	Insulins	Example medications	Day prior to admission	Patient for am surgery	Patient for pm surgery
Long acting insulin	**Once daily long acting (morning)**	Abasaglar® Humulin I® Insulatard® Insuman Basal® Lantus® Levemir® Semglee® Tresiba® Toujeo® Xultophy®	No dose adjustment necessary	Give 80% of dose and blood glucose to be checked on admission	Give 80% of dose and blood glucose to be checked on admission
	Once daily long acting (lunchtime)	As above	Give 80% of dose	Restart insulin at normal dose when eating and drinking starts	Restart insulin at normal dose when eating and drinking starts
	Once daily long acting (evening)	As above	Give 80% of dose	No dose adjustment necessary	No dose adjustment necessary
	Twice daily (long acting insulin)	As above	Morning dose will need to stay the same evening dose will need to be 80%	Morning dose will need to be 80% and blood glucose to be checked on admission The evening dose will remain unchanged	Morning dose will need to be 80% and blood glucose to be checked on admission The evening dose will remain unchanged

	Insulins	Example medications	Day prior to admission	Patient for am surgery	Patient for pm surgery
Premixed insulin prepared by manufacturers	**Twice daily (premixed insulin)**	Humulin M3® Humalog Mix 25® Humalog Mix 50® Hypurin Porcine 30/70 Mix®) Insuman Comb 15® Insuman Comb 25® Insuman Comb 50® Novomix 30®	No dose adjustment necessary	Halve usual morning dose. Blood glucose to be checked on admission Resume usual l insulin with evening meal if eating a normal meal. If eating a half/small meal give half usual dose. If not eating give basal only component of the usual mixed insulin	Halve usual morning dose. Blood glucose to be checked on admission Resume usual insulin with evening meal if eating a normal meal. If eating a half/small meal give half usual dose. If not eating give basal only component of the usual mixed insulin
	Three times per day (premixed insulin)	As above	No dose adjustment necessary	Halve usual morning dose. Blood glucose to be checked on admission Omit lunchtime dose Resume normal insulin with evening meal if eating a normal meal. If eating a half/ small meal give half usual dose. If not eating give basal only component of the usual mixed insulin	Halve usual morning dose. Blood glucose will be checked on admission Omit lunchtime dose Resume normal insulin with evening meal if eating a normal meal. If eating a half/ small meal give half usual dose. If not eating give basal only component of the usual mixed insulin

	Insulins	Example medications	Day prior to admission	Patient for am surgery	Patient for pm surgery
Self-mixed insulin prepared by patient/carer	**Twice daily (two different types of insulin combined by the person with diabetes into one injection)**	Short acting: Actrapid® Apidra® Fiasp® Humalog® Humulin S® Hypurin® Porcine Neutral Insuman Rapid® Lyumjev® NovoRapid® AND intermediate acting: Humulin I® Hypurin® Porcine Isophane Insulatard®	No dose adjustment necessary	Calculate the total dose of both morning insulins and give half of this total dose as intermediate acting insulin only, in the morning Blood glucose to be checked on admission Resume usual insulin with evening meal if eating a normal meal. If eating a half/ small meal give half usual dose. If not eating give basal only component of the usual mixed insulin	Calculate the total dose of both morning insulins and give half of this total dose as intermediate acting insulin only, in the morning Blood glucose to be checked on admission Resume usual insulin with evening meal if eating a normal meal. If eating a half/ small meal give half usual dose. If not eating give basal only component of the usual mixed insulin

	Insulins	Example medications	Day prior to admission	Patient for am surgery	Patient for pm surgery
Short acting insulin	**Short acting insulin with meals (two to four doses a day)**	Actrapid Apidra® Fiasp® Humalog® Humulin S® Hypurin® Porcine Neutral Insuman Rapid® Lyumjev® NovoRapid®	No dose adjustment necessary	Omit morning dose if no breakfast is eaten Blood glucose to be checked on admission Omit lunchtime dose if not eating and drinking normally Resume normal insulin with evening meal if eating a normal meal. If eating a half/ small meal give half usual dose. If not eating give basal only component of the usual mixed insulin	Take your usual morning insulin dose with your breakfast Omit lunchtime dose if not eating Blood glucose to be checked on admission Resume normal insulin with evening meal if eating a normal meal. If eating a half/ small meal give half usual dose. If not eating give basal only component of the usual mixed insulin
Resume taking usual insulin the morning after surgery (procedure). However, blood glucose levels may be higher than usual for a day or so.					
Variable rate intravenous insulin infusions	Dose of long-acting insulin should be 80% Short acting, Intermediate and Pre-mixed Insulins should be discontinued and replaced by a long-acting basal insulin at a dose of 0.2 units per kilogram A return to the person's usual diabetes management should be made once they are eating and drinking normally. Adjustments may need to be made to insulin dose(s) as insulin requirements may change in the postoperative period – blood glucose levels should be monitored and advice sought from the specialist diabetes team if necessary				

1.2 Guideline for perioperative adjustment of non-insulin diabetes medication before surgery

This guideline is an updated version to the appendices 2 and 8 found in the Joint British Diabetes Society guideline: Management of adults with diabetes undergoing surgery and elective procedures: Improving standards (March 2016).

Due to the potential for diabetic medicine to change this table is for guidance only and reference should be made to the UKCPA Handbook of Perioperative Medicines for up-to-date information.

Diabetes medication	Day prior to admission	Timing of surgery	
		Patient for am surgery	Patient for pm surgery
Acarbose	Take as normal	Omit morning dose if not eating	Give morning dose if eating
Meglitinide (repaglinide or nateglinide)	Take as normal	Omit morning dose if not eating	Give morning dose if eating
Metformin (AND eGFR >60 ml/min/1.73m^2 OR procedure not requiring use of contrast media**)	Take as normal	If taken once or twice a day – take as normal If taken three times per day, omit lunchtime dose	If taken once or twice a day – take as normal If taken three times per day, do not take lunchtime dose
Sulphonylurea (eg glibenclamide, gliclazide, glipizide, glimiperide)	Take as normal	Omit on morning of surgery If taken twice daily, take evening dose if eating	Do not take on day of surgery
Pioglitazone	Take as normal	Take as normal	Take as normal
DPP4 inhibitor (eg sitagliptin, vildagliptin, saxagliptin, alogliptin, linagliptin)	Take as normal	Take as normal	Take as normal
GLP-1 Receptor Agonist (eg exenatide, liraglutide, lixisenatide, dulaglutide, semaglutide) Daily/Weekly administration	Take as normal	Take as normal	Take as normal
SGLT-2 inhibitors (eg dapagliflozin, canagliflozin, empagliflozin, ertugliflozin)	Omit on day before surgery	Omit on day of surgery	Omit on day of surgery

**If contrast medium is to be used and eGFR less than 60ml/min/1.73m^2, metformin should be omitted on the day of the procedure and for the following 48 hours.

SGLT-2 Inhibitors

Serious, life-threatening, and fatal cases of diabetic ketoacidosis (DKA) have been reported rarely in people with diabetes taking an SGLT-2 inhibitor. The presentation can be atypical, with people with diabetes having only moderately elevated blood glucose levels.[33] Risk factors for DKA in people with diabetes taking an SGLT-2 inhibitor include conditions leading to a restricted food/fluid intake. This includes people with diabetes who are required to follow a reduced calorie diet prior to their surgical procedure, such as in bariatric surgery or those who require bowel preparation preoperatively. For these cases, a longer period of treatment cessation may be necessary and, in general, should coincide with the reduced food intake. Trusts/Health Boards should ensure that they have clear guidance in place for these cases so that peoples treatment can be appropriately managed.

In addition, SGLT-2 treatment should be interrupted in people with diabetes who have been hospitalised for major surgery or acute serious illness.[34,35] Ketone levels should be monitored, preferably in blood rather than urine. Treatment may be restarted once ketone levels are normal and the person with diabetes condition has stabilised, and normal oral intake is established.

Please regularly check the UKCPA Handbook of Perioperative Medicines for updated advice.

2 Suggested scales for variable rate intravenous insulin infusion

Aim

The aim of the VRIII is to achieve and maintain glucose levels within the target range of 6–10mmol/l, although up to 12mmol/l may be acceptable. This is done by infusing a constant rate of glucose containing fluid as substrate while infusing insulin at a variable rate.

Principles

- There is no one fit for all.
- The VRIII is the preferred method of managing the surgical patient's serum glucose in the following circumstances:
  - people with Type 1 or 2 diabetes undergoing surgery with a fasting period with more than one missed meal
  - people with Type 1 diabetes undergoing surgery who have not received background insulin.
  - people with suboptimal diabetes management as defined as an HbA_{1c} >69mmol/mol (>8.5%)
  - most people with diabetes requiring emergency surgery.
  - people with persistent hyperglycaemia (CBG >12mmol/l) in the perioperative period in the context of acute decompensation.
- If the person with diabetes is already on a long acting insulin analogue (eg Levemir®, Lantus® or Tresiba®) these should be continued at 80% of the usual dose.
- Insulin requirements often vary with weight.
- Initial insulin infusion rate should be determined by the bedside capillary blood glucose (CBG) measurement.
- Hourly bedside CBG measurement should be taken to ensure that the intravenous insulin infusion rate is correct – initially for the first 12 hours or as locally agreed.
- If the blood glucose remains over 12mmol/l for three consecutive readings and is not dropping by 3mmol/l/hr or more the rate of insulin infusion should be increased.