APAC Assessment for Diabetic Patients

Summary

- Check glycaemic control
  - HbA1c >69mmol/mol or Hypoglycaemia Unawareness-> refer GP or Diabetes Service; allow 3/12 to improve
- Check for co-morbidities

Pre-op management

See details below.

Type 1 Diabetes

- First on list.
- Minimise starvation time.
- Stop short & intermediate acting insulin on morning of surgery.
- Reduce long acting (Lantus) by 30% evening prior or morning of surgery.
- Enter instructions into 'keypoints' in APAC assessment and explain to patient.

Type 2 Diabetes

- On SGLT2 inhibitor? EMPAGLIFLOZINE (Jardiance); Empagliflozine/Metformin (Jadiamet); Dapagliflozin (Forxiga): Stop 3 days pre-op includes day of surgery.
- Stop other oral hypoglycaemics incl metformin on day of surgery.
- Reduce Lantus by 30% evening pre-op or morning of surgery.
- Minimise starvation time.
- Enter instructions into 'keypoints' in APAC assessment and explain to patient (see tables below for further details).

Perioperative Diabetes Management (Otago) Extended Version

After return of Health Questionnaire to APAC

After return of health questionnaire to APAC

1. **Triage by APAC nurse:**
   - Nurse assessment and discussion with anaesthesia if required (Stream 2) if **good control on oral hypoglycaemics** or
   - Anaesthetist appointment (Stream 3) for **higher risk patients** with poor glycaemic control, significant comorbidities, on insulin.

2. **Instructions to patients** to attend clinic with **medication record** and **glycaemic control monitoring record.**

3. **Pre-order Investigations**
   - FBC, U+E, HBA1C (if not performed within the last 3 months), useful if corresponds or contrasts with self-testing; ECG, urine analysis.

Pre-operative assessment

- Optimise glycaemic control prior to surgery.
- Check for recent changes in medication (SGLT2i? Empagliflozin or dapagliflozin)
- Recognise co-morbidities and optimise as part of the management plan for perioperative period.
- Draw-up individualized management plan for perioperative period in consultation with the patient.
- Identify high risk patients who will require ICU/ HDU.

Plan

1. Assessment of glycaemic control

- Review of BSL record.
- Consider referral to Diabetes Service if unstable control, development of significant comorbidity,
- HBA1C > 69 mmol/mol,
- Hypoglycaemia unawareness.
- Discuss BSL target range – BSL 6-10 mmol/L appropriate where it can be managed safely.
- A range of 4-12 mmol/L is also acceptable.

2. Comorbidity management

- Identify comorbidities; referral to the appropriate service for optimisation if necessary.

3. Admission Planning

- Timing of operation – First on the list if possible to avoid prolonged fasting ('keypoints' in APAC assessment).
- Location – May be unsuitable for day surgery with significant comorbidities and unstable glycaemic control.
- Advise patient to come to hospital with medications for self-administration where appropriate.
- Medication planning as per algorithm below.
- Give **written instructions** for any peri-operative medication changes and add to 'keypoints'.
- Give tight fasting instructions (in writing) for both food and fluid to avoid prolonged fasting.
- Consider thromboembolic risk and instructions.

Elective surgery

1. Major surgery or patient *not* eating on day of surgery, e.g. bowel surgery):

a) Diet Controlled Type II

- Seldom need more than q4h BSL monitoring through perioperative period.

b) Type II on Oral Hypoglycaemics

- See Table 1:
- Beware of SGLT2 inhibitors
- Medication instructions – Oral Hypoglycaemics.

c) Type II on Insulin

- Stop short- and intermediate acting insulin on morning of surgery.
- If patient is using long acting insulin (*Lantus*), reduce pre-op doses by 30% both the evening before and the morning of surgery.
- Consider D/W DNS (*diabetes nurse specialist* via switch):
  - q4 hourly BSLs.
  - If BSL >15mmol/L commence variable rate Actrapid infusion.
  - Will usually require prescription of infusion during surgery
    (See MIDAS: 24273 V4- Actrapid variable infusion).

