infusions should be protected from light exposure.

References

1. Desmidt,T and Constans,T. Subcutaneous infusion of esomeprazole in elderly patients in palliative care: A report of two cases. Journal of the American Geriatrics Society. 2009; Vol 57 (9): 1724-1725
2. Woodman, M et al. Esomeprazole for subcutaneous infusion: compatibility with other alkaline medications. BMJ Supportive and Palliative Care. 2023; 13 (e3): e751-e753
3. Hindmarsh, J et al. Administering esomeprazole subcutaneously via a syringe driver in the palliative demographic: A case series. Journal of clinical pharmacy and therapeutics. 2022; Vol 47 (5): 694-698
4. Agar, M et al. The use of subcutaneous omeprazole in the treatment of dyspepsia in palliative care patients. Journal of Pain and Symptom Management. 2004; 28 (6); 529-530.
5. Michelon H et al. Subcutaneous pantoprazole in an elderly, palliative care patient. BMJ Supportive and Palliative Care. 2022; 12 (e2): e187-e188.