NHS Lanarkshire

Guidelines for the Management of the Perioperative Adult Diabetic Patient

Target blood glucose 6-10 mmol/l for all patients

Acceptable blood glucose 4-11 mmol/l for all patients

DEFINITIONS

Non-Insulin Glucose Lowering medications (NIHM) include all oral hypoglycaemics and injectable GLP1 analogues like Victoza (Liraglutide), Trulicity (Dulaglutide), Ozempic (Semaglutide) and Byetta (Exenatide)

Minor surgery: Daycase or overnight stay but likely to resume normal oral intake within 24hrs

Major surgery: Unlikely to resume normal intake within 24hrs

VRII: Variable Rate Insulin Infusion

NOT FOR USE IN ITU

Pre-operative assessment for diabetes mellitus:

Check HbA1c and follow usual pre-operative protocols (see flowchart next page)

Desired pre-operative HbA1c value: Less than 69 mmol/mol (8.5%)

For patients needing referral to diabetes services pre-operatively complete Form DIAB R1

Incidental glycosuria: In non-diabetic patients if a routine urine test reveals glycosuria, check HbA1c. If HbA1c > 48 mmol/mol (6.5%), patient may have diabetes. Defer surgery if possible (discuss with anaesthetist) and refer to GP. If HbA1c ≤ 48 mmol/mol (6.5%) proceed to surgery.

Hypoglycaemia management in the peri-operative period

Pre procedure Hypoglycaemia:

- If pre-operative BM 3.1 - 3.9 mmol/L, alert Anaesthetist/Medical Staff who may commence IV Dextrose +/- VRII.
- If BM 3.0 mmol/L or less, send a sample for lab glucose and follow local hypoglycaemia management protocol; alert Anaesthetist/Medical Staff.

Post procedure hypoglycaemia:

- If post procedure BM 3.1 – 3.9 mmol/L, treat as per local hypoglycaemia management guideline, ensure patient is alert and able to resume normal oral intake. Once BM > 4.0, Discuss with medical staff prior to discharge
- If BM < 3.0 send sample for lab glucose, treat as per NHSL hypoglycaemia management guideline and arrange review by Anaesthetist or Senior Medical Staff.
- The NHSL hypoglycaemia management guideline can be found on firstport.

Non insulin glucose lowering agents (NIHM)