- For estimating starting dose of insulin calculate patients total daily basal dose, aim to give over 24 hour period (ie: Total daily basal insulin dose /24 = u/hr).

d) **Type I for Major Surgery**

- Omit *fast acting sc insulin* on morning of surgery and start actrapid infusion on admission to hospital. (MIDAS 12345 & 24273)
- If the patient is using *long acting insulin* (*Lantus*), reduce pre-op doses by 30% both the evening before and the morning of surgery.
- At least hourly BSL checks from time of admission!
  - SC insulin pump – disconnect patient's own sc pump (as absorption may be variable with major surgery) AFTER inserting IV line.
    - start IV insulin (*Actrapid*) infusion.
    - (See figure 1: Summary of insulin infusion regime).
  - IV fluids: normal saline will normally be appropriate in the perioperative period.
    - KCl (20-40mmol/L) can be added if hypokalaemia. Additional Dextrose10% 125mL/hr or Dextrose/Saline can be used if risk of hypoglycaemia in prolonged surgery or for longer term administration postoperatively (if BSL<15mmol/l)
    - *Hartmann's* solution is generally avoided due to concern of lactate addition to glucose load.; consider Plasmalyte instead.

2. Minor surgery or patient eating on day of operation

a) Diet Controlled Type II:

- Seldom requires more than q4h BSL monitoring through the perioperative period.

b) Type II on Oral Hypoglycaemics:

- See table 1: Medication instructions – Oral Hypoglycaemics
- Commence insulin infusion if BSL >15mmol/L.

c) Type II on Insulin:

- Refer Table 2:
  Management of insulins – short starvation period.
- Maintain hydration; recommence usual sc insulin with next normal meal. Additional sc or iv insulin rarely required.
- Q4h BSL monitoring.

d) Type I Minor Surgery:

- Refer Table 2:

  Management of insulins – short fasting period.
- SC Insulin pump:

  Continue patient's own SC infusion if well controlled. Consider reduction by 30% if considered high risk of hypoglycaemia for estimated duration of surgery or until next meal. (Temporary Basal Reduction feature on pump)
- If unstable or unwell or BSL > 15mmol/L: commence variable rate iv insulin infusion & disconnect SC pump
- (See Figure 1: Summary of insulin infusion regime).

3. General Advice

- Maintain electrolyte balance,
  - watch for hypokalaemia on insulin infusions.
- Fluid infusion: normal saline will normally be appropriate. KCl (20-40mmol/L) can be added if hypokalaemia.

  Additional Dextrose or changing to Dextrose saline can be used if risk of hypoglycaemia.

  Avoid Hartmann's due to lactate addition to glucose load.
- Consider associated complications: e.g. risk of PVD and TED stockings, contrast toxicity, more susceptible to hypovolaemia, pre-renal impairment.
- Ensure DVT prophylaxis (often dehydrated, immobile, 'low flow' states).
- Brittle haemodynamics: risk of fluid overload/heart failure.
- Consider delayed wound healing, silent ischaemia.
- Also comorbid CRF, IHD, neuropathy, hypertension, poor vision, reduced pain sensitivity, autonomic dysfunction.
- Treat sepsis aggressively.
- **Untreated sepsis in diabetes carries a high mortality.**
- **If SGLT2i has NOT been stopped – refer to Appendix.**

Consult Endocrine Service if problematic management

Diabetic Nurse Specialist 8.30 – 16.00 (via switch)
After hours: on-call physician

Table 1: Medication Instructions – Oral Hypoglycaemics

Hypoglycaemic Agents	Day Prior to Surgery	Day of Surgery		Post Op
		Patient for morning surgery	Patient for afternoon surgery	
Metformin	Take as normal	Omit	Omit	Restart Day 2 post op (48 hours)

