Peri-Procedure Management of Patients on Sodium-glucose cotransporter-2 (SGLT-2) Inhibitors

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson’s specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient’s care. This algorithm should not be used to treat pregnant women.

Note: Patients on SGLT-2 inhibitors have an increased risk of euglycemic (glucose < 250 mg/dL) and hyperglycemic diabetic ketoacidosis (DKA) during the peri-procedure period.

**PRESENTATION**

Patient on SGLT-2 inhibitor and requiring surgical procedure or colonoscopy

- Proceed with procedure

**ASSESSMENT**

- Obtain basic metabolic panel (i-STAT or sent to lab) prior to procedure

**EVALUATION**

- Does patient have bicarbonate < 18 mEq/L and anion-gap > 12

- Consult Endocrinology-Diabetes and discuss risk of euglycemic DKA and need for further evaluation

- Proceed with procedure?

**MANAGEMENT PRE-PROCEDURE**

- Yes
  - Proceed with procedure
  - See Page 2 for Management Post-Procedure

- No
  - Transport patient to ACCC for further assessment and management
  - Provide handoff to the ACCC health care providers

**MANAGEMENT POST-PROCEDURE**

- Yes
  - Proceed with procedure
  - See Page 2 for Management Post-Procedure

- No
  - Reschedule procedure
  - See Appendix A for SGLT-2 inhibitor hold recommendations

ACCC = Acute Cancer Care Center
DKA = diabetic ketoacidosis

1 There are insufficient data to make recommendations regarding the need to hold SGLT-2 inhibitors for procedures other than scheduled surgery or colonoscopy

2 See Appendix A for SGLT-2 inhibitor hold recommendations

3 If patient has an anion gap > 12 ([anion gap = sodium – (chloride + bicarbonate)] without a metabolic acidosis (bicarbonate < 18 mEq/L) or a normal anion gap metabolic acidosis (bicarbonate < 18 mEq/L and anion gap ≤ 12), DKA is not likely and other etiologies should be evaluated based on patient risk factors

4 If anion-gap metabolic acidosis based on i-STAT results, send STAT basic metabolic panel to lab for confirmation

5 Consult the inpatient Endocrinology-Diabetes Team A by the on-call system with direct provider to provider communication

6 Refer to the Hand-Off Communication Policy (#CLN0513)
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ASSESSMENT

Does patient have bicarbonate < 18 mEq/L and anion-gap > 12\(^1,2\)?

\[\text{anion gap} = \text{sodium} - (\text{chloride} + \text{bicarbonate})\]

\[\text{bicarbonate} < 18 \text{ mEq/L} \text{ and anion gap} \leq 12\]

\[\text{bicarbonate} < 18 \text{ mEq/L} \text{ and anion gap} > 12\]

EVALUATION

Will patient resume carbohydrate containing diet on the day of procedure?

Yes

Consult Endocrinology-Diabetes\(^3\)

Admit patient as indicated

No

Planned admission post-procedure?

Yes

No

\[\text{Initiate post-operative glucose management (see Inpatient Hyperglycemia - Adult algorithm)}\]

\[\text{Monitor for anion-gap metabolic acidosis}^1 \text{ with basic metabolic panel every 12 hours until patient resumes nutrition} \]

\[\text{Consult Endocrinology-Diabetes}^2 \text{ if euglycemic DKA is suspected} \]

\[\text{Instruct patient to resume SGLT-2 inhibitor the day after discharge}\]

\[\text{Initiate post-operative glucose management}\]

\[\text{When patient resumes a carbohydrate containing diet}^4 \text{ and meets all other clinical criteria for discharge, patient can be discharged to home}\]

\[\text{Instruct patient to resume SGLT-2 inhibitor the day after discharge}\]

\[\text{Follow routine post-operative glucose management}\]

\[\text{When patient resumes a carbohydrate containing diet and meets all other clinical criteria for discharge, patient can be discharged to home}\]

\[\text{Instruct patient to resume SGLT-2 inhibitor the day after discharge}\]

Note: Patients on SGLT2 inhibitors have an increased risk of euglycemic (glucose < 250 mg/dL) and hyperglycemic diabetic ketoacidosis (DKA) during the peri-procedure period.

