Diabetes Management for the Adult Surgical Patient

General principles

- Everyone needs glucose (~180g/day) and insulin to maintain normal metabolism
- Target blood glucose level is 4 – 10 mmol/l
- Type 1 diabetics need to continue insulin whilst fasting
- Assess glucose control and manage comorbidities, e.g. support renal perfusion with appropriate oral or IV hydration.
- Advise patients to bring their own insulin preparation into hospital
- Give written instructions for fasting and medications, including oral and injectable hypoglycaemic agents and insulin
- If in doubt seek help from Endocrine team or senior colleague

Preoperative management of blood glucose levels

All patients with diabetes require a blood sugar level check on admission and q4h once fasting (more frequently if unstable)	
If a preoperative BSL is outside the range of 4-10 mmol/L contact the anaesthetist to manage	
Hypoglycaemia BSL < 4 mmol/l	**Hyperglycaemia** BSL > 10mmol/l
Commence IV dextrose infusion 200ml 5% dextrose or 20ml 50% dextrose	Consider Novorapid supplemental insulin schedule (refer to eMeds and adapt to the individual's insulin sensitivity and oral intake)
Following corrective management • recheck the BSL after one hour • consider giving further insulin after two hours	
Diabetes Ketoacidosis	
Consider in the: - Unwell diabetic patient - Patients taking SGLT-2 inhibitors	- measure capillary blood ketones using fingerprick monitor

ORAL HYPOGLYCAEMICS

PREOPERATIVE OHG

NO BOWEL PREP		BOWEL PREP GIVEN	
DAY OF SURGERY	**DRUG**	**DAY 1 OF PREP**	**DAY OF PROCEDURE**
Omit DOS	DPP-IV Inh (...gliptin) Sulphonylureas (gli...) Meglitinide (...glinide) GLP-1 A (...tide)	Take morning dose only	Omit
	Acarbose	Omit	
Omit DOS Omit 48 hours post-op if renal impairment or IV contrast to be used (can result in lactic acidosis)	Metformin	Omit	Omit DOS Omit for the next 48 hours if renal impairment
Omit 2 days before surgery and DOS (can result in severe euglycaemic ketoacidosis)	SGLT-2 Inhibitors (...gliflozin)	Omit day before and day of bowel prep	Omit
Recommence post-operatively: - only when normal oral intake is tolerated - consider delaying SGLT-2 inhibitors until discharged from hospital			

INSULIN

PREOPERATIVE INSULIN

Practical points:

- Patients on subcutaneous (SC) insulin (bolus or by pump) need insulin prescribed for the DOS and day of bowel prep
- The exception is short-acting "bolus with food-only" regimens

DAY OF SURGEY	BSL MANAGEMENT
GIVE INSULIN AT 6 AM	If BSL < 10 mmol/l have ONE glass of clear apple juice/lemonade
INSULIN MISSED 6 AM	Give SC insulin on arrival to DSU If BSL < 10 mmol/l start an IV 5% dextrose infusion @ 100ml/hour

NO BOWEL PREP		CURRENT INSULIN DOSING REGIMEN	BOWEL PREP GIVEN	
DAY OF SURGERY	DAY BEFORE SURGERY		DAY 1 OF PREP	DAY OF PROCEDURE
Give 80% usual AM dose	Give 100% AM usual dose Give 80% PM usual dose	Single daily dose – basal • long acting AM/PM	Give 80% of usual AM or PM dose	Give 50% usual AM dose
Give 50% total AM insulin dose	Usual dose	Twice daily dosing • biphasic/premix/long acting	Give 50% of usual AM and PM doses	Give 50% usual AM dose
Give 80% **basal** insulin Omit *bolus* insulin only when fasting, take bolus if breakfast permitted for PM list	Usual dose	Three times daily or more dosing • **basal** + *bolus*	Give 80% of **basal** AM and PM doses Also give 50% of usual *short-acting insulin* with breakfast, then no more short-acting	Give 50% **basal** AM insulin Give *bolus* insulin only if breakfast fluids permitted, then no more bolus insulin.
Consult Endocrinologist		Continuous SC insulin Infusion pump	Consult Endocrinologist	

Postoperative management of diabetes for >12 hour starve or emergency surgery (Inpatients)

POSTOPERATIVE

Monitor BSL q 2-4 hourly depending on results and interventions

If BSL unstable or patient is unwell a variable rate intravenous insulin infusion (VRIII) should be established.

VRIII rate has to be titrated to hourly BSL measurement. If the BSL is less than 15mmol/l administer Normal saline + 5% dextrose +/-20mmolKCl @ 20-40ml/kg/day (See Appendix 3)

Type 1 diabetes	Type 2 diabetes on regular insulin
Contact Endocrine Team for ALL patients to discuss Insulin and IV glucose regimen	Continue 80% basal long-acting SC insulin. Seek advice for dosing of mixed insulin regimes if necessary.
Continue 80% basal SC insulin on DOS	Administer Normal saline + 5% dextrose +/-20mmolKCl @20-40ml/kg/day [Check EUC daily]
CSII Pumps should be managed with the patient's own endocrinologist or on-call endocrinologist, in-hours or out-of-hours	Troubleshooting

BSL < 4 mmol/l	BSL > 10mmol/l for 6 hours
↑ IV dextrose rate Avoid ↓ or ceasing insulin	Consider prescribing a Novorapid supplementary insulin schedule or VRIII (See Appendix 3)

- Consult the **Endocrine Team**:
  - Type 1 DM patients admitted overnight
  - Type 2 DM patients requiring Variable Rate Insulin Infusion (VRII) or adjustments to usual insulin doses or preparations
  - Patients with difficult control of their BSL