Sulphonylurea (e.g. Glibenclamide, Gliclazide, Glipizide)	**Take as normal**	• Once daily morning omit • Twice daily omit morning	• Once daily morning omit • Twice daily omit morning and afternoon	**Restart Day 1 post op if normal diet.**
Pioglitazone	**Take as normal**	**Take as normal**	**Take as normal**	**Take as normal**
Acarbose	**Take as normal**	**Omit morning dose if 'nil by mouth'**	**Give morning dose if light breakfast allowed**	**Take as normal**
DPP-4 inhibitor (e.g. Sitagliptin, Vildagliptin, Saxagliptin)	**Take as normal**	**Omit on day of surgery**	**Omit on day of surgery**	**Take as normal**
GLP-1 analogue(injection) (e.g. Exenatide, Liraglutide)	**Take as normal**	**Omit on day of surgery**	**Omit on day of surgery**	**Take as normal**
Gliflozin - SGLT2 inhibitors **EMPAGLIFLOZIN, DAPAGLIFLOZIN** *** See appendix** ANZCA Alert January 2020	**Stop 3 days prior to surgery (incl day of surgery). May require increase in other glucose lowering agents. See Appendix for further information and consult with diabetes service**			

Table 2: Medication Instructions – Insulins

- **Short starvation period**
- **No more than one missed meal**

Insulins	Day Prior to Admission	Day of Surgery		Post Op
		Patient for morning surgery	Patient for afternoon surgery	
Once daily (evening) (Lantus or Levemir. Humulin NPH, Protaphane)	**Reduction of evening regular dose by 30%**	**Check blood glucose on admission**	**Check blood glucose on admission**	**Usual insulin dosing once full diet reinstated. Maintain dose reduction if not back to full diet**
Once daily (morning) (Lantus or Levemir Humulin NPH, Protaphane)	**No dose change**	• Reduction of regular dose by 30% • Check blood glucose on admission	• Reduction of regular dose by 30% • Check blood glucose on admission	**Usual insulin dosing once full diet reinstated. Maintain dose reduction if not back to full diet**
Twice daily (Novomix 30, PenMix, Humulin 30/70, Humalog Mix 25, Humalog Mix 50, Twice daily (Protaphane or Humulin NPH, Levemir or Lantus)	**No dose change**	• Halve the usual morning dose. • Check blood glucose on admission. • Leave the evening meal dose unchanged	• Halve the usual morning dose. • Check blood glucose on admission. • Leave the evening meal dose unchanged	**Usual insulin dosing once full diet reinstated. Maintain dose reduction if not back to full diet**
Twice daily—separate injections of short-acting (e.g. animal neutral, Novorapid, Humalog, Apidra) and intermediate acting (Protaphane, Humulin NPH)	**No dose change**	• Calculate the total dose of both morning insulins and give half the total dose as intermediate acting only in the morning. Do not give any short-acting insulin in the morning. Check blood glucose on admission. • Leave the evening meal dose unchanged	• Calculate the total dose of both morning insulins and give half the total dose as intermediate acting only in the morning. Do not give any short-acting insulin in the morning. Check blood glucose on admission. • Leave the evening meal dose unchanged	**Usual insulin dosing once full diet reinstated. Maintain long acting insulin dosing and dose reduction of short acting insulin depending on diet and BSL**
Three, 4 or 5 injections daily	**No dose change**	• Basal bolus regimens: omit the morning and lunchtime short-acting insulins. Reduce the basal insulin dosing by 30%. • Premixed morning insulin: halve the morning dose and omit lunchtime dose. • Check blood glucose on admission	• Take usual morning insulin dose(s). • Omit lunchtime dose. • Check blood glucose on admission.	• Usual insulin dosing once full diet reinstated. • Dose reduction according to BSL and diet.

Figure 1: Summary of Insulin Infusion Regime

- IV insulin (*Actrapid)* infusion. (See MIDAS: 24273 V4- Actrapid variable infusion).

- For estimating starting dose of insulin calculate patient's total daily dose; aim to give over 24 hour period but reduce by 30% (i.e. Total daily insulin dose /24) x 0.7= u/hr).

- Titrate carefully to BSL.

- Increase slowly as required **by no more than 1-2U/hr.**

- Decrease rate as required, do not stop completely in Type I diabetics, **unless Lantus has been administered in last 24 hours.**

- BSLs should be checked hourly initially, then q2hr if stable.

- Stop insulin infusion when eating and drinking has been re-established; restart normal insulin regimen.

Remember: Overlap IV and SC insulin by 1-2 hours (short $t_{1/2}$ of IV **Actrapid**)

Administering an Insulin Infusion (MIDAS 12345)
Prescribing an Insulin Infusion (MIDAS 24273)

Addendum

Management of acute pre-operative patient

- Consider consultation with diabetes service when preparing Type I or unstable Type II diabetic for acute surgery.
- Is patient taking SGLT2? Risk of EUGLYCAEMIC KETOACIDOSIS – check Ketones.
- Discuss BSL target range
    - BSL 6-10 mmol/L appropriate where it can be managed safely. A range of 4-12 mmol/L may also be acceptable.
- Correct hypotension and restore circulation if necessary.
- Always ensure adequate oxygenation (often low SaO_2; increased risk of organ ischaemia, comorbid IHD, carotid disease, etc).
- Titrate fluid requirements according to frequent assessment of hydration, clinical state, and urine output.
    - Remember increased risk of fluid overload.
- Ensure IV access. If the patient is unstable and JVP not easily visible, it may be best monitored by CVP line.

- Monitor urine output closely (best with IDUC especially if reduced LOC).

- Monitor BSL hourly.

- Consider insulin infusion (See figure 1: Summary of insulin infusion regime) or regimen suggested by anaesthetist.
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Appendix

ALERT UPDATE June 2021

Periprocedural Diabetic Ketoacidosis (DKA) with SGLT2 Inhibitor Use In People with Diabetes

Background

Sodium-glucose co-transporter-2 inhibitors (SGLT2i) are oral medications that promote glucose excretion in the urine for the treatment of type 2 diabetes. Note that SGLT2i are not approved for use in the management of type 1 diabetes in Australia or New Zealand, although they are sometimes used off-label in this setting.

- Over the last few years there has been an increasing number of reports of people with type 2 diabetes who are taking these medications developing severe acidosis requiring ICU/HDU admission during the peri-operative period.
- SGLT2i carry a small but definite risk of severe diabetic ketoacidosis (DKA), which is associated with near-normal or only mildly elevated blood glucose levels (i.e. 'euglycaemic' ketoacidosis [euDKA]); therefore, a normal or only modestly elevated plasma glucose level does not exclude the diagnosis.
- The risk is increased if the patient has been fasting or has very restricted dietary (especially carbohydrate) intake, has undergone bowel preparation and/or a surgical procedure, is dehydrated or has an intercurrent illness such as active infection.
- Blood ketone testing is strongly recommended to detect and monitor DKA as urine ketone testing may be unreliable.
- It should be noted that ketone levels may be elevated in patients undergoing colonoscopy due to the decreased carbohydrate intake during the preparation for colonoscopy, even in people who are not administered SGLT2 inhibitors. In people with and without type 2 diabetes and not taking SGLT2i, ketone levels up to 1.7 mmol/L have been reported in the absence of of acidosis.

Clinicians should consider DKA/euDKA in patients taking SGLT2i who have one or more of:

- Symptoms of abdominal pain, nausea, vomiting, fatigue or metabolic acidosis
- Finger prick capillary blood ketone (or blood beta-hydroxybutyrate) levels >1.0 mmol/L with or without hyperglycaemia
- Low (negative) base excess (BE) < -5 mmol/L indicating metabolic acidosis on arterial or venous blood gasses.

SGLT2i agents currently available in Australia include dapagliflozin (Forxiga), empagliflozin (Jardiance), and ertugliflozin (Steglatro), as well as fixed dose combinations with metformin (Xigduo, Jardiamet, Segluromet) or with gliptins (Glyxambi, Qtern, Steglujan).

SGLT2i agents currently registered in New Zealand include dapagliflozin (Forxiga), empagliflozin (Jardiance) and canagliflozin (Invokana).

Advice for peri-procedural practice

- When commencing patients on SGLT2i, clinicians should inform patients about the risk of DKA associated with procedures, ideally with written information and management plans. It is advisable to document that the advice has been provided.
- For surgery and procedures requiring one or more days in hospital, omit SGLT2i for at least 3 days (i.e. 2 days pre-procedure, and the day of procedure). This may require increasing other glucose-lowering drugs during that time. If the SGLT2i is part of a fixed dose combination, this will lead to withdrawal of two glucose-lowering drugs unless the second drug is prescribed separately.
- For surgery and procedures including colonoscopy requiring 'bowel preparation with carbohydrate restriction' commencing on the day prior to the procedure, omit SGLT2i for at least 4 days (i.e. 3 days pre-procedure, and the day of procedure).
- For day-stay procedures (including gastroscopy), SGLT2i can be stopped just for the day of procedure. However, fasting before and after the procedure should be minimised.

On admission

- If the patient is unwell: strongly consider postponing non-urgent procedures.
- Measure both blood glucose and blood ketone levels. If the patient has ceased the SGLT2i 3 days pre-procedure, is clinically well and ketones are < 1.7 mmol/L, proceed. Consider hourly blood glucose and blood ketone testing during the procedure and 2 hourly following the procedure until the patient is eating and drinking normally.
- If the SGLT2i has not been omitted for 3 days (i.e. 2 days prior to surgery and the day of surgery) or if the SGLT2i has been taken on the day of surgery or the day procedure, the course of action depends on the urgency of the procedure, patient comorbidities, surgical factors, HbA1c, blood ketones, and base-excess (see table). *Note HbA1c >9% or 75 mmol/mol is an indicator of insulin insufficiency. It confers a higher risk of DKA in this setting.*
- All patients on SGLT2i undergoing emergency surgery should be admitted post-procedure to a ward capable of managing diabetic ketoacidosis in collaboration with endocrinology and critical care.

- **At any point before, during or after a procedure, if the blood ketone level is >1.0 mmol/L in an unwell patient** who has been on an SGLT2i, take arterial or venous blood gases to measure the (standard) Base Excess (SBE). If ketones are > 1.0 mmol/L and base excess <-5 mmol/L the patient has presumed DKA, and if the blood sugar < 14 mmol/L, presumed euDKA.
  - For a ward patient, or where there is no critical care expert, the rapid response (MET) team should be activated or an ICU contacted, and collaboration sought with endocrinology or general medicine.
  - In other critical care areas, anaesthetists or emergency medicine physicians should liaise with endocrinology and ICU. Management priorities include: rehydration; intravenous insulin (with added dextrose infusion if the BGL is<15mmol/l); hourly monitoring of blood glucose, ketones and blood gases with appropriate action to escalate or de-escalate treatment.
- All patients with DKA and euDKA should be reviewed by an endocrinologist or physician on-call and critical care specialists. If required, contact a tertiary hospital for expert advice.

Post procedure

- Restart SGLT2i post-operatively only when the patient is eating and drinking normally or close to discharge from hospital.
- Patients who have day surgery/procedures should only recommence SGLT2i when they resume full oral intake. Consider delaying recommencement of SGLT2i for a further 24 hours but also consider potential for hyperglycaemia.
- Provide patients with written advice to seek medical advice if unwell in the week following the procedure.

Table: Suggested Management of CLINICALLY WELL patients who have NOT ceased SGLT2i

Ketones	Base Excess	Comments
<1	> -5	**No ketosis and no metabolic acidosis.** Consider proceeding with day surgery: hourly monitoring of blood ketones during the procedure, and 2nd hourly following the procedure until eating and drinking normally or discharged. Provide the patient with written post-discharge advice. Where blood gas analysis is not available proceed only if added risk is consistent with goals of care. More extensive surgery requires considering goals of care and collaboration with endocrinology and critical care. Perioperative insulin and dextrose infusions may reduce risk.
>1	> -5	**Ketosis without metabolic acidosis.** Seek endocrinology or general medicine advice. Ketosis without acidosis may reflect starvation, particularly in patients with HbA1c < 9% (<75 mmol/mol). Consider proceeding, but with perioperative insulin and dextrose infusions to reduce risk of ketosis and acidosis.
>1	< -5	**Ketosis with metabolic acidosis.** Postpone non-urgent surgery. Escalate care with endocrinology and critical care.

Footnote: Blood gas analysis is recommended to assess for presence of metabolic acidosis. Where blood gas analysis is not readily available, and the ketones are > 1.0 mmol/L the procedure should not be performed.

Precaution:

This updated management alert on the use of SGLT2 inhibitors in relation to periprocedural DKA risk should not supplant individualised clinical decisions based on the circumstances of each clinical scenario.

Resources

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2. Meyer EJ, Gabb G, Jesudason D. SGLT2 Inhibitor–Associated Euglycemic Diabetic Ketoacidosis: A South Australian Clinical Case Series and Australian Spontaneous Adverse Event Notifications. Diabetes Care. 2018; 41: e47-e49.
3. Peacock SC, Lovshin, JA Can J. Sodium-glucose cotransporter-2 inhibitors (SGLT-2i) in the perioperative setting. Anesth/J Can Anesth. 2018; 65:143–147.
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6. Fralick M, Schneeweiss S, Patorno E. Risk of Diabetic Ketoacidosis after Initiation of an SGLT2 Inhibitor. N Engl J Medicine. 2017; 376:2300–2302.
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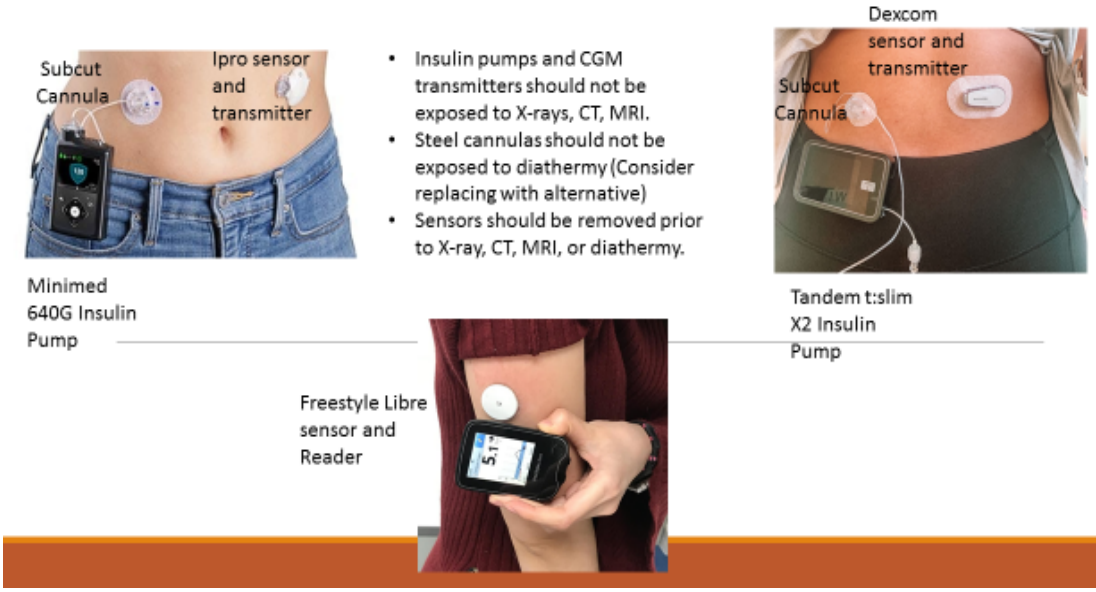
12. Meyer EJ, Mignone E, Hade A, Thiruvenkatarajan V, Bryant RV, Jesudason D. Periprocedural euglycemic ketoacidosis associated with sodium-glucose cotransporter 2 inhibitor therapy during colonoscopy. Diabetes Care. 2020; 43:e181-e184.
13. Hamblin S, Wong R, Ekinci EI, Sztal-Mazer S, et al. Capillary ketone concentrations at the time of colonoscopy: a cross-sectional study with implications for SGLT2 inhibitor-treated type 2 diabetes. Diabetes Care 2021; 44:e1-e3.

sensors



CGM Continuous Glucose Monitoring Sensors

Table 1 Common medical conditions during hospitalization that affect insulin pump management

Medical condition	Recommendation for insulin pump management
Altered mental status, confusion or unresponsive	Stop insulin pump use and switch to MDI
Acute kidney injury	Decrease basal and bolus settings
NPO, nothing by mouth	Decrease basal rate by at least 20%
Decreased appetite or change in dietary habits	Decrease basal and bolus settings
Steroid use	Decrease insulin sensitivity factor and consider expert consultation or stopping pump
Weakness or impaired vision or hand strength	Evaluate pump self-management skills
Narcotic or anesthetic use	Evaluate pump self-management skills

MDI, multiple daily injections. Adapted from Thompson, et al. [6]

Table 2 Recommendations for insulin pump and CGM usage during common inpatient imaging studies and procedures [2, 25–27]

Type of imaging/procedure	Insulin pump	Dexcom G6	Medtronic Guardian	Abbott Freestyle Libre	Senseonics Eversense
X-ray Bone density Ultrasound	Cover pump by a lead apron	Remove sensor and transmitter; new sensor to be placed after the procedure is complete	Remove sensor and transmitter; new sensor to be placed after the procedure is complete	Cover sensor with a lead shield, or remove if it will be directly exposed to the X-ray beam	Implantable CGM sensor itself is compatible; the transmitter must be removed prior, and can be worn after
Ultrasound	Cover pump by a lead apron	Sensor and transmitter can remain in place	Sensor and transmitter can remain in place	Sensor can remain in place	Implantable CGM sensor itself is compatible; the transmitter must be removed prior, and can be worn after
CT scan	Cover pump by a lead apron	Remove sensor and transmitter; new sensor to be placed after the procedure is complete	Remove sensor and transmitter; new sensor to be placed after the procedure is complete	Remove sensor; new sensor to be placed after the procedure is complete	Implantable CGM sensor itself is compatible; the transmitter must be removed prior, and can be worn after
MRI	Remove pump and infusion set;patient will need new infusion set available to resume pump	Remove sensor and transmitter; new sensor to be placed after the procedure is complete	Remove sensor and transmitter; new sensor to be placed after the procedure is complete	Remove sensor; new sensor to be placed after the procedure is complete	Implantable CGM sensor itself is MRI compatible; the transmitter must be removed prior, and can be worn after
PET scan	Pump needs to be off for at least 1 h prior to the study (no bolus insulin <4 h prior)	Remove sensor and transmitter; new sensor to be placed after the procedure is complete	Remove sensor and transmitter; new sensor to be placed after the procedure is complete	Remove sensor; new sensor to be placed after the procedure is complete	Implantable CGM sensor itself is compatible; the transmitter must be removed prior, and can be worn after
High-frequency electrical heat (diathermy) treatment	Pump needs to be distal from surgical site; plastic infusion set may be preferred if possible	Remove sensor and transmitter; new sensor to be placed after the procedure is complete	Remove sensor and transmitter; new sensor to be placed after the procedure is complete	Remove sensor; new sensor to be placed after the procedure is complete	Implantable CGM sensor itself is compatible; the transmitter may be removed prior, and can be worn after
Colonoscopy/endoscopy	Pump can remain in place and continue to run	Sensor and transmitter can remain in place	Sensor and transmitter can remain in place	Sensor can remain in place	Implantable CGM sensor itself is compatible; the transmitter may be removed prior, and can be worn after
Cardiac catheterization Pacemaker/AICD placement	Cover pump by a lead apron	Sensor and transmitter can remain in place	Sensor and transmitter can remain in place	Sensor can remain in place	Implantable CGM sensor itself is compatible; the transmitter may be removed prior, and can be worn after