Drug Shortage: Loop diuretics (bumetanide, furosemide) for injection

This document provides mitigation strategies for handling ongoing drug shortages to participants in the Vizient® Pharmacy Program. Information is compiled from mitigation strategies of institutions that serve on the Vizient Clinical Pharmacy Council and is reviewed by a panel of pharmacists. For more information, contact pharmacyquestions@vizientinc.com

Situation

This mitigation strategy is to serve as a resource if loop diuretics (bumetanide or furosemide) injection experience supply disruptions due to shortages.

Background

Previous shortages of bumetanide for injection and furosemide for injection have caused concern. This mitigation strategy is intended to provide guidance for present and future shortages.

Products affected[a]

Bumetanide injection	▪ 0.25 mg/mL, 4 mL vial ▪ 0.25 mg/mL, 10 mL vial
Furosemide injection	▪ 10 mg/mL, 2 mL vial ▪ 10 mg/mL, 4 mL vial ▪ 10 mg/mL, 10 mL vial ▪ 10 mg/mL, 4 mL syringe

[a] Review ASHP Drug Shortages for the most current information

Assessment

The loop diuretics – bumetanide, furosemide, and torsemide – inhibit reabsorption of sodium or chloride at the loop of Henle. Loop diuretics are used for treatment of edema associated with heart failure, hepatic disease, or renal disease. Orally, some loop diuretics may also be used for the treatment of hypertension. In hospitalized patients with heart failure, loop diuretics are preferred over other classes of diuretics for treatment of fluid retention. Hospitals and health systems are advised to have a mitigation strategy available, to conserve inventory, in the event of a shortage of loop diuretics.

Recommendation

Must know information

- Reserve intravenous loop diuretics for patients without enteral access and:
  - who experience diuretic resistance to other diuretic classes, or
  - are not expected to respond to alternative diuretics.
- Maintain an IV-to-PO protocol to utilize enteral loop diuretics as clinically indicated. See Appendix 1 for comparison of loop diuretics.
- Establish a therapeutic interchange policy during shortages to utilize injectable bumetanide or furosemide when an enteral option is not clinically indicated.
- Evaluate utilization trends in automatic dispensing cabinets and shift inventory as able to prevent expiration and maximize availability where needed most.

Clinical

Adults

1) Reserve intravenous loop diuretics for patients without enteral access and:
   - who experience diuretic resistance to other diuretic classes, or

- are not expected to respond to alternative diuretics.

2) Maintain an IV-to-PO protocol to utilize enteral loop diuretics as clinically indicated. See Appendix 1 for comparison of loop diuretics.
3) Establish a therapeutic interchange policy during shortages to utilize injectable bumetanide or furosemide when an enteral option is not clinically indicated.
4) In patients not achieving effective diuresis, may consider the addition of a thiazide diuretic (metolazone or chlorothiazide) to the loop diuretics in order to minimize excessive dosing and conserve loop diuretic supply.

Pediatrics & Neonates

1) Reserve intravenous loop diuretics for NICU patients.
2) Reserve intravenous furosemide for pediatric and neonatal patients requiring doses < 5 mg.

Operational

1) Electronic health record changes:
   - Implement changes (eg, creating alerts, pre-checking order sets) to direct providers to utilize enteral route when clinically appropriate.
2) Evaluate utilization trends in automatic dispensing cabinets and shift inventory as able to prevent expiration and maximize availability where needed most.
3) If inventory becomes critically low, pull available stock to inpatient pharmacy for inventory control.
4) Coordinate direct orders with manufacturers and/or monitor designated allocation with wholesaler.

Appendix 1. Comparative loop diuretic table

Drug	Onset of action	Time to peak effect	Duration of effect	Bioavailability[a]	Equipotent dosing[b]
Bumetanide oral	0.5 to 1 h	1 to 2 h	4 to 6 h	89%	1 mg
Bumetanide IV	2 to 3 min	15 to 30 min	2 to 3 h	100%	
Furosemide oral	0.5 to 1 h	1 to 2 h	6 to 8 h	50%	40 mg – 80 mg
Furosemide IV	5 min	30 min	2 h	100%	20 mg – 40 mg
Torsemide oral	Within 1 h	1 to 2 h	6 to 8 h	80%	20 mg

[a] Bioavailability varies widely
[b] Equipotent dosing is based on normal renal function.

References

Bumetanide [package insert]. Lake Forest, IL: Hospira; 2021.

Furosemide [package insert]. Lake Forest, IL: Hospira; 2019.

Torsemide [package insert]. North Wales, PA: Teva Pharmaceuticals USA; 2017.

Heidenreich PA, Bozkurt B, Aguilar D et al. 2022 AHA/ACC/HFSA guideline for the management of heart failure: A report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. *Circulation*. 2022;145:e895-e1032.

Loop diuretics. Drug Facts and Comparisons online. Facts & Comparisons eAnswers online. Wolters Kluwer Health, Inc. Waltham, MA. Accessed June 7, 2022. http://online.factsandcomparisons.com.

Bumetanide. IBM Micromedex DrugDex. IBM Watson Health. Greenwood Village, CO. Accessed June 7, 2022. http://www.micromedexsolutions.com.

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