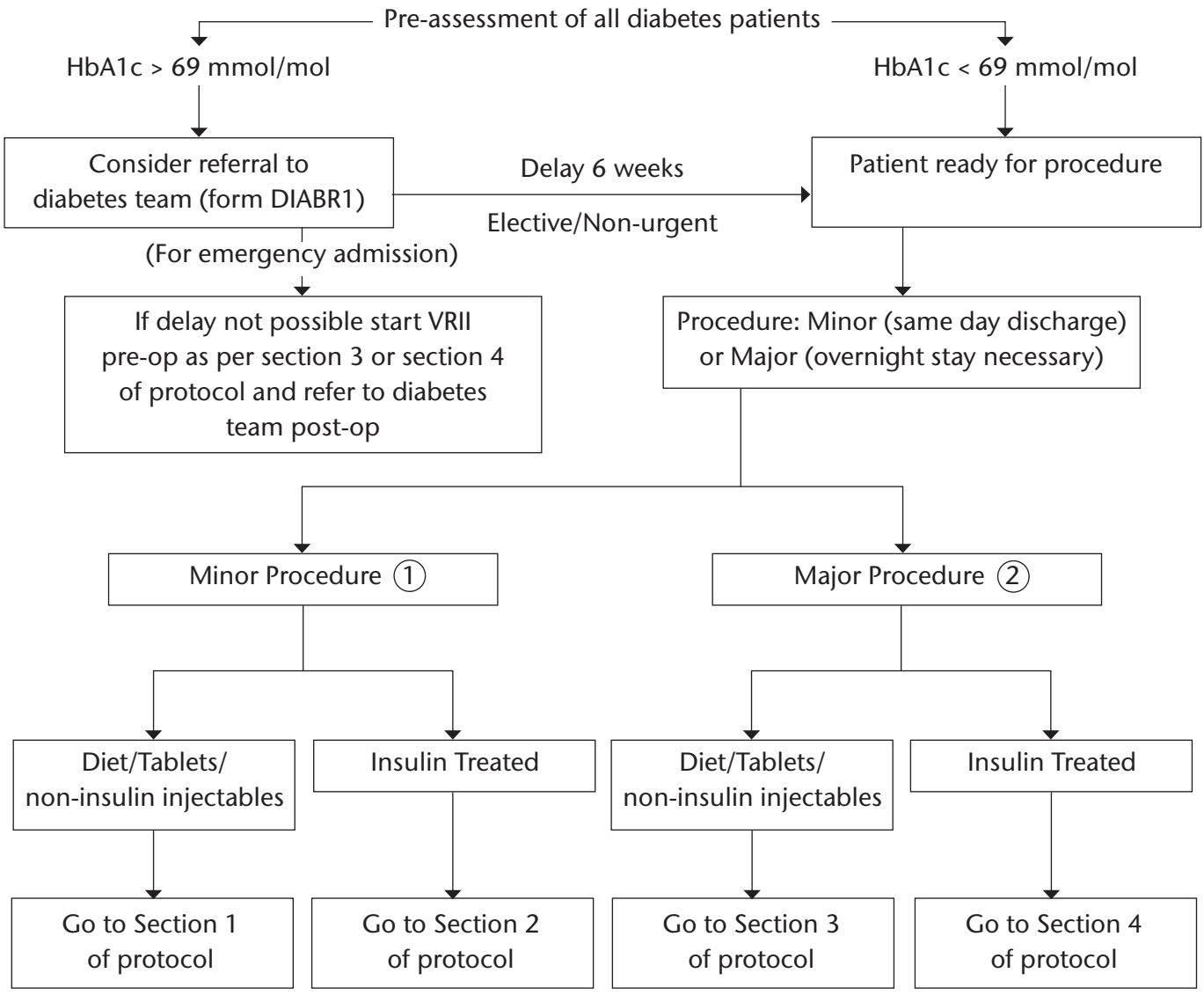
This includes all glucose lowering tablets and non insulin injectable therapies which include Victoza, Byetta, Lixisenatide, Bydureon (weekly injection), Trulicity weekly injection, Ozempic (Semaglutide), etc.

Safety alert

SGLT2 inhibitors are oral glucose lowering medications which include DAPAGLIFLOZIN, CANAGLIFLOZIN and EMPAGLIFLOZIN.

These agents can cause EUGLYCAEMIC DIABETIC KETOACIDOSIS in fasted patients undergoing major surgery. They should therefore be **STOPPED** one week before the date of surgery.

Diabetes Peri-operative flowchart



For All Patients

Post-procedure and pre-discharge check for any advice necessary for metformin.

If feet high risk check pre-discharge and alert diabetes podiatry if necessary (form DIABR1)

① Minor Procedure: Day case or overnight stay likely to resume normal oral intake within 24hrs

② Major Procedure: Overnight stay and unlikely to resume normal oral intake within 24hrs

SECTION 1:

Diet controlled & Non Insulin treated patients undergoing minor surgery or day case procedures (including radiological procedures with or without contrast administration)

Diet controlled patients:

Check BM stix on admission & 4 Hourly

If glucose between 4 and 11mmol/l, no further action necessary

If glucose > 11 mmol/l, advise anaesthetist who may consider Variable Rate Insulin Infusion VRII (Appendix 1)

Non-insulin treated patients:

Morning list:

- Usual medications day before surgery.
- Omit breakfast and all non-insulin glucose lowering medications on morning of procedure. Allow water upto 2hrs preop.
- Check BM stix on admission and 2 hourly.
- If glucose between 4 and 11 mmol/l, no further action necessary
- Restart oral hypoglycaemic drugs with first meal post procedure.
- If BM > 11 mmol/l, consider VRII and monitor BM 1 hourly (during procedure) (see Appendix 1)
- Stop IV insulin when eating/drinking and restart usual medications with first meal post procedure

Afternoon list: (avoid if possible)

- Light breakfast may be allowed.
- Omit all hypoglycaemic medications and check BM stix on admission. Then follow advice as per morning list

Note for patients taking metformin: If patient needed radiological contrast during procedure, omit metformin for 48 hours post procedure and request GP to repeat UEC after 48 hours.

Please give Form A to patient who should take it to his/her GP.

SECTION 2: INSULIN TREATED PATIENTS & MINOR SURGERY

Insulin treated patients undergoing minor surgery or day case procedures (including radiological procedures with or without contrast administration)

- Usual insulin and oral hypoglycaemic tablets (if any) day before including long acting (basal) insulin
- Check BM stix at admission and 1-2 hourly.

Morning list:

- Omit breakfast short acting or pre-mixed insulin (like Novorapid, Humalog, Apidra, Humulin S, Novomix 30, Humulin M3, Humalog Mix 25, Humalog Mix 50, Mixtard 30) and tablets (if any) on morning of surgery
- **If patient takes a long acting insulin like Tresiba (Degludec), Abasaglar, Toujeo, Lantus, Levemir, Humulin Insulatard in the morning, half of usual dose may be given in the morning**
- Monitor BMs 1-2 hourly
- If BM 4-11 and patient is anticipated to make a quick recovery and is not expected to miss more than one meal, IV insulin is not necessary.
- If BM>11 pre-procedure, advise anaesthetist who may consider starting VRII (see appendix 1-VRIII).
- Restart short acting insulin and tablets with next meal; if on twice daily pre-mixed insulin (like Humulin M3, Novomix 30, Humalog Mix25 or Mix 50), **give half of usual morning dose with lunch.**
- If the patient is likely to miss more than one meal and likely to remain fasted till evening, IV insulin infusion should be started in the morning prior to procedure (see pre-op assessment or discuss with anaesthetist) and continue till patient able to eat/drink, when usual insulin should be restarted.

Afternoon list:
(Avoid if possible but do not transfer to another site if specialty access is only afternoon list)

- Usual medications and insulin day prior to surgery including long acting insulin
- Omit all non-insulin glucose lowering medications on day of surgery; however patients with type 1 diabetes should take their usual long acting insulin if they take it in the morning.
- If patient allowed light breakfast, to take half dose of morning short acting/pre-mixed insulin.
- Check BM 2 hourly pre-procedure and hourly during and after procedure.
- If BM>11 pre-procedure advise anaesthetist who may consider starting VRII (appendix 1).
- Restart usual medications and insulin with next meal.
- If unable to eat/drink post procedure, will need VRII until able to do so.

Note for patients taking metformin:

If patient needed radiological contrast during procedure, omit metformin for 48 hours post procedure and request GP to repeat UEC after 48 hours.

Please give Form A to patient who should take it to his/her GP.

SECTION 3: MAJOR SURGERY(NEEDING OVERNIGHT ADMISSION)

Diet controlled patients undergoing major surgery:

- Target blood glucose is 6-10 mmol/l for all patients although (4-11) is acceptable.
- Random venous glucose and UEC to be checked prior to surgery.
- If Blood glucose level is 4-11 mmol/l no further action required but monitor blood glucose 2 hourly.
- If random glucose is > 11 mmol/l, patient will need VRII (Appendix 1) and blood glucose should be monitored 1 hourly.
- BM to be checked pre-procedure and hourly during procedure.
- Use VRII (Appendix 1) if BM>11 until eating/drinking. If BMs persist above 12 when on oral diet, request input from diabetes team for most appropriate treatment.

Non-insulin treated diabetes patients undergoing major surgery:

- Target blood glucose is 6-10 for all patients although (4-11) is acceptable.
- Random venous glucose and UEC to be checked prior to procedure.
- Usual medications day before surgery.
- Omit all non-insulin glucose lowering medications on day of surgery
- Check BM in morning and then 1 hourly during procedure and 2 hourly during recovery phase in first 24 hours. (This may be done 4 hourly if patient is stable and all BMs $\leq$10)
- If random glucose or BM>11 commence VRIII. (see Appendix 1)

Note that serum potassium and renal function must be monitored at 12 hours and thereafter at least every 24 hours or more frequently (if abnormal) for patients on intravenous insulin.

- Restart usual medications when able to take normal oral diet.

Safety alert

SGLT2 inhibitors are oral glucose lowering medications which include DAPAGLIFLOZIN, CANAGLIFLOZIN and EMPAGLIFLOZIN.

These agents can cause EUGLYCAEMIC DIABETIC KETOACIDOSIS in fasted patients undergoing major surgery. They should therefore be **STOPPED** one week before the date of surgery.

SECTION 4: MAJOR SURGERY & INSULIN TREATED PATIENTS

- Target blood glucose is 6-10 mmol/l in all patients– change regime as outlined below*
- Foot care must be optimised for patients immobile beyond 12 hours; assess foot risk and consider heel protection. (Contact Diabetes Podiatry for advice if needed)
- Random venous glucose and UEC to be checked prior to procedure.
- Usual insulin day before surgery.
- Commence VRII on morning of surgery. (Appendix 1)
- **Continue longacting insulins alongside IV insulin peri and post operatively. - So for patients receiving Insulin Glargine (Lantus), Humulin I, Insulin Detemir (Levemir), Tresiba (Degludec), Abasaglar, Toujeo etc or any other basal insulin, such should be continued alongside IV insulin on a daily basis. This would enhance quick switching to sc insulin when patient is able to eat/drink and also prevent DKA if IV inadvertently discontinued.**
- Serum potassium must be monitored postoperatively at 12 hours and then every 12 or 24 hours as necessary for patients on VRII longer than 12 hours.
- Patients with normal renal function, satisfactory urine output and normal pre-op serum potassium will need 40-60mmol potassium replacement every 24 hours
- Adjustments would be necessary where pre-op serum potassium is outwith normal range or there is renal impairment or poor urine output – discuss with anaesthetist
- **Switch to subcutaneous insulin** when eating meals – discontinue VRII only after sc insulin has been administered.** Introduce oral and other glucose lowering medications once eating/ drinking normally.

*Note: If BM > 20 persistently, lab glucose and blood ketones (or serum bicarbonate) must be checked. If there is evidence of diabetic ketoacidosis, please revert to DKA protocol. Hospital Diabetes team **must** be contacted in this scenario.

**Note: Patients who need TPN or parenteral feeding post operatively will need to be prescribed a suitable sc insulin regime – contact Hospital Diabetes Team

Safety alert

SGLT2 inhibitors are oral glucose lowering medications which include DAPAGLIFLOZIN, CANAGLIFLOZIN and EMPAGLIFLOZIN.

These agents can cause EUGLYCAEMIC DIABETIC KETOACIDOSIS in fasted patients undergoing major surgery. They should therefore be **STOPPED** one week before the date of surgery.

References:

1. Management of adults undergoing surgery and elective procedures: NHS Diabetes, April 2011 (Joint working party report)
2. Perioperative guidelines: NHS Tayside Diabetes Managed Clinical Network Handbook 2011.
3. NHSL Planned Care Clinical Protocols 2007-2012

*Appendix 2: Form DIABR1

REFERRAL TO DIABETES SERVICE

Patient label	Type of surgery: Minor/Daycase or major Date of Surgery: ..... Date of Referral:.....

Why is input needed (pl tick)?
- ☐ HbA1c >69 mmol/mol
- ☐ High risk feet
- ☐ Other (specify).....

HbA1c: .....

Check U & Es (yellow top)

Check urinalysis: if ketones 4+ or large, consider referral to diabetes team urgently; if protein present please send sample for albumin creatinine ratio (ACR)

Document diabetes treatment:

Diet only ☐

Tablet treated ☐ Is patient taking metformin? ☐ Yes ☐ No

Insulin treated ☐ Yes ☐ No

Byetta / Victoza ☐ Yes ☐ No

Insulin pump ☐ Yes ☐ No

Is administration of radiological contrast necessary? ☐ Yes ☐ No

Check feet:

Is there active ulceration of feet/heels? ☐ Yes ☐ No

Contact details: (a copy of this sheet must be sent for all referrals)

Hairmyres:	Diab Nurses ext 5230;	Podiatry ext 5235
Monklands:	David Matthews Centre ext 3337	
Wishaw:	Diab Nurses ext 6066;	Podiatry ext 6359

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