Doncaster and Bassetlaw Teaching Hospitals
NHS Foundation Trust

Peri-operative Management of Diabetes in Adults

This procedural document supersedes: PAT/T 70 v 2 – Peri-operative Management of Diabetes in Adults

Did you print this document yourself?

The Trust discourages the retention of hard copies of policies and can only guarantee that the policy on the Trust website is the most up-to-date version. **If, for exceptional reasons, you need to print a policy off, it is only valid for 24 hours.**

Executive Sponsor(s):	Karen Jessop, Chief Nurse
Author/reviewer: (this version)	Padma Gopal – Consultant Anaesthetist Sue Robson – Diabetes Specialist Nurse Shivani Dewan – Consultant in Diabetes and Endocrinology
Date written/revised:	August 2021
Approved by:	Patient Safety Review Group
Date of approval:	5 May 2023
Date issued:	16 October 2023
Next review date:	5 May 2026
Target audience:	Trust-wide Clinical Staff

Amendment Form

Please record brief details of the changes made alongside the next version number. If the procedural document has been reviewed **without change**, this information will still need to be recorded although the version number will remain the same.

Version	Date Issued	Brief Summary of Changes	Author
Version 3	August 2021	• Typographical errors in main body, text added • Semglee Insulin to flow charts 3,4,5,6 and 15	Padma Gopal Susan Robson Shivani Dewan
Version 2	January 2020	• Typographical errors in main body of text and flow charts corrected	Padma Gopal Susan Robson Shivani Dewan
Version 1	January 2018	• This is a new procedural document, please read in full	Padma Gopal Susan Robson Shivani Dewan

Contents

Page No.

1 INTRODUCTION

In September 2015 Joint British Diabetes Society – Inpatient Care (JBDS-IP) published the revised National guidelines for Management of adults with Diabetes undergoing elective surgical procedures.

This was based on studies which showed increased morbidity in uncontrolled diabetics compared to non-diabetics having elective operations.

The National guidelines are primarily intended for the management of patients with diabetes referred for elective surgery. However, most of the recommendations can be applied to the patients presenting for emergency surgery with the provision that many such patients are at high risk and are likely to require an intravenous insulin infusion and level 1 care (acute ward with input from critical care team) as a minimum.

2 PURPOSE

The Trust should have a Clinical lead for the perioperative management of patients with diabetes whose responsibility it is to ensure that DBTH has up to date guidelines that are implemented. The Clinical lead should also ensure that all patients with diabetes are optimally managed during their admission. Diabetes must be recognized and managed effectively.

Work has been undertaken to raise standards of diabetes care for patients undergoing surgical and various other invasive procedures. The National Health Service Institute for innovation and improvement (NHSIII) “Think Glucose” campaign highlights key areas for improvement in the care of in patients with diabetes, which are:

- Focus on the patient
- Early identification of people with diabetes
- Comprehensive standardized assessment of patient needs
- Care Pathways agreed amongst various teams and implemented
- Involvement of Diabetes Inpatient Specialist Team.

3 DUTIES AND RESPONSIBILITIES

All medical and nursing staff has a responsibility to work within the policy. Any deviations should be by a Senior Clinician to meet the needs of the individual and this should be documented.

Diabetes team

- Implementation of this policy and all National recommendations made regarding diabetes at the perioperative care.
- Ensure education and training of all appropriate Trust staff
- Responsibilities to ensure all patients with diabetes receive an equitable and high quality service.
- To be alerted to all patients with diabetes who are identified for surgical procedures.
- Escalate any incidents regarding diabetes management to the relevant clinical governance groups.

Lead Diabetologist/Consultant Surgeon/ Anaesthetist

Act as a clinical expert in diabetes management and surgery. Provide education and training to all staff.

Head of Nursing for all Specialty services

To ensure Matrons/ward managers support the policy and support the nurse in providing care for patients with diabetes undergoing a surgical procedure.

Matrons and Ward Managers

To promote safe standards of diabetes care on all wards as appropriate.
Staff should familiarize with the policy.
Ward Managers to release staff when required in order to participate in education and training.

All staff directly involved in caring for diabetic patients who are undergoing a surgical procedure

All staff should demonstrate good communication and familiarization with the policy when dealing with diabetic patients having surgery. To ensure all diabetic patients are referred to the Diabetes Specialist Nurse Team so that they can offer the patient and staff full support and guidance.

4 MAIN RECOMMENDATIONS

- DBTH should have a clinical lead for perioperative management of patients with diabetes. Clear guidelines should indicate when the diabetes specialist team should be involved.
- Planning is required at all stages of patient pathway-from GP referral to post-operative discharge.
- Patients should be involved in planning at all stages. They should be supported to continue to manage their own diabetes (including self-testing and self-administration of medicines) wherever possible. Those requiring insulin should have access to the same formulation of insulin (analogue, human or animal) as before admission.

- Information and education should be provided for the management of diabetes, during the admission, recovery period and following discharge. This should take into account any lifestyle and dietary changes necessitated by the procedure.
- DBTH should implement Diabetes Inpatient Specialist Nurse Service to support the elective pathway.
- DBTH should have systems in place to identify all patients with diabetes on admission to highlight the need to prioritise them on the operating list.
- High risk patients should be identified in surgical outpatients/preoperative assessment and plans should be in place to manage the risk.
- Ward staff should ensure that the timing and choice of food and snacks is appropriate. (Recent evidence suggests that meal choices for people with diabetes in hospital are poor, with up to 21% saying that they would never make the same food choices at home).
- Early pre-operative assessment should be arranged to determine pre-operative diabetes management strategy and to identify and optimize the co-morbidities.
- Day of surgery admission should be the "default "position. Diabetes specific pre-admission should be avoided.
- Minimize starvation time.
- Enhanced Recovery Programme should be implemented - Multimodal analgesia with appropriate anti-emetics should be planned to enable early return to normal diet and diabetes regimen.
- Patients should resume diabetes self-management as soon as possible where appropriate.
- A plan should be in place for safe discharge of diabetic patients.
- Insulin should be prescribed using the brand name and the word "unit" is written in full (not using the abbreviation "u").
- Outcomes should be audited regularly by the Diabetes team.
- All areas of admission should have hypoglycemic boxes.

5 PROCEDURE

1. All diabetic patients scheduled to undergo an elective procedure requiring a period of starvation should attend a pre-operative assessment clinic.
2. Pre-operative teams should assess:

- Adequacy of glycaemic control (HbA1c of less than 69mmol/mol).
- The risk of proceeding when control is sub-optimal, this should be balanced against the urgency of the procedure.
- Identify other co-morbidities with referral to appropriate teams for optimization.
- Referral to the Diabetes specialist team according to local policy.
- Plan patient's admission for surgery:
  - Timing of admission
  - Location
  - Timing of surgery (prioritize on the theatre list to minimize starvation time to promote early resumption of normal diet and normal medication at normal time).
  - Pre-admission management of medications.

- Availability of usual Insulin, patients may need to bring if non-formulary.
- Plans for Enhanced Recovery.
- Ensure the patient is fully consulted and engaged in the proposed plan.
- Patients should receive written instructions of the changes they need to make to their medications prior to admission.
- Plan initial pre-operative management of diabetes.
- Ensure that Glucogel, Glucagon and rapid acting insulin is routinely prescribed to treat hypoglycaemia or hyperglycaemia.
- The target BG in the pre-operative, anaesthetised or sedated patient should be 6-10mmol/L (4 - 12mmol/l may be accepted).
- Patient's usual diabetes medication should be written up on the drug chart with the appropriate adjustments made.
- Patients with "at risk feet" should be identified and document this clearly where it will be easily visible to theatre and ward staff.
- Plan duration of stay and make preliminary discharge arrangements. Consider the need for home support following discharge and involve the primary care team in discharge planning.