1 If patient has an anion gap > 12 [anion gap = sodium – (chloride + bicarbonate)] without a metabolic acidosis (bicarbonate < 18 mEq/L) or a normal anion gap metabolic acidosis (bicarbonate < 18 mEq/L and anion gap ≤ 12), DKA is not likely and other etiologies should be evaluated based on patient risk factors.

2 If anion-gap metabolic acidosis based on i-STAT results, send STAT basic metabolic panel to lab for confirmation.

3 Consult the inpatient Endocrinology-Diabetes Team A by the on-call system with direct provider to provider communication.

4 Carbohydrate containing diet includes enteral nutrition and/or total parenteral nutrition delivered at a goal rate.

Department of Clinical Effectiveness V4

Approved by the Executive Committee of the Medical Staff on 03/21/2023
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**PRESENTATION**

Post partial pancreatectomy and/or Whipple procedure and NOT able to resume a carbohydrate containing diet

**ASSESSMENT**

- Obtain C Peptide and glucose on post-operative day 2 or 3

  - Is glucose ≥ 150 mg/dL?
    - Yes
      - When patient meets all other clinical criteria for discharge, patient can be discharged to home
      - Repeat C Peptide and glucose 1 to 2 weeks post discharge
    - No
      - Consult Endocrinology-Diabetes for recommendations on restarting SGLT-2

- Is C Peptide ≥ 1 ng/mL?
  - Yes
    - Restart SGLT-2 inhibitors if indicated
  - No
    - Is glucose ≥ 150 mg/dL?
      - Yes
        - Do not restart SGLT-2 inhibitors
        - Consult Endocrinology-Diabetes for recommendations on restarting SGLT-2
      - No
        - Is glucose ≥ 150 mg/dL?
          - Yes
            - Do not restart SGLT-2 inhibitors
            - Refer to treating primary care physician (PCP)/endocrinologist to re-evaluate use of SGLT-2 inhibitor
          - No
            - See Box A on this page

- Obtain post prandial C Peptide and glucose

  - Is glucose ≥ 150 mg/dL?
    - Yes
      - Consult Endocrinology-Diabetes for recommendations on restarting SGLT-2
    - No
      - See Box A on this page

1 Carbohydrate containing diet includes enteral nutrition and/or total parenteral nutrition delivered at a goal rate
APPENDIX A: SGLT-2 Inhibitors¹ and Recommended Hold Times

**Note:** Holding SGLT-2 inhibitors prior to surgery increases the risk for hyperglycemia.

- During the period when SGLT-2 inhibitors are held, it is essential that patients monitor their blood glucose prior to breakfast (fasting) and at bedtime (2 times daily).
- Patients should be instructed to contact their procedural/surgical team and treating primary care physician (PCP)/endocrinologist IMMEDIATELY for any glucose value > 250 mg/dL if a patient is either unable to reach the treating PCP/endocrinologist or the PCP/endocrinologist is uncomfortable with management, an URGENT Endocrinology-Diabetes referral should be placed. For urgent Endocrinology-Diabetes referrals, page the outpatient team through the on-call system.

<table>
<thead>
<tr>
<th>Require holding for 3 days (72 hours)</th>
<th>Require holding for 4 days (96 hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Bexagliflozin (Brenzavvy⁷)</td>
<td>• Ertugliflozin (Steglatro™)</td>
</tr>
<tr>
<td>• Canagliflozin (Invokana®)</td>
<td>• Ertugliflozin/metformin (Segluromet™)</td>
</tr>
<tr>
<td>• Canagliflozin/metformin (Invokamet®)</td>
<td>• Ertugliflozin/sitagliptin (Steglujan™)</td>
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<tr>
<td>• Canagliflozin/metformin XR (Invokamet® XR)</td>
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<tr>
<td>• Dapagliflozin (Farxiga®)</td>
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<tr>
<td>• Dapagliflozin/metformin XR (Xigduo®)</td>
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<td>• Dapagliflozin/saxagliptin (Qtern®)</td>
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<td>• Empagliflozin (Jardiance®)</td>
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<tr>
<td>• Empagliflozin/linagliptin/metformin XR (Trijardy® XR)</td>
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¹ All SGLT-2 inhibitors are non-formulary
SUGGESTED READINGS


DEVELOPMENT CREDITS

This practice consensus statement is based on majority opinion of the Peri-Procedure Management of Patients on SGLT-2 work group at the University of Texas MD Anderson Cancer Center for the patient population. These experts included:

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