

Diabetes and Out-Patient Investigations: Guidelines for Procedures requiring a period of fasting or dietary restrictions

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Rationale

Metabolic stress during investigative procedures is less than during surgical procedures but still requires appropriate management to reduce the risk of adverse outcomes. In preparation for investigations there may be a need for fasting, bowel preparation, dietary restrictions (low residue diet) and fluid restrictions. The period of disruption could last from 4 hours to 3 days, depending on the nature of the investigation.

Preparation prior to an investigative procedure or test will affect normal routine and lifestyle. Alteration of eating pattern and/or lifestyle can adversely affect the management of diabetes. This is because the timing and nature of meals and medicines is different than usual resulting in higher risk of hypoglycaemia and hyperglycaemia.

In order to minimise disruption to pharmacological therapies and consequently glycaemic control, a structured, co-ordinated approach to management should be adopted. This involves consideration of the type of diabetes, pharmacological treatment, duration of starvation, use of bowel preparation and time of procedure on the day's list.

Scope of guidelines

This guidance is intended for use in the management of diabetes in people who are due to undergo elective procedures which require a period of fasting. It is aimed at medical staff and nursing staff who must communicate the person's diabetes status at time of booking the procedure with extended medical teams. This ensures good communication between teams and increased likelihood of the patient being placed on a morning list, as far as possible.

Outcome statement

The aim of co-ordinated management is to ensure that procedures are completed with minimum amount of disruption to the stability of glycaemic control and reduced risk of adverse outcomes.

Aims of management

1. To ensure correct preparation for the investigation and appropriate adjustments to diabetes treatment
2. To prevent hypoglycaemia
3. To prevent hyperglycaemia which may predispose the patient to ketoacidosis in type 1 diabetes
4. To ensure that procedures are scheduled as early as possible on daily list
5. To avoid cancellation of procedures
6. To avoid undue psychological stress to the patient
7. To return the patient as soon as possible to usual diet and medication routine so as to reduce prolongation of disruption to glycaemic control

Diet-controlled Type 2 Diabetes

Patients controlled by diet alone have sufficient endogenous insulin production to require monitoring of blood glucose levels only. Management can proceed as for a patient without diabetes.

Tablet controlled Type 2 Diabetes

Sulphonylureas (e.g. Gliclazide, Glipizide, Glimepiride, Glibenclamide) dose may require 50% reduction during bowel preparation to reduce risk of hypoglycaemia.

Omit diabetes medication on morning of procedure. Resume usual diabetes medication with food after procedure.

Insulin-treated Diabetes (Type 1 and Type 2)

Requires reduction of 30 – 50% total insulin dose prior to fast to prevent hypoglycaemia.

People with type 1 diabetes should always continue basal (long- acting) insulin as normal.

Basal insulin preparations include Lantus, Levemir, Insulatard & Humulin I.

Resume normal insulin, as prescribed, with food following procedure.

If twice daily insulin regimen is restarted at lunchtime it is recommended that half of the normal 'breakfast' insulin dose should be prescribed with lunch after procedure

Monitoring blood glucose levels

Target blood glucose levels: 6 – 10 mmols/l

Blood glucose levels should monitored be 1 – 2 hourly during the procedure to ensure that hypoglycaemia is detected early and treated promptly. Once eating and drinking, the frequency of monitoring may be reduced.

Delayed procedures

If the procedure is delayed until nearing midday, IV fluids and insulin sliding scale must be commenced for all patients treated on insulin. This ensures that the patient is well-hydrated, comfortable and reduces risk of ketoacidosis in patients with type 1 diabetes.

Hypoglycaemia pre- and during procedure

Initiate treatment for hypoglycaemia if blood glucose levels fall below 4.0 mmols/l.

See guidelines on Management of Hypoglycaemia

Common Procedures in Hospital*

Radiological	Endoscopic
Small bowel meal (12)	Oesophagogastroduodenoscopy (OGD) (6)
Barium meal +/- follow through (12)	Oesophageal dilatation (6)
Barium enema (No solid food the day prior to test) (6)	Gastroscopy (6)
Ultrasound Liver and gall bladder (6)	Endoscopic retrograde cholecystopancreatography (ERCP) (6)
CT scan of abdomen (6)	Colonoscopy (Bowel prep + 6 hours fast)
CT pneumocolon (Bowel prep + 6 hours fast)	Endoscopic ultrasound (6)
Cardiac angiography +/- Stenting (4)	Flexisigmoidoscopy (Bowel prep + 6 hours fast)
Cardiac ablation (4)	Breath test (12)
Magnetic resonance cholecystopancreatography (MRCP) (4)	Oesophageal manometry (12)
MR scan gallbladder (4)	Capsule endoscopy (Low residue diet + 12 hrs)
Ultrasound upper and lower abdomen (4)	Bronchoscopy +/- Lung biopsy (4)
CT abdomen and pelvis (4)	
Coronary angiogram/catheterisation (2)	
Transoesophageal echocardiogram (TOE) (6)	
Cardioversion (6)	
Cardiac ablation (4)	
Renal angiogram (4 – 6)	
IV Urogram (4)	
Liver biopsy (4)	
IV Cholangiogram (6)	
Pacemaker insertion (4)	
PFO closures (6)	
Mitral clips (6)	
Transcatheter Aortic Valve Implantation TAVI (6)	

***This list is not exhaustive but merely aims to highlight the more common tests and procedures**

Number in parentheses denote recommended period of fasting

Investigations requiring starvation (fasting)

Type of diabetes	Morning List	Afternoon List
Diet-controlled	<p>Usual diet to be eaten the day before.</p> <p>Fast begins at 24:00 hrs – may have water.</p> <p>Nil by mouth after 7:00 hrs.</p> <p>Resume diet post-procedure.</p>	<p>Light breakfast on the morning of procedure.</p> <p>Fast begins after breakfast.</p> <p>Resume normal diet post-procedure.</p>
Tablet –controlled	<p>Usual diet and tablets to be eaten the day before.</p> <p>Fast begins at 24:00 hrs.</p> <p>Omit morning tablets to reduce risk of hypoglycaemia during the procedure.</p> <p>Resume regular oral agents post-procedure once eating and drinking.</p>	<p>Usual diet to be eaten the day before.</p> <p>Take morning tablets with breakfast</p> <p>Fast begins after breakfast</p> <p>Omit midday/ lunch tablets to reduce risk of hypoglycaemia during the procedure.</p> <p>Resume regular oral agents and diet post-procedure.</p>
<p>Insulin-treated:</p> <p>Type 1</p> <p>Type2</p> <p>OHAs = Oral hypoglycaemic agents</p> <p>NB. Basal insulins include:</p> <p style="padding-left: 20px;">Lantus</p> <p style="padding-left: 20px;">Levemir</p> <p style="padding-left: 20px;">Insulatard</p> <p style="padding-left: 20px;">Humulin I</p> <p>Must <u>never</u> be omitted in the patient with Type 1 diabetes.</p> <p>Short-acting insulins include:</p> <p style="padding-left: 20px;">Humalog</p> <p style="padding-left: 20px;">Novorapid</p> <p style="padding-left: 20px;">Humulin S</p> <p style="padding-left: 20px;">Actrapid</p>	<p>Fast begins at 24:00 hrs.</p> <p>Omit morning insulin.</p> <p>Once eating and drinking:</p> <p style="text-align: center;">Once daily insulin+/- OHAs</p> <p>Give 2/3 morning dose of insulin if before midday.</p> <p style="text-align: center;">OR</p> <p>Give 1/3 dose of insulin if after midday.</p> <p style="text-align: center;">Twice daily insulin</p> <p>Give 2/3 morning dose of insulin if before midday.</p> <p style="text-align: center;">OR</p> <p>Give 1/3 morning dose of insulin if after midday.</p> <p>Give regular insulin with evening meal.</p> <p style="text-align: center;">Basal-bolus regime</p> <p>Omit morning dose of short-acting insulin but continue with same dose of long-acting insulin either the night before or on the morning of the procedure.</p> <p>Once eating and drinking resume next dose of short-acting insulin post-procedure.</p>	<p>Fast begins after a light breakfast.</p> <p style="text-align: center;">Once daily insulin+/- OHAs</p> <p>Give ½ dose morning insulin with breakfast.</p> <p>Fast commences after breakfast.</p> <p style="text-align: center;">Twice daily insulin</p> <p>Give ½ dose morning insulin with breakfast.</p> <p>Fast commences after breakfast.</p> <p>Resume regular treatment post-procedure with evening meal.</p> <p style="text-align: center;">Basal-bolus regime</p> <p>Give short-acting insulin with breakfast and continue with long-acting insulin as per normal regime.</p> <p>Omit lunchtime dose of short-acting insulin.</p> <p>Once eating and drinking resume next dose of short-acting insulin post-procedure.</p>

Investigations requiring purgatives/low residue diet

2 days before procedure – Low residue diet
 1 day before procedure – Low residue breakfast
 Bowel prep to commence @ 12:00 hrs
 Clear fluids all day

Day of procedure

Type of diabetes	Morning List	Afternoon List
Diet-controlled	Prepare as for patient without diabetes	Prepare as for patient without diabetes
Tablet -controlled	Usual tablets to be taken the day before. Fast begins at 24:00 hrs. Omit morning tablets on day of procedure. Resume regular oral agents once eating and drinking.	Clear fluids on the morning of the procedure. Give morning tablets Fast begins at 7:00 hrs. Omit any tablets at lunchtime to reduce risk of hypoglycaemia during the procedure. Resume regular oral agents once eating and drinking
<p>Insulin-treated: Type 1 Type2 OHAs = Oral hypoglycaemic agents NB. Basal insulins include: Lantus Levemir Insulatard Humulin I Must <u>never</u> be omitted in the patient with Type 1 diabetes.</p> <p>Short-acting insulins include: Humalog Novorapid Humulin S Actrapid</p>	<p>Continue on same dose of insulin on the day before the procedure and whilst on low residue diet.</p> <p style="text-align: center;">Once daily insulin +/- OHAs</p> <p>Omit dose of insulin and OHAs on day of procedure.</p> <p style="text-align: center;">Twice daily insulin</p> <p>Omit morning insulin on the day of the procedure. Give 2/3 morning dose of insulin if eating and drinking <u>before</u> midday. Give 1/3 morning dose of insulin if eating and drinking <u>after</u> midday.</p> <p style="text-align: center;">Basal-bolus regime</p> <p>Continue on normal insulin regime on the day before procedure and whilst on low residue diet. Fast begins at 24:00 hrs On the morning of the procedure, omit short-acting insulin but continue on long-acting insulin which is either taken the night before or in the morning. Once eating and drinking, give normal dose of short-acting insulin.</p>	<p>Continue on same dose of insulin on the day before the procedure and whilst on low residue diet.</p> <p style="text-align: center;">Once daily insulin +/- OHAs</p> <p>Take ½ dose of insulin on day of procedure. Omit OHAs.</p> <p style="text-align: center;">Twice daily insulin</p> <p>Give ½ morning dose of insulin with clear fluids containing calories. Fast begins after 7:00 hrs After procedure, give normal dose of insulin with evening meal.</p> <p style="text-align: center;">Basal-bolus regime</p> <p>Continue on normal insulin regime on the day before procedure and whilst on low residue diet. Continue on clear fluids and bowel prep. Fast begins at 7:00 hrs. On the morning of the procedure, give short-acting insulin and continue on long-acting insulin which is either taken the night before or in the morning Omit lunchtime dose of short-acting insulin. Resume normal doses of afternoon insulin once eating and drinking.</p>

Radiological procedures requiring intravenous contrast

Intravenous contrast may compromise renal function. People with diabetes and established nephropathy are at risk of acute exacerbation of renal function. Contrast-induced renal impairment must be avoided and renal function should be monitored before and after the procedure.

Metformin must be stopped for 48 hours before contrast-enhanced procedure. Renal function should be monitored 48 hours post-procedure and metformin-containing tablets to be resumed only if creatinine is < 150 mmols/l.

See guidelines on IV contrast.

Discharge

It is essential that the patient is warned of the possibility of delayed hypoglycaemia. Revise treatment of hypoglycaemia with patient prior to discharge:

If symptomatic (dizzy, sweaty, shaky), take fast-acting sugar eg. 2 - 3 teaspoons of sugar, 4 glucose tablets or 1/2 glass of Lucozade. This should be followed by a starchy snack within 10 minutes. Patients should also be advised to test more frequently in the subsequent 24 hours.

Admin Info**6) IMPLEMENTATION**

Training required for staff	No
If yes, who will provide training	
When will training be provided?	
Date for implementation of guideline	

7) MONITORING / AUDIT

When will this guideline be audited?	1/1/2011
Who will be responsible for auditing this guideline?	Dr. Jonathan Valabhji, Clinical Lead, Diabetes
Are there any other specific recommendations for audit?	

8) REVIEW

When will this guideline be reviewed?	June 2013 Nick Oliver
Please indicate frequency of review: As a guide: <ul style="list-style-type: none"> • Drug related guidance should be reviewed every 2 years • Therapy related guidance should be reviewed every 5 years • Clinical treatment guidance should be reviewed every 3 – 5 years 	3 yearly
Date of next review	June 2013

10) GUIDELINE DETAIL

Start Date: (date of final approval by CPG)		
Dates approved by:	Divisional Guidelines Group (if applicable)	
	CPG1 Guidelines Committee	

Have all relevant stakeholders (Trust sites, CPGs and departments) been included in the development of this guideline?	<p>Imperial College Healthcare NHS Trust Diabetes Team</p> <p>Professor D Johnston Dr A Dornhorst Dr J Valabhji Dr E Hatfield Dr N Martin Dr T Tan Dr D Gable Dr M Yee Dr N Oliver</p> <p>Sarah Allen Carol Jairam Mary Joyce Barbara Muzenda Clare Poulter Jo Reed Carmel Ryan Anna Sackey Inez Walkes</p> <p>Sarah Menezes Nicola Bandaranayake Louisa Fearnley</p>
Who will you be notifying of the existence of this guidance?	Please give names/depts
Related documents:	If applicable
Author/further information:	Nick Oliver / Carol Jairam Diabetes Dept CPG1 – Medicine St. Mary's Hospital 0203 312 1073
Document review history:	If applicable – version number; dates of previous reviews
Next review due	
THIS GUIDELINE REPLACES:	New

11) INTRANET HOUSEKEEPING

Key words	Diabetes, Endoscopy, Colonoscopy, out-patient investigations
Which CPG does this belong to?	Medicine
Which subdivision of the guidelines spine should this belong to?	Diabetes and Endocrinology
Title for the intranet if different from the document (<i>please note that documents sit alphabetically so should not start with "guideline for..."</i>)	Diabetes and Out Patient Investigations