FACTORS INFLUENCING THE CHOICE OF PERI-OPERATIVE DIABETES MANAGEMENT

1. Duration of starvation - missing one meal or more than one meal.
2. Timing of surgery - am or pm.
3. Usual treatment regimen - insulin, tablets, diet.
4. Diabetes control prior to admission.
5. Other co-morbidities.
6. Likelihood that the patient will be capable of self-managing their diabetes during the immediate post-operative period.

PRE-OPERATIVE PLANNING:

1. Notify the Diabetes team well before the event.
2. Admit on the same day of surgery through Theatre admissions unit (TAU).
3. Plan where possible to be first on the theatre list (am or pm).
4. Minimal starvation - 6hours for solids and 2hrs for clear liquids.
5. Check blood glucose prior to surgery.
6. Refer to appropriate chart for medication/insulin administration.
7. If variable rate Intravenous insulin infusion (VRIII) is required to be started by anesthetist in theatre.

THEATRE AND RECOVERY

AIMS:

1. Maintain intra-operative blood glucose level between 6-10mmol/L, up to 12mmol/L is acceptable.
2. Maintain normal electrolyte concentrations.
3. Optimise intra-operative cardiovascular and renal function.

4. Provide multi-modal analgesia and appropriate anti-emetics.
5. Avoid pressure damage to feet during surgery.

RECOMMENDATIONS:

1. Implement the WHO surgical safety checklist bundle.
2. Implement the agreed care plan.
3. A patient with VRIII needs at least 2 cannula.
4. Check capillary blood glucose (CBG) prior to induction of anesthesia.
5. Monitor CBG regularly during the procedure - at least hourly, more frequently if reading outside the target range. NICE recommends CBG to be monitored every 30mins during Caesarean section under general anesthetic (GA) from induction until woman is fully conscious.
6. Avoid unnecessary use of VRIII, but never stop an insulin infusion in Type I diabetes unless subcutaneous (SC) insulin has been given.
7. Substrate infusion should be 4% Dextrose in 0.18% sodium chloride with either 0.15% or 0.3% potassium chloride. Alternatively, 5% Dextrose with added potassium.
8. Document the CBG, VRIII and substrate infusion on the anesthetic record as per **RCOA/AAGBI recommendations**.
9. Plan ITU/HDU care for high risk patients.
10. Pressure areas should be inspected and high risk areas should be protected using suitable equipment.

POST OPERATIVE CARE

AIMS

1. Ensure blood glucose levels are appropriately maintained.
2. Acceptable range in awake patients not on VRIII is 4-12mmol/L, if VRIII is used acceptable range remains 6-12mmol/L.
3. Maintain adequate fluid and electrolyte balance.
4. Optimize pain control.
5. Encourage early return to normal eating, facilitating return to the usual diabetes regimen.
6. Enhanced Recovery Principles.
7. Avoid iatrogenic injury - drugs, diabetes management/pressure damage.
8. Monitor blood glucose half hourly for the first 2hrs, hourly for next 4 hours and then 2 hourly until the next morning. In the morning refer to diabetes team.
9. Continue IV fluids and insulin infusion until taking adequate food and fluids orally.
10. Stop VRIII 1 hour after medication or subcutaneous insulin dose. Only discontinue when convenient to do so and at a time when medication or insulin dose due.
11. **Never stop VRIII during surgery.**
12. If in-patient discuss with in charge Consultant and discharge home when medically fit.

RECOMMENDATIONS

1. Staff skilled in diabetes management should supervise surgical wards.
2. Allow patients to self-manage their diabetes as soon as possible.
3. Provide written guidelines for the use of intravenous fluids and insulin.
4. Prescribe and administer insulin in line with NPSA guidelines.
5. Blood glucose maintained within the guideline range.
6. Monitor electrolytes and fluid balance daily.
7. Maintain meticulous infection control.
8. Inspect feet and pressure areas regularly.

Emergency Surgery

- Inform the Diabetes team to discuss management with the Anaesthetist and surgeon.
- Bloods where appropriate.
- If in Diabetes ketoacidosis (DKA), follow protocol.
- Commence VRIII.
- Operate only when the patient is stable where possible.
- Measure blood glucose half hourly.
- Never stop infusion during surgical procedure.

PERIOPERATIVE MONITORING DIABETES AND MANAGEMENT OF HYPO OR HYPERGLYCAEMIA IN PATIENTS UNDERGOING SURGERY WITH A SHORT STARVATION (ONE MISSED MEAL)

These guidelines are for patients with well controlled diabetes

Pre- Operative Hyperglycemia

Refer to hyperglycemia flow chart for advice **Appendix 1**

Post-Operative hyperglycaemia

Refer to hyperglycemia flow chart for advice **Appendix 2**

Insulin and medication Guidance

- Once day insulin - reduce dose the day before surgery as per guidelines, fast from midnight and monitor blood glucose regular.
- Twice daily insulin, give normal dose at breakfast the day before surgery and reduce teatime dose as per guidelines.
- Three or more doses of insulin (basal bolus), reduce basal insulin the night before surgery as per guidelines.
- **Do not** take rapid acting insulin prior to surgery. Monitor blood glucose regularly, if BG below 4mmol/l follow advice given for hypoglycaemia when fasting, if elevated follow the management plan and contact the in-patient diabetes team for advice.

Once a day insulin for nil by mouth (NBM) for 1 missed meal

Refer to flow chart for advice. **Appendix 3**

Once a day insulin NBM for more than 1 missed meal

Refer to flow chart for advice. **Appendix 4**

Type 1 Diabetes 4 or more times daily (basal Bolus) NBM for 1 missed meal

Refer to flow chart for advice. **Appendix 5**

Type 1 Diabetes 4 or more times daily (basal Bolus) NBM for more than 1 missed meal

Refer to flow chart for advice. **Appendix 6**

Type 2 Diabetes Twice/three times daily mixed insulin NBM for 1 or more missed meal

Refer to flow chart for advice. **Appendix 7**

Type 2 Diabetes NBM 1 missed meal

Refer to flow chart for advice. **Appendix 8**

Medication

- **Metformin** -take normal dose the day before surgery it does not cause hypoglycaemia unless given with Sulphonylureas.
- **Gliclazide/Glimepiride/Glipizide**- take normal dose the day before surgery in the morning. Reduce the dose by half if taken at tea time.
- **Gliptins (DPP4)**-have a low risk of causing hypos unless taken with insulin oral sulfonylurea therefore take as normal.
- **Dapagliflozin, Canagliflozin, Empagliflozin (SGLT2 inhibitors)** –have a low risk of causing hypos unless taken with insulin or a sulfonylurea therefore take as normal.
- **Pioglitazone** –Has a low risk of causing hypos unless taken with insulin or a sulfonylurea therefore take as normal.
- **Liraglutide/Bydureon (GLP)** - These should not be mistaken for insulin. They are injectable solutions to help suppress appetite and aid weight loss. They have a low risk of causing hypos unless taken with insulin or a sulfonylurea therefor take as normal.

Oral therapy NBM for more than 1 missed meal

Refer to flow chart for advice. **Appendix 9**

DIET ONLY NBM for 1 missed meal

Refer to flow chart for advice. **Appendix 10**

Diet only for 1 or more missed meals

Refer to flow chart. **Appendix 11**

PERIOPERATIVE MONITORING DIABETES AND MANAGEMENT OF HYPO OR HYPERGLYCAEMIA IN PATIENTS UNDERGOING SURGERY WITH A LONG STARVATION PERIOD (MORE THAN ONE MISSED MEAL)

1. Admit on the day of surgery.
2. If patient is on long acting insulin, this should be continued at 80% of usual dose
3. Preferably morning list.
   Minimal starvation, 2 hours for clear fluids and 6 hours for solids.
4. Glucagon, 20% glucose and rapid acting insulin should be prescribed on the preferred method of charting (drug chart or JAC).
5. Regular BG monitoring- as per guideline.
6. BG levels should be between 6-12mm0l/l.

Management of Hypoglycaemia

Please follow Trust guidelines for hypoglycaemia, can be found on the intranet. Flow chart for advice **Appendix 12.**

5.1 Indications for Variable Rate Insulin Infusion

- Type 1 Diabetes undergoing surgery with long starvation period- missing more than 1 meal.
- Type 1 Diabetes undergoing surgery who has not received background insulin.
- Type 2 Diabetes undergoing surgery with long starvation period-missing more than 1 meal and develops hyperglycaemia (capillary blood glucose > 12mmol/l).
- Patients with poorly controlled Diabetes (HbA1c>69mmol/l) and surgery cannot be postponed.
- Decompensated Diabetes.
- Most patients with Diabetes requiring emergency surgery.

5.2 Variable Rate Insulin Infusion Protocol

- One size does not fit all.
- Obese patients require more insulin per hour.
- Ideally 2 cannulas, one dedicated cannula For VRII and substrate (with appropriate one-way/anti-siphon valve.
- Intra-venous (IV) fluids must be administered using a volumetric pump.
- Initial infusion rate should be determined by the CBG before the start of the procedure
- Make up 50 units of soluble Human insulin (Act-rapid as per Trust protocol), with 49.5mls of 0.9 Sodium Chloride solution. Infuse with a syringe pump used by Trust.
- Substrate solution recommended is 5% Dextrose with added Potassium Chloride. This should run along-side the VRIII at a rate to meet the patient's fluid requirement. If this

is not available the alternative fluid is 4% Dextrose in 0.18% Saline and 0.15% or 0.3% Potassium Chloride.
- CBG should be measured hourly and VRIII adjusted as per the values obtained.
- Post-operatively CBG should be measured hourly for the first 12 hours.
- If blood glucose remains >12mmol/l for 3 consecutive readings and is not dropping by 3mmol/l/hr. The scale should be changed as per the trust guidelines.
- The practice of alternating Dextrose and Saline according to serum glucose is not normally recommended, however, additional fluids may be recommended according to specific needs of the patient. Hartmann's is the recommended solution which is acceptable.
- Continue the insulin and substrate intra-operatively and post-operatively, until the patient is eating and drinking and back on their usual medication.
- If insulin and substrate solution is disconnected, new solutions and new giving sets should be used to reduce the risk of nosocomial infection.

CAUTION

- **Do not** infuse insulin without substrate solution unless in ITU/HDU/CCU/Theatres setting and only where necessary.
- Measure CBG hourly to avoid hypo/hyperglycaemia.
- Ensure the administration of background insulin is given if part of usual regime to prevent hyperglycaemia and diabetes ketoacidosis.
- In patients with type 1 diabetes, the VRIII must not be discontinued until alternative. Subcutaneous insulin has been administered 30 minutes prior to stopping the infusion.
- Ensure RDA of sodium is met to prevent hyponatraemia and measure U&Es daily.

5.3 Transferring from a VRIII to Subcutaneous or Oral Treatment

Restarting Oral Hypoglycaemia Medication

- Restart pre-operative doses once the patient is ready to eat/drink.
- Be prepared to withhold or reduce Sulphonylureas if the food intake is likely to be reduced.
- Metformin should only be recommended if the e-GFR is >60m/min/1.73m2.

Restarting Subcutaneous Insulin for Patients Already Established on Insulin

- Conversion to subcutaneous (SC) insulin should be delayed until patient is able to eat and drink without nausea or vomiting.
- Restart their normal pre-surgical regime, doses may need adjusting because insulin requirements may change post-operatively, due to stress, infection or altered food intake.
- **Consult diabetes team** if blood glucose levels are outside the normal range, or if any change in management is required.
- The transition from intravenous to subcutaneous insulin should take place when the next meal and subcutaneous insulin are due. For example – breakfast, lunch or tea.

For Patients on a Basal Bolus Insulin Regime.

- There should be an overlap between the VRIII and the first injection of rapid/short acting insulin.
- Rapid/short acting insulin should be given subcutaneous with the meal and the intravenous insulin and fluids discontinued 30 to 60 minutes later.
- If the patient was previously on long acting insulin, this should have continued and the only action should be to restart their normal short acting insulin at the next meal.

5.4 Surgical Outpatients

1. Arrange pre-operative assessment as soon as possible.
2. Day of surgery admission.
3. Priorities these patients on the operating list, avoid pm operations.
4. Patients undergoing investigative procedures requiring period of starvation should be identified and provided with written information about diabetes management.
5. Unless Diabetes Inpatient Specialist team is available for consultation 7 days a week, it may be prudent to avoid operating on patients with diabetes routinely at weekends.

Patients with diabetes for day case surgery
Refer to flow chart for advice. **Appendix 13**

5.5 Information of Pre-Operative Assessment Team

1. GP referral letter should include the following details:
   - Duration and type of diabetes.
   - Primary or secondary care.
   - Other co-morbidities.
   - Current HbA1c (within the last 3 months).
   - Blood pressure.
   - Weight.
   - Relevant medical information.
   - The glycaemic control is as good as it could be (in uncontrolled diabetes).

2. GP's should optimize the glycaemic control aiming for an HbA1c of less than 69mmol/l before referral.
3. GP's should consider referral to diabetes specialist team for advice if the HbA1c is greater than 69mmol/mol (8.5%) and it is felt that further optimization is safely achievable.
4. Optimise diabetes related co-morbidities- At risk foot, renal dysfunction and cardiac disease.

5.6 Special Circumstances

Continuous Subcutaneous Insulin Infusion (CSII) Pump patients

- If a day case and no more than 1 missed meal, CSII pump therapy should be continued. Remain on basal rate until eating and drinking. If there is more than 1 missed meal, remove pump and start VRIII. If the patient is for x-ray, diathermy treatment, CT scan or any other type of exposure to radiation. Take off the pump or keep it as far away from the patient as the line will allow.
  Refer to (CSII) pump flow chart for advice**.** See **Appendix 14**

Bariatric Patients

- Patients under-going bariatric surgery are treated differently post procedure.
  - Type 2 diabetes patients will stop all insulin and oral therapies and will be reviewed in clinic 6 weeks post-op. Diabetes is considered to be in remission and the patient should not need any medication or insulin.
  - Type 1 patients will need a variable VRIII prior to surgery. Continue the basal insulin during the fasting period**. Refer to the Diabetes team post procedure.**

Refer to flow chart for advice. See **Appendix 15.**

PATIENTS LACKING CAPACITY

Sometimes it will be necessary to provide care and treatment to patients who lack the capacity to make decisions related to the content of this policy. In these instances staff must treat the patient in accordance with the Mental Capacity Act 2005 (MCA 2005).

- A person lacking capacity should not be treated in a manner which can be seen as discriminatory.
- Any act done for, or any decision made on behalf of a patient who lacks capacity must be done, or made, in the persons Best Interest.
- Further information can be found in the MCA policy, and the Code of Practice, both available on the Extranet.

There is no single definition of Best Interest. Best Interest is *determined on an individual basis. All factors relevant to the decision must be taken into account, family and friends should be consulted, and the decision should be in the Best interest of the individual. Please see S5 of the MCA code of practice for further information.*

6 TRAINING/SUPPORT

The Trust training needs analysis (diabetes) will identify individual needs for staff.
Diabetes and Endocrinology can be contacted at any time for support.

Please note: The training requirements of staff will be identified through a learning needs analysis (LNA). Role specific education will be co-ordinated/ delivered by the topic lead. Alternatively, training may be accessed via an approved e-learning platform where available.

7 MONITORING COMPLIANCE WITH THE PROCEDURAL DOCUMENT

What is being Monitored	Who will carry out the Monitoring	How often	How Reviewed/ Where Reported to
All diabetic patients undergoing surgery are managed as per the trust guideline.	Datix incidents.	Incidents filled in whenever there is breach in the guideline.	Every Datix incident actioned appropriately.
Patients with Diabetes undergoing surgery, who have been referred to the Diabetes team for advice and support	The in-patient Diabetes team, Surgeons and Anaesthetist	Annually	Audit referrals, to be reviewed by The Lead for Diabetes. To be discussed at the Diabetes Network meeting.
Regular audits	Diabetes team/ Surgeons/ Anaesthetist	Annually	Discuss in appropriate Departmental Clinical Governance meetings.

8 DEFINITIONS

Pre-op Preoperative-before operation
Peri-op During the operation
Post-op After the operation

9 EQUALITY IMPACT ASSESSMENT

The Trust aims to design and implement services, policies and measures that meet the diverse needs of our service, population and workforce, ensuring that none are disadvantaged over others. Our objectives and responsibilities relating to equality and diversity are outlined within our equality schemes. When considering the needs and assessing the impact of a procedural document any discriminatory factors must be identified.

An Equality Impact Assessment (EIA) has been conducted on this procedural document in line with the principles of the Equality Analysis Policy (CORP/EMP 27) and the Fair Treatment for All Policy (CORP/EMP 4).

The purpose of the EIA is to minimise and if possible remove any disproportionate impact on employees on the grounds of race, sex, disability, age, sexual orientation or religious belief. No detriment was identified. See Appendix 16.

10 ASSOCIATED TRUST PROCEDURAL DOCUMENTS

- In Hospital Management of Hypoglycaemia in Adults with Diabetes Mellitus – PAT/T 49
- Fair Treatment for All Policy – CORP/EMP 4
- Equality Analysis Policy CORP/EMP 27
- Adult Diabetic Ketoacidosis treatment and monitoring chart WPR39420 Aug 2013.
- Mental Capacity Act 2005 Policy and Procedure, including Deprivation of Liberty Safeguards (DoLS) - PAT/PA 19 and the Privacy and Dignity Policy - PAT/PA 28].

11 DATA PROTECTION

Any personal data processing associated with this policy will be carried out under 'Current data protection legislation' as in the Data Protection Act 2018 and the UK General Data Protection Regulation (GDPR) 2021.

For further information on data processing carried out by the trust, please refer to our Privacy Notices and other information which you can find on the trust website: https://www.dbth.nhs.uk/about-us/our-publications/information-governance/

12 ABBREVIATIONS

VRIII	Variable Rate Intravenous Insulin Infusion
CBG	Capillary Blood Glucose
DKA	Diabetes Ketoacidosis
BG	Blood Glucose
IV	Intravenous Infusion
CSII	Continuous Subcutaneous Insulin Infusion
RDA	Recommended Dietary Allowance
RCOA	Royal College of Anaesthetist
AAGBI	Association of Anaesthetists of Great Britain & Ireland
NBM	Nil by Mouth
NHSIII	National Health Service Institute for Innovation and Improvement
HDU	High Dependency Unit
TAU	Theatre Assessment Unit
ITU	Intensive care Unit

CCU Coronary Care Unit

13 REFERENCES

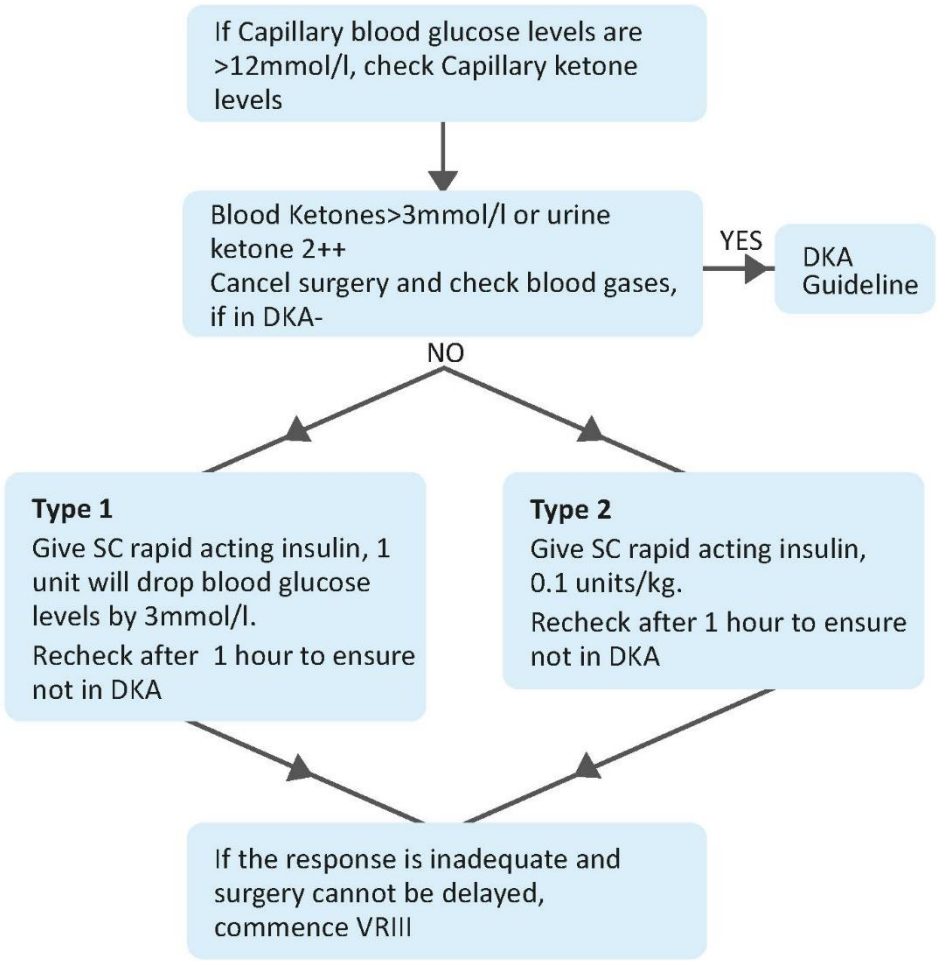
JBDS-IP. Joint British Diabetes Societies for in-patient care. *Management of Adults with Diabetes undergoing surgery and elective procedures.* **Improving standards, reviewed September 2015.**

NICE Guidance on Diabetes in Pregnancy.

Perioperative Management of Surgical Patients with Diabetes published in 2015 by AAGBI.

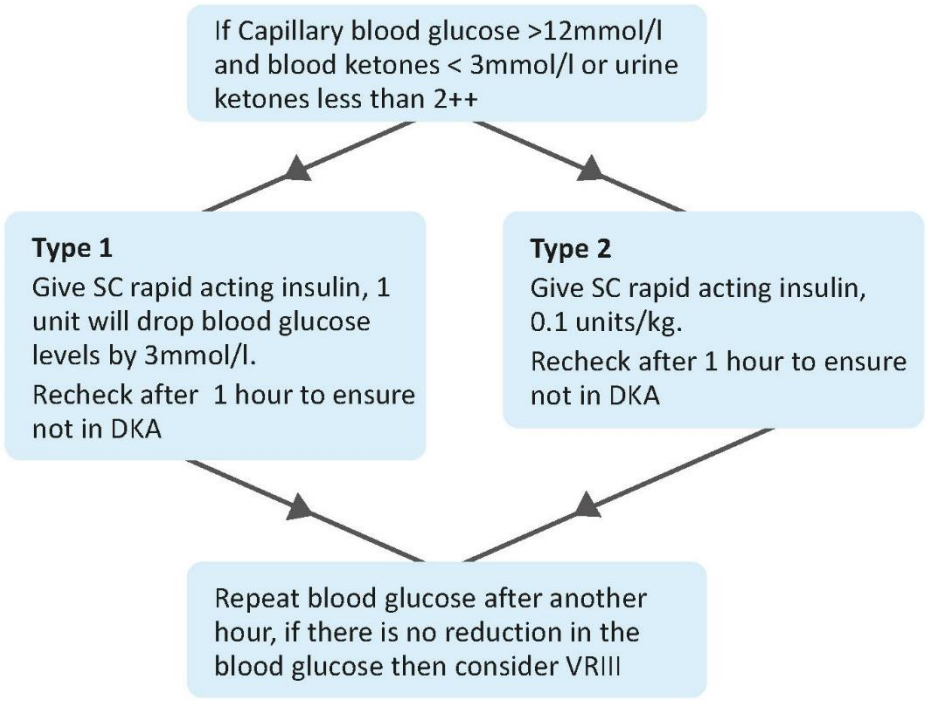
Department of Constitutional Affairs Mental Capacity Act (2005): Code of Practice, 2007 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/497253/Mental-capacity-act-code-of-practice.pdf

