



DAY SURGERY & THE DIABETIC PATIENT

**GUIDELINES FOR THE ASSESSMENT
AND MANAGEMENT OF DIABETES
IN DAY SURGERY PATIENTS**



Day Surgery & the Diabetic Patient

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Published: September 2004

Printed by: Colman Print, Norwich

1. Introduction

Diabetes is a common endocrine disease affecting at least one hundred million people worldwide, including 2-3% of the British population. In the surgical population however this figure may be even higher as diabetes is both a coincidental disease and is also associated with end organ damage, which may require surgical intervention.

Diabetic patients have historically been excluded from day surgery because of concerns about perioperative blood glucose control especially during the period of pre-operative starvation. After surgery, unpredictable return to feeding and the possibility of nausea and vomiting can potentially destabilize the diabetic patient. So what has changed?

- Modern day surgery anaesthesia is associated with faster recovery so that oral intake is usually rapidly re-established.
- Post-operative emetic symptoms are now uncommon.
- More patients are able to monitor their own blood sugar and take an active part in managing their own diabetes.

These considerations mean that many diabetic patients can now be treated safely on a day case basis.

The purpose of this booklet is to provide an up-to-date summary of current diabetes treatment, and to describe the practical preoperative assessment and peri-operative management of diabetic patients having day surgery. It is intended for medical and nursing staff working in day surgery and has been written by a working party experienced in the management of diabetic patients.

2. Current trends in diabetes management

There are two main forms of diabetes. Type 1 generally presents before the age of 30 years and is due to autoimmune destruction of the insulin-producing pancreatic beta cells. Treatment is invariably by regular insulin injections. Type 2 diabetes usually presents in middle age or in the elderly and is often of slow onset. Type 2 diabetes is more common, representing about 80% of cases in most European countries and North America. About 80% of type 2 diabetic patients are obese. Insulin secretion may be preserved but there is resistance to its action on target organs. Treatment may initially involve modification of the patient's diet or administration of oral hypoglycaemic agents. The proportion of type 2 diabetic patients requiring insulin therapy increases with length of time from diagnosis. Diabetes may also occur as a temporary manifestation during conditions such as pregnancy, pancreatic disease, steroid therapy and a variety of metabolic diseases. It is now widely recognised that for all patients with diabetes, poor glycaemic control is directly associated with an increased risk of serious complications^{1,2} (see table 1).

For type 2 diabetic patients, oral hypoglycaemic agents are the most common form of therapy. There are several classes of these drugs and they may be used in combination. In addition, it has become more popular in recent years to treat type 2 patients with insulin in addition to or instead of tablets, in order to achieve better blood glucose control. The types of oral hypoglycaemic agents are listed below.

Sulphonylureas: (gliclazide, glimepiride, glipizide, tolbutamide) Act by increasing insulin release from the pancreas. They all have the potential to cause hypoglycaemia, especially in the first few months of treatment, although this is relatively uncommon.

Metformin: Acts by reducing insulin resistance. There is a theoretical possibility of lactic acidosis in patients with renal impairment and product literature recommends the substitution of insulin for metformin 2 days before elective surgery. However, a straw poll at a recent British Association of Day Surgery meeting (June 2003) suggests that in practice, most day surgery units are not asking patients to stop taking their metformin other than on the morning of surgery.

Thiazolidinediones: (also known as 'glitazones': rosiglitazone, pioglitazone). Act by decreasing insulin resistance and are now licensed for monotherapy in addition to combination therapy with either metformin or sulphonylureas.

Acarbose: Acts by slowing digestion and absorption of carbohydrate from the intestine.
Repaglinide, nateglinide: like sulphonylureas, act by stimulating release of insulin from the pancreas.

For type 1 diabetic patients and insulin treated type 2 patients, there are several options. One of the most common insulin treatment plans involves twice daily injections of short and intermediate acting insulin. However, better and more flexible control can usually be achieved with repeated injections of short acting insulin with meals, and a single injection of intermediate or long acting insulin at night.

Day surgery staff should be aware of the new long acting insulin analogue, insulin glargine, which is given as a single injection once daily. Insulin glargine is released from the injection site at a relatively constant rate. It is usually used in combination with a rapid acting insulin which is given before each meal. This strategy is popular among young and well-motivated patients because of the flexibility it offers, and has been recommended by NICE as an option for type 1 diabetic patients. Insulin glargine may also be used once daily in addition to oral hypoglycaemic agents in type 2 diabetes.

3. Pre-operative assessment

Nurse based pre-assessment in day surgery units throughout the United Kingdom is now well established and should be quite possible for diabetic patients. When considering the diabetic patient for day surgery it is essential to determine:

Type of diabetes (Type 1 or 2)

Stability of the disease

The patient's understanding of their diabetes and its management

Surgical procedure (minor, intermediate)

Type of anaesthesia (local, regional, general)

Diabetic complications

Type of Diabetes

Type 1 diabetic patients are more difficult to manage in the peri-operative period than Type 2 patients and are more liable to unplanned overnight admission. Stability of the disease in the months before surgery is central to the success of the admission, especially in the Type 1 patient.

Stability of the Disease

Pre-operative assessment provides an opportunity to assess the general medical condition of the patient. All diabetic patients should now have an annual review, but the majority of these will be carried out in primary care. This review would normally include assessment of microvascular and macrovascular complications, blood pressure, glycosylated haemoglobin (HbA1c) and cholesterol. It may be possible (and avoid duplication of effort) to obtain such information from the patient's general practitioner. Good stable control of blood glucose not only makes for easier management on the day of surgery, but is also associated with improved wound healing and reduced risk of post-operative wound infection. A stable diabetic history in the three months before surgery is mandatory before elective day case admission is undertaken.

Random blood glucose estimation is **useless** in assessing suitability for day surgery and should only be performed on the day of admission to help guide peri-operative management.

The stability of the diabetic patient can be assessed by the patient's self-monitored blood glucose profiles in the preceding few months, unplanned hospital admissions, changes in medication, hypoglycaemic attacks and by HbA1c estimation. This latter measurement is a reflection of the integrated blood glucose control over the preceding two to three months with extra weighting for the one month preceding sampling.

The reference range of HbA1c in non-diabetic subjects is about 4 to 6%. Most laboratories are now DCCT (Diabetes Control and Complications Trial) aligned and values obtained from different laboratories should therefore be broadly comparable. An HbA1c result of less than about 8% suggests that the patient will be suitable for day surgery. In general, a patient with an HbA1c estimate above 8% will be unsuitable for day surgery because results above this level tend to be associated with a higher fasting blood glucose on the day of surgery, making peri-operative blood glucose control more difficult to manage. An HbA1c result of over 9% suggests that review of diabetic management is needed **before any elective surgery is carried out**³, and the patient should be referred to their diabetes clinic or GP. In the case of non-urgent surgery, there may be time to improve diabetic control and reassess for day surgery at a later date (rather than simply listing the patient for inpatient surgery). It is worth including so-called 'diet controlled' diabetic patients in this assessment process as some will prove to have poorly controlled blood glucose and will benefit from treatment before their operation.

The patient's understanding of their diabetes and its management

Starvation prior to surgery may lead to hypoglycaemia. Susceptible patients include those treated with insulin or sulphonylureas. In addition, post-operative nausea and vomiting are difficult to prevent completely, may occur only after the patient has been discharged home, and may be associated with disturbed glycaemic control (hypo or hyperglycaemia). For all of these reasons, it is important to ensure that

- The patient and their carer are able to measure blood glucose at home, and understand that extra vigilance will be required for a few days after surgery, especially if oral intake is poor.
- The patient and their carer understand about hypoglycaemia and can treat appropriately

For patients who do not have this knowledge, referral to primary care or the hospital diabetes clinic for some pre-admission education and preparation is necessary. Day surgery practitioners will need to establish links with key individuals in the hospital diabetes team and in the community if this is to be successful. We have found diabetes specialist nurses and practice nurses very helpful in preparing such patients for surgery.

Surgical Procedure

Most minor and intermediate surgical procedures such as those listed in the Audit Commission's basket of procedures (Appendix I) can be safely undertaken in adult diabetic patients with the possible exception of laparoscopic cholecystectomy (because of the higher risk of postoperative nausea and vomiting). More major procedures suitable for the day surgery unit may however be totally unsuitable for the diabetic patient due to the associated risks of postoperative nausea and vomiting resulting in difficulty in recommencing the patient's normal drug and diet regimen. Therefore while it is possible to perform operations listed in the BADS trolley (Appendix II), such interventions should only be undertaken if the day surgery team is experienced and confident in the management of the diabetic patient. Furthermore, such interventions are exceedingly labour intensive for both medical and nursing staff and may be considered an inappropriate use of scarce resources.

Type of Anaesthesia

Wherever possible the patient should be managed with local anaesthesia as this may remove the need for the patient to starve pre-operatively. Avoidance of general anaesthesia can also help to reduce post-operative nausea and vomiting. Where general anaesthesia is employed, careful technique aimed at reducing post-operative emesis is essential.

Diabetic Complications

Diabetes may present with glycosuria or abnormal random blood glucose but may also present with one or more diabetic complications (table 1).

Table 1. Complications of Diabetes

Ketoacidosis	Retinopathy
Nephropathy	Peripheral neuropathy
Autonomic neuropathy	Hyperlipidaemia
Peripheral Vascular Disease	Cerebrovascular disease
Ischaemic heart disease	Hypertension

A medical assessment of any complications of the patient's diabetes is essential before considering surgery. Intractable problems with blood pressure, coronary heart disease, nephropathy or autonomic neuropathy may preclude admission for a day surgical procedure.

Practical Pre- admission Assessment

One of the easiest ways to assess the patient's suitability for day surgery is to produce a checklist which identifies the additional questions required for the diabetic patient (table 2).

Table 2. Pre-Operative Checklist For All Diabetic Patients

All usual selection criteria for day surgery met
Intermediate surgery can be scheduled for a morning list
Patient has no history of
Repeated hypoglycaemic attacks
Recurrent admission to hospital with complications related to diabetes
Patient and carer are able to measure blood glucose at home
Patient and carer understand about hypoglycaemia and its treatment
HbA1c < 8%

4. Peri-operative management of the diabetic patient

Three key principles for management of the diabetic patient were identified by Natof⁴ (1991):

1. Diabetic medication should be omitted on the morning of surgery.
2. The procedure should be scheduled as early as possible on the list, preferably first.
3. Aim to return the patient as soon as possible to usual diet and medication routine.

In day surgery, the aim is to manage the diabetes according to safe and simple protocols. It is a great advantage if the protocol can be managed by the day surgery nurses alone and largely without medical input. For these reasons, this booklet describes the use of the glucose/potassium/insulin (GKI) infusion where necessary, and not the use of separate glucose drip and insulin infusion. It is desirable that at least some day unit staff are able to cannulate so that the GKI infusion (if required) can be started without delay. We have also found that, where the use of an infusion is anticipated, it can be helpful for the patient to be second, rather than first on the operating list as this allows more time to set up the infusion without delaying the start of the list.

Irrespective of the type of diabetes or the therapy, patients with an HbA1c of less than 8% are likely to arrive on the day of surgery with a fasting blood glucose of less than 10mmol/l. This makes peri-operative blood glucose control much more straightforward. Indeed, any diabetic patient with a pre-assessment HbA1c of less than 8% and arriving with fasting blood glucose significantly higher than 13mmol/l should be checked for the likely cause of the hyperglycaemia (infections and non-compliance with starvation instructions are the most likely explanations). Consideration should be given to postponing the surgery in such cases.

Minor procedures

For the purposes of this booklet, a minor surgical procedure is defined as one where the patient is expected to resume oral intake within an hour or so of surgery. We anticipate that many day surgery units will wish to limit their management of diabetic patients to those in this category.

The term ‘minor’ therefore includes many procedures performed under a short general anaesthetic⁵. Longer procedures under regional anaesthesia can also be regarded as minor because 1st stage recovery will usually be bypassed and the patient returned directly to the ward area for refreshments.

All of these patients can be managed by simply postponing their usual diabetic treatment (insulin or oral hypoglycaemic drugs) until they take a delayed meal after surgery. Obviously it is important that these patients are treated first on the operating list and that blood glucose is monitored closely. Vigilance is necessary to avoid the risk of hypoglycaemia caused by the delayed action of insulin or oral hypoglycaemic agents taken on the day before surgery or on the morning of surgery in the case of afternoon operations. In cases where hypoglycaemia occurs or seems likely, a simple glucose infusion will suffice until the patient is back to eating post-operatively. It goes without saying that it is vitally important to avoid hypoglycaemia under general anaesthesia.

For management flowcharts see appendix III, flowcharts 1 and 2 and corresponding patient information.

Intermediate procedures

For patients undergoing longer and more complex day surgery, more detailed management is required. The authors suggest that when intermediate surgery is planned, diabetic patients **are only accepted for morning day surgery lists**. This allows for a period of observation during the afternoon to ensure that the patient’s blood glucose is stable and that oral intake is properly established before discharge.

Type 2 diabetic patients treated with oral hypoglycaemic drugs

These patients will be admitted to the unit in the morning, starved and having omitted their morning dose of oral hypoglycaemic tablets.

Patients with fasting blood glucose of less than 10mmol/l can safely be monitored.

Those who arrive with a higher fasting sugar should be managed with a GKI infusion. For management flowchart see appendix III, flowchart 3 and corresponding patient information.

Type 1 and insulin treated type 2 diabetic patients

Management of these patients can be more complicated and more likely to require the help and guidance of an interested anaesthetist. We suggest that day surgery units only accept these patients for intermediate surgery if they have access to such assistance.

These patients will all need a GKI infusion until they are ready for a meal after surgery.

For management flowcharts see appendix III, flowcharts 4 and 5 and corresponding patient information.

5. Discharge

At the time of discharge, regardless of the type of diabetes, the patient must fulfill the agreed criteria. It is *essential* that the patient be warned of the possibilities of hyperglycaemia and of delayed hypoglycaemia. The latter is more common if the patient has taken their hypoglycaemic medication significantly later than usual on the day of surgery and patients should be warned that additional carbohydrate might be required the morning after surgery. Since the criteria for admission to day surgery include the ability to be able to measure blood glucose at home, patients can be instructed to carry out extra blood tests on the day of surgery and the on the following day. A 24-hour telephone help-line number should be mandatory rather than optional for all diabetic patients who have day surgery. Most day surgery staff will not have the expertise to deal with diabetic queries by telephone but day units may be able to obtain post-discharge advice for their patients from diabetes specialist nurses.

6. Conclusions

The diabetic patient can be treated as a day case but the resource implications for running a diabetic day surgery program are substantial. It is essential that each patient be individually assessed to establish their stability, motivation towards their diabetic control and willingness to be treated as a day case.

Diabetic patients in day surgery are best managed by a dedicated team, which reviews its protocols regularly. Admitting the occasional diabetic patient to the day unit may not be the best or safest practice. Each unit must decide whether diabetic patients are to be treated as day cases and it is essential that resource implications (staff training, medical support and suitable infusion devices) be considered before these patients are accepted for day surgery.

7. References

1. DCCT Research Group.
The effect of intensive diabetes treatment on the development and progression of long-term complications in insulin-dependent diabetes mellitus: The Diabetes Control and Complications Trial.
N Engl J Med 1993; 329: 978-86
2. UK Prospective Diabetes Study Group.
Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes. (UKPDS33)
The Lancet 1998; 352: 837-853
3. European Diabetes Policy Group 1998-1999.
Guidelines for Diabetes Care: A desktop guide to type 2 diabetes mellitus.
4. Natof, H. et al (1991) in Anaesthesia for Ambulatory Surgery 437 - 474.
Lippincott
5. King T A, Bending J J and Higgins T M (2001).
Journal One Day Surgery, 11(1), 18-19

Appendix I

The Audit Commission "Basket 2000"

1. Orchidopexy
2. Circumcision
3. Inguinal hernia repair
4. Excision of breast lump
5. Anal fissure dilation or excision
6. Haemorrhoidectomy
7. Laparoscopic cholecystectomy
8. Varicose vein stripping or ligation
9. Transurethral resection of bladder tumour
10. Excision of Dupuytren's contracture
11. Carpal tunnel decompression
12. Excision of ganglion
13. Arthroscopy
14. