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?

Yes

Proceed with procedure

No

Was SGLT-2 inhibitor held?

Yes

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

No

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

Yes

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

No

Proceed with procedure?

Yes

Transport patient to ACCC for further assessment and management and provide handoff to the ACCC health care providers

No

Reschedule procedure

See Page 2 for Management Post-Procedure

ASSESSMENT

EVALUATION

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

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

Proceed with procedure?

Yes

No

No

No

No

Reschedule procedure

See Appendix A for SGLT-2 inhibitor hold recommendations

A MCC = 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 (CCLN0513)
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ASSESSMENT

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

EVALUATION

- Does patient have bicarbonate < 18 mEq/L and anion-gap > 12?1,2
  - Yes
    - Consult Endocrinology-Diabetes3
    - Admit patient as indicated
  - No
    - Planned admission post-procedure?
      - Yes
        - Will patient resume carbohydrate containing diet on the day of procedure?
          - Yes
            - Follow routine post-operative glucose management
          - No
            - When patient resumes a carbohydrate containing diet and meets all other clinical criteria for discharge, patient can be discharged to home
            - Instruct patient to resume SGLT-2 inhibitor the day after discharge
      - No
        - When 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

INTERVENTIONS/FOLLOW UP

- When patient resumes a carbohydrate containing diet and meets all other clinical criteria for discharge, patient can be discharged to home
- 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.

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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

Is C Peptide ≥ 1 ng/mL?

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

Consult Endocrinology-Diabetes for recommendations on restarting SGLT-2

No

No

Consult Endocrinology-Diabetes for recommendations on restarting SGLT-2

No

Restart SGLT-2 inhibitors if indicated

TREATMENT/FOLLOW-UP

Is C Peptide ≥ 1 ng/mL?

Yes

Is glucose ≥ 150 mg/dL?

Yes

Do not restart SGLT-2 inhibitors

Consult Endocrinology-Diabetes for recommendations on restarting SGLT-2

No

No

Do not restart SGLT-2 inhibitors

Refer to treating primary care physician (PCP)/endocrinologist to re-evaluate use of SGLT-2 inhibitor

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

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

1
**APPENDIX A: SGLT-2 Inhibitors 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>
</tr>
</thead>
<tbody>
<tr>
<td>• Canagliflozin (Invokana®)</td>
</tr>
<tr>
<td>• Canagliflozin/metformin (Invokamet®)</td>
</tr>
<tr>
<td>• Canagliflozin/metformin XR (Invokamet® XR)</td>
</tr>
<tr>
<td>• Dapagliflozin (Farxiga®)</td>
</tr>
<tr>
<td>• Dapagliflozin/metformin XR (Xigduo®)</td>
</tr>
<tr>
<td>• Dapagliflozin/metformin XR (Xigduo® XR)</td>
</tr>
<tr>
<td>• Dapagliflozin/saxagliptin (Qtern®)</td>
</tr>
<tr>
<td>• Dapagliflozin/saxagliptin/metformin (Qternmet® XR)</td>
</tr>
<tr>
<td>• Empagliflozin (Jardiance®)</td>
</tr>
<tr>
<td>• Empagliflozin/metformin (Synjardy®)</td>
</tr>
<tr>
<td>• Empagliflozin/metformin XR (Synjardy® XR)</td>
</tr>
<tr>
<td>• Empagliflozin/linagliptin (Glyxambi®)</td>
</tr>
<tr>
<td>• Empagliflozin/linagliptin/metformin XR (Trijardy® XR)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Require holding for 4 days (96 hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Ertugliflozin (Steglatro™)</td>
</tr>
<tr>
<td>• Ertugliflozin/metformin (Segluromet™)</td>
</tr>
<tr>
<td>• Ertugliflozin/sitagliptin (Steglujan™)</td>
</tr>
</tbody>
</table>

1 All SGLT-2 inhibitors are non-formulary.
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SUGGESTED READINGS


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

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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