APPENDIX 1 – PRE OPERATIVE HYPERGLYCAEMIA



For additional advice contact the Diabetes Specialist nursing team on bleep 1333 or 1388

APPENDIX 2 – POST OPERATIVE HYPERGLYCAEMIA



For additional advice contact the Diabetes Specialist nursing team on bleep 1333 or 1388

APPENDIX 3 – ONCE A DAY INSULIN NO MORE THAN 1 MISSED MEAL

Once Daily Insulin (Basal)

↓

Nil By Mouth (Short starvation period)

↓

ADVICE

- Pre op fasting as per guidelines.
- Same day admission.
- Arrange 1st on AM/PM list.
- If VRIII required or CBG >12mmol/l follow trust guidelines.
- If CBG is sub optimal <4mmol/l - >12mmol/l, for diabetes review.
- Monitor CBG at least hourly.
- Can have clear fluids up to 2 hours prior to surgery.
- If CBG <4mmol/l, follow trust guidelines for the management of hypoglycaemia for NBM patients.

↓

Day prior to admission

Morning list Lantus, Abasaglar, Levemir, Semglee, Insulatard, Humulin I, Tresiba, Toujeo, Insuman. Take 80% of usual dose.

Afternoon list Lantus, Abasaglar, Levemir, Insulatard, Humulin I, Tresiba, Toujeo, Semglee and Insuman. Take 80% of usual dose.

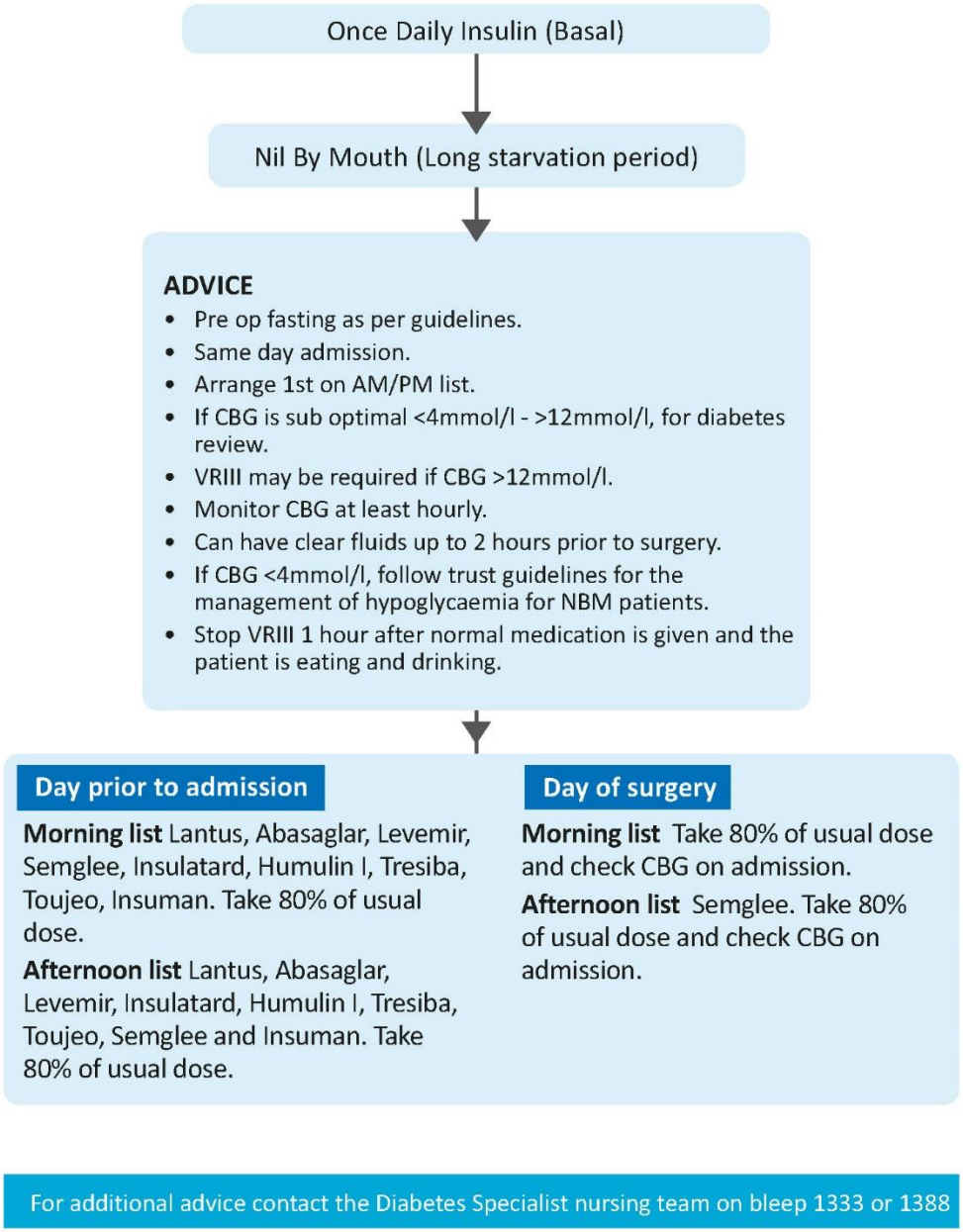
Day of surgery

Morning list Take 80% of usual dose and check CBG on admission.

Afternoon list Semglee. Take 80% of usual dose and check CBG on admission.

For additional advice contact the Diabetes Specialist nursing team on bleep 1333 or 1388

APPENDIX 4 – ONCE A DAY INSULIN MORE THAN 1 MISSED MEAL



APPENDIX 5 – 3, 4 OR MORE TIMES BASAL INSULIN FOR TYPE 1 NO MORE THAN 1 MISSED MEAL

3,4 or More Times Daily Insulin (Basal Bolus)

↓

Nil By Mouth (Short starvation period)

↓

ADVICE

- Pre op fasting as per guidelines
- Same day admission
- Arrange 1st on AM/PM list
- If CBG is sub optimal <4mmol/l - >12mmol/l, for diabetes review
- Monitor CBG at least hourly before surgery
- Can have clear fluids up to 2 hours prior to surgery
- If CBG <4mmol/l, follow trust guidelines for the management of hypoglycaemia for NBM patients
- If CBG >12mmol/l a VRIII may be required.
- Stop VRIII 1 hour after normal medication is given and the patient is eating and drinking

Day prior to admission

Lantus, Abasaglar, Levemir, Tresiba, Semglee, Insulatard, Humulin I, Insuman, Toujeo are all **basal** insulins. Take 80% of usual dose. Apidra, Actrapid, Novorpid, Humulin S and Humalog are all short acting insulins.

Take usual dose of short acting insulin.

Day of surgery

Morning list Take 80% of usual dose of **basal** insulin. Omit the morning and lunch time dose of short acting insulin. Check CBG on admission.

Afternoon list Take 80% of usual dose of basal insulin. Omit lunch time dose. Check CBG on admission.

* Post-operation - If on VRIII - stop all sub cut rapid acting insulin until eating and drinking normally.

For additional advice contact the Diabetes Specialist nursing team on bleep 1333 or 1388

APPENDIX 6 – 3, 4 OR MORE TIMES BASAL INSULIN FOR TYPE 1 MORE THAN 1 MISSED MEAL

3,4 or More Times Daily Insulin (Basal Bolus)

↓

Nil By Mouth (Long starvation period)

↓

ADVICE

- Pre op fasting as per guidelines
- Same day admission
- Arrange 1st on AM/PM list
- If CBG is sub optimal <4mmol/l - >12mmol/l, for diabetes review
- Monitor CBG at least hourly before surgery
- Can have clear fluids up to 2 hours prior to surgery
- If CBG <4mmol/l, follow trust guidelines for the management of hypoglycaemia for NBM patients
- If CBG >12mmol/l a VRIII may be required.
- VRIII to be started depending on the type of surgery (if patient is not for enhanced recovery
- Stop IV fluids and VRIII 1 hour after normal medication is given and the patient is eating and drinking

↓

Day prior to admission

Lantus, Abasaglar, Levemir, Tresiba, Semglee, Insulatard, Humulin I, Insuman, Toujeo are all **basal** insulins. Take 80% of usual dose. Apidra, Actrapid, Novorpid, Humulin S and Humalog are all short acting insulins. Take usual dose of short acting insulin.

Day of surgery

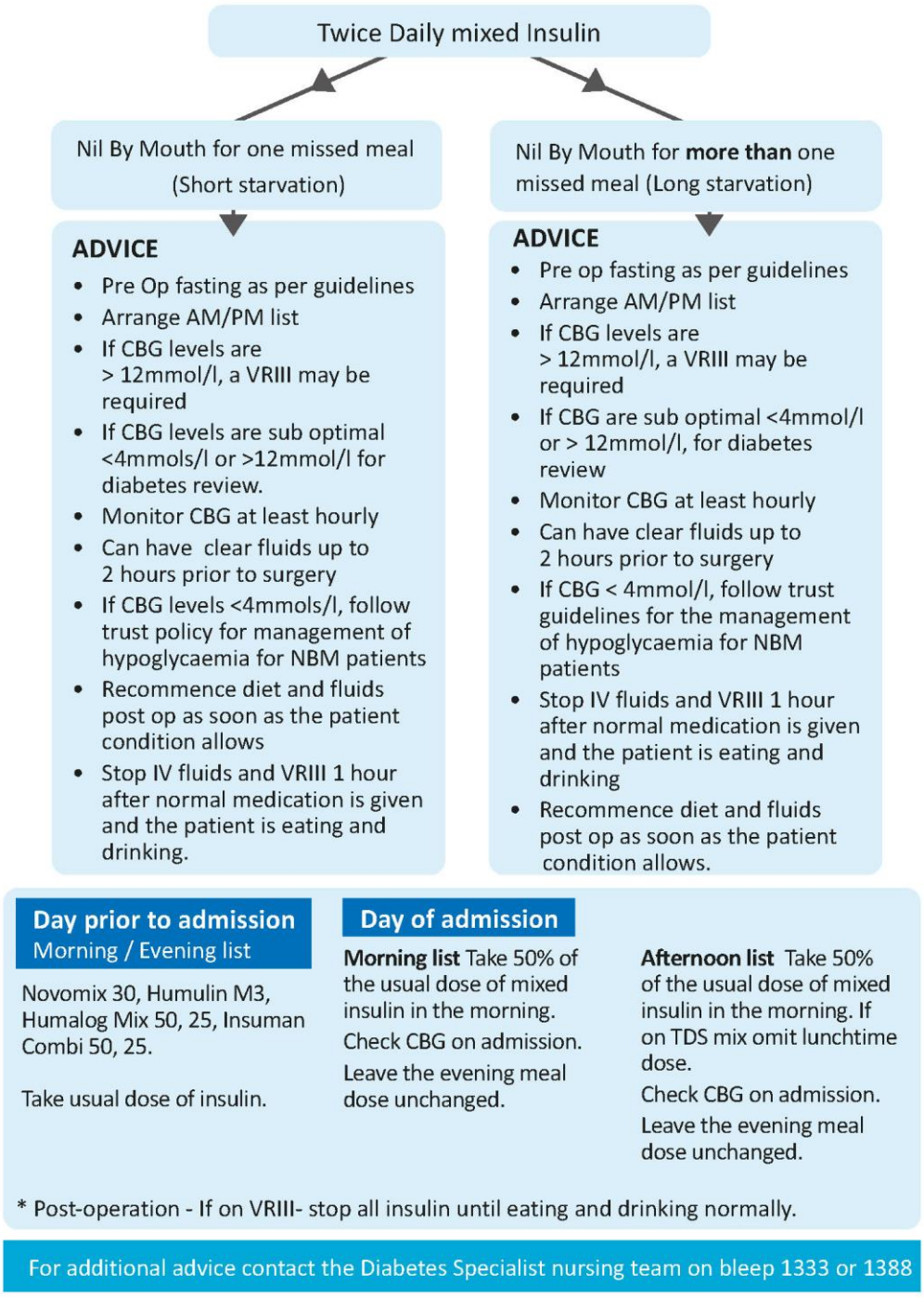
Morning list Take 80% of usual dose of **basal** insulin. Omit the morning and lunch time dose of short acting insulin. Check CBG on admission.

Afternoon list Take 80% of usual dose of basal insulin. Omit lunch time dose. Check CBG on admission.

* Post-operation - If on VRIII - stop all sub cut rapid acting insulin until eating and drinking normally.

For additional advice contact the Diabetes Specialist nursing team on bleep 1333 or 1388

APPENDIX 7 – TWICE DAILY INSULIN 1 OR MORE MISSED MEAL



APPENDIX 8 – ORAL THERAPY NO MORE THAN 1 MISSED MEAL

Oral Therapy

↓

Nil By Mouth (Short starvation period)

↓

ADVICE

- Pre op fasting as per guidelines
- Arrange 1st on AM/PM list
- Same day admission
- If CBG is sub optimal <4mmol/l - >12mmol/l, for diabetes review. (If CBG > 12mmol/l consider VRIII)
- Monitor CBG at least hourly before surgery
- Can have clear fluids up to 2 hours prior to surgery
- If CBG levels <4mmol/l, follow trust guidelines for the management of hypoglycaemia for NBM patients
- Recommence diet and fluids post op as soon as the patient condition allows
- If on VRIII, aim to give normal medication and stop VRIII, 1 hour after normal diet and fluids.

Tablets	Day prior to admission	Day of surgery	
		Patient for AM surgery	Patient for PM surgery
Acarbose	Take as normal	Omit morning dose if NBM	Give morning dose if eating
Meglitinide (repaglinide or nateglinide)	Take as normal	Omit morning dose if NBM	Give morning dose if eating
Metformin (procedure not requiring use of contrast media*)	Take as normal	Take as normal	Take as normal
Sulphonylurea (e.g Glibenclamide, Gliclazide, Glipizide, etc.)	Take as normal	Once daily AM omit Twice daily omit AM	Once daily AM omit Twice daily omit AM and PM
Pioglitazone	Take as normal	Take as normal	Take as normal
DPP IV inhibitor (e.g. Sitagliptin, Vildagliptin, Saxagliptin)	Take as normal	Omit on day of surgery	Omit on day of surgery
GLP-1 analogue (e.g. Exenatide, Liraglutide)	Take as normal	Omit on day of surgery	Omit on day of surgery

*Patients might be taking newer medications known as SGLT2 (Empagliflazin, Dapoglaflazin and Canaglaflazin) Take usual dose.

For additional advice contact the Diabetes Specialist nursing team on bleep 1333 or 1388

APPENDIX 9 – ORAL THERAPY MORE THAN 1 MISSED MEAL

Oral Therapy

Nil By Mouth (Long starvation period)

ADVICE

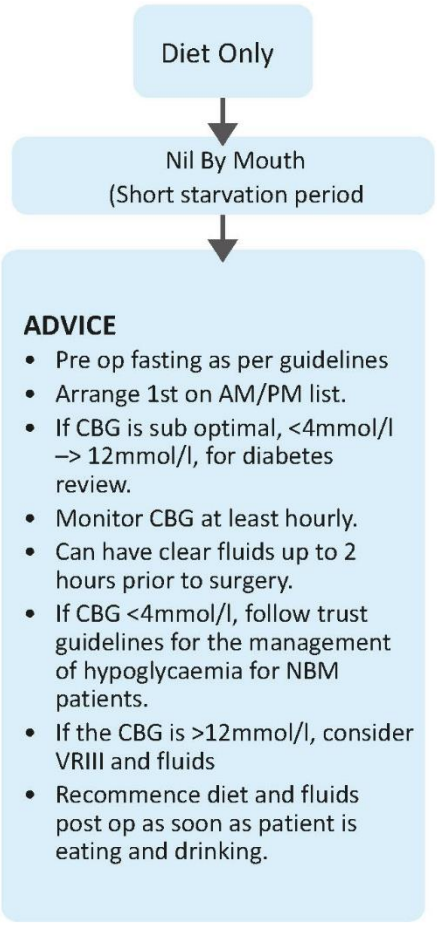
- Pre op fasting as per guidelines
- Arrange 1st on AM/PM list
- Same day admission
- If CBG is sub optimal <4mmol/l - >12mmol/l, for diabetes review
- Monitor CBG at least hourly before surgery
- Can have clear fluids up to 2 hours prior to surgery
- If CBG levels <4mmol/l, follow trust guidelines for the management of hypoglycaemia for NBM patients
- If the CBG is >12mmol/l, consider VRIII and fluids
- Stop IV fluids and VRIII 1 hour after normal medication is given and the patient is eating and drinking.

Tablets	Day prior to admission	Day of surgery	
		Patient for AM surgery	Patient for PM surgery
Acarbose	Take as normal	Omit morning dose if NBM	Give morning dose if eating
Meglitinide (repaglinide or nateglinide)	Take as normal	Omit morning dose if NBM	Give morning dose if eating
Metformin (procedure not requiring use of contrast media*)	Take as normal	Take as normal	Take as normal
Sulphonylurea (e.g Glibenclamide, Gliclazide, Glipizide, etc.)	Take as normal	Once daily AM omit Twice daily omit AM	Once daily AM omit Twice daily omit AM and PM
Pioglitazone	Take as normal	Take as normal	Take as normal
DPP IV inhibitor (e.g. Sitagliptin, Vildagliptin, Saxagliptin)	Take as normal	Omit on day of surgery	Omit on day of surgery
GLP-1 analogue (e.g. Exenatide, Liraglutide)	Take as normal	Omit on day of surgery	Omit on day of surgery

*Patients might be taking newer medications known as SGLT2 (Empaglaflazin, Dapaglaflazin and Canaglaflazin) Take usual dose.

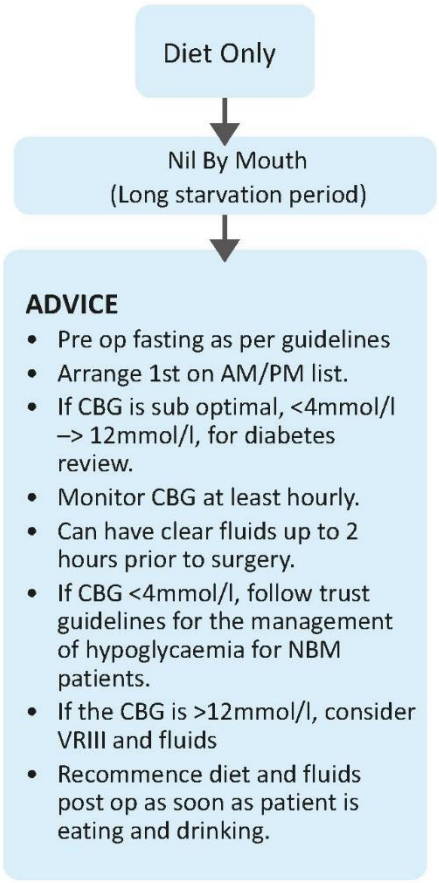
For additional advice contact the Diabetes Specialist nursing team on bleep 1333 or 1388

APPENDIX 10 – ORAL THERAPY MORE THAN 1 MISSED MEAL



For additional advice contact the Diabetes Specialist nursing team on bleep 1333 or 1388

APPENDIX 11 – DIET CONTROL LONG STARVATION PERIODS



For additional advice contact the Diabetes Specialist nursing team on bleep 1333 or 1388

APPENDIX 12 – TREATING HYPOGLYCAEMIA

Management of Hypoglycaemia

If capillary blood glucose between 4-6mmols/l and symptomatic of a low blood glucose, consider 50mls of 20% glucose IV stat. Repeat blood glucose after 10 mins.

If capillary blood glucose <4mmols/l, follow trust guidelines for NBM patients with hypoglycaemia. Repeat blood glucose after 10mins.

In patient with VRII, follow the trust guidelines for NBM patient with hypoglycaemia. Repeat blood glucose after 10 mins.

Refer to the intranet, policies and procedures, in hospital management of hypoglycaemia in adults with diabetes.

Please insert the new link - this one is out of date

Increase frequency of blood glucose monitoring until normoglycaemia is achieved. Then monitor blood glucose hourly until the patient is eating and drinking.

Persistent hypoglycaemia should be referred urgently to the diabetes team.

For additional advice contact the Diabetes Specialist nursing team on bleep 1333 or 1388

IN HOSPITAL MANAGEMENT OF HYPOGLYCAEMIA IN ADULTS WITH DIABETES

Doncaster and Bassetlaw Teaching Hospitals
NHS Foundation Trust

Hypoglycaemia is defined as a finger prick or laboratory glucose level of less than 4.0mmols/L

If patient is known diabetic and symptomatic of hypoglycaemia e.g. sweating, pallor, tremor, irritability or behavioural change
Perform Finger prick glucose & Laboratory glucose. **DO NOT DELAY TREATMENT WHILST WAITING FOR LABORATORY RESULT**

EMERGENCY TREATMENT

Chosen according to condition of patient and their prior treatment

Pt. is conscious, orientated and able to swallow

Follow Step A

STEP A
Give any of the following:
A quick acting carbohydrate drink, for example 60ml of fortijuice.
OR 150-200ml pure fruit juice e.g. orange
OR 3 dextrosol tablets (patient's own)
OR 1 Tube of glucose gel
OR 60mls Fortijuice (for enteral feeding)

Points of consideration
Treatment may need repeating after 10-15 mins if no improvement.
If blood glucose remains <4.0mmol/L after 45 mins or 3 attempts of quick acting carbohydrate, consider glucagon or IV glucose

Pt. is conscious but confused, uncooperative or disoriented and unable to tolerate oral treatment

Follow Step B or C

STEP B **GLUCAGON**
1 mg reconstituted with diluents and given IM

Cautions, Contraindications and Side effects as per B.N.F guidelines

Points of consideration
If patient is disoriented, uncooperative give Glucagon as above. Patients usually respond within 10 minutes. May be less in patients prescribed sulphonylureas, or under the influence of alcohol.
Approx. 20% patients experience nausea and vomiting post dose. If blood glucose remains <4.0mmols/L after 45 mins use IV glucose regime

Pt. is unconscious/fitting/unable to swallow

Follow Step B and C

STEP C
Check ABC. Stop any IV insulin
10% Glucose infusion 200mls given over 10 mins. Alternatively, give 20% glucose infusion 100mls stat.

Points of consideration
Response usually within 4-6 mins

ALWAYS CHECK FINGER PRICK GLUCOSE LEVELS 10-15 MINS AFTER INITIAL TREATMENT AND AT 1 HOUR

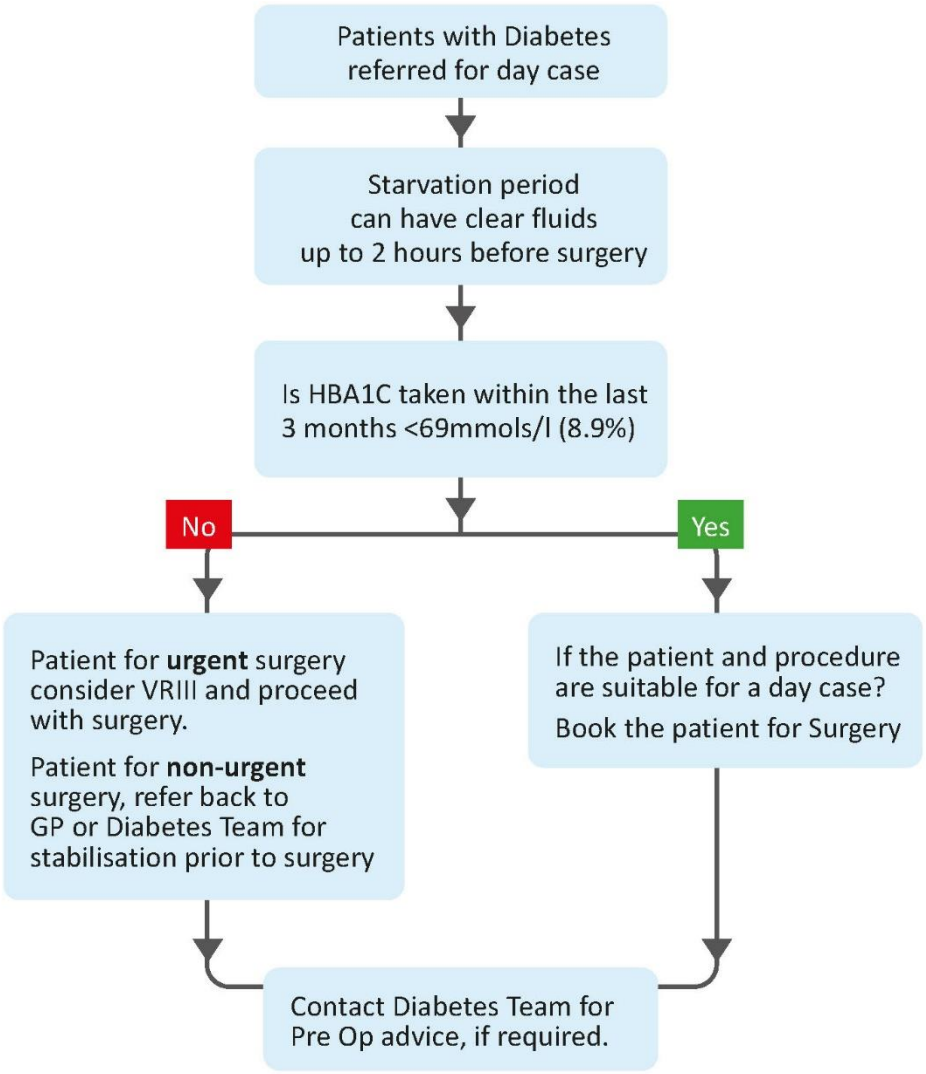
ON RECOVERY

Give longer acting carbohydrate or next meal if due e.g. Sandwich, 2 digestive biscuits, 1 slice of bread/toast, non-sugary cereals or 200-300mls glass of milk

COMPLETE HYPOGLYCAEMIA AUDIT FORM

March 2017 Review date by: March 2020

APPENDIX 13 – DIABETICS AND DAY CASE SURGERY



For additional advice contact the Diabetes Specialist nursing team on bleep 1333 or 1388

APPENDIX 14 – INSULIN PUMP PATIENTS

For patients on a continuous subcutaneous insulin CSII pump

The Diabetes team should be informed at the time of admission or routinely referred at pre assessment.

If it is a day case or no more than one missed meal, pump therapy should be continued and remain on basal rate until eating and drinking.

If there is more than one missed meal, remove pump and start VRIII.

Regular CBG testing will be necessary throughout the procedure.

Meal time boluses should recommence once the patient is eating and drinking. Discontinue the VRIII at least 30 minutes after the first mealtime bolus. At this stage check the pump is working

If hypoglycaemia occurs whilst on CSII, the pump should be stopped, and the hypo treated as per hypoglycaemia guidelines. Restart the pump once blood glucose above 4mmol/l.

Emergency Surgery

There may be no opportunity for pre-admission planning, the patient will require a VRIII.

Exposure to Magnetic Fields and Radiation

If you are going to have an X-ray, MRI, CT scan or any other type of exposure to radiation, take off the pump.
The magnetic field can make them non-functional.

APPENDIX 15 –BARIATRIC PATIENTS POST SURGICAL PROCEDURE

Patients under-going bariatric surgery are treated very differently post procedure

Type 2 Diabetes

Should stop all insulin and oral therapies. Their Diabetes is in remission and should no longer require any treatment. They are treated as diet controlled and will be reviewed by the Diabetes Consultant at a later date.

Type 1 Diabetes

Continue the basal insulin during the fasting period.

Examples: Abasaglar, Levemir, Insulatard, Humulin I, Tresiba, Semglee, Toujeo and Lantus.

For additional advice contact the Diabetes Specialist nursing team on bleep 1333 or 1388

APPENDIX 16 - EQUALITY IMPACT ASSESSMENT PART 1 INITIAL SCREENING

Service/Function/Policy/Project/Strategy	Division	Assessor (s)	New or Existing Service or Policy?	Date of Assessment
Peri-operative Management of Diabetes in Adults	Clinical Specialties/Medicines	Padma Gopal	Amended	August 2021

1) Who is responsible for this policy? Name of Division/Directorate: Department of Diabetes and Endocrinology, Specialty Services and Surgical Divisions

2) Describe the purpose of the service / function / policy / project/ strategy? Who is it intended to benefit? What are the intended outcomes? All Adult Diabetic patients undergoing surgery

3) Are there any associated objectives? Legislation, targets national expectation, standards:

4) What factors contribute or detract from achieving intended outcomes? – Awareness and training

5) Does the policy have an impact in terms of age, race, disability, gender, gender reassignment, sexual orientation, marriage/civil partnership, maternity/pregnancy and religion/belief? Details: [see Equality Impact Assessment Guidance] - Only for adult patients

- **If yes, please describe current or planned activities to address the impact** [e.g. Monitoring, consultation] –

6) Is there any scope for new measures which would promote equality? [any actions to be taken]

7) Are any of the following groups adversely affected by the policy?

Protected Characteristics	Affected?	Impact
a) Age	No	
b) Disability	No	
c) Gender	No	
d) Gender Reassignment	No	
e) Marriage/Civil Partnership	No	
f) Maternity/Pregnancy	No	
g) Race	No	
h) Religion/Belief	No	
i) Sexual Orientation	No	

8) Provide the Equality Rating of the service / function /policy / project / strategy – tick (✓) outcome box

Outcome 1 ✓	Outcome 2	Outcome 3	Outcome 4

If you have rated the policy as having an outcome of 2, 3 or 4, it is necessary to carry out a detailed assessment and complete a* **Detailed Equality Analysis form – see CORP/EMP 27.

Date for next review: **August 2024**

Checked by: **Shivani Dewan / Sue Robson** **Date: August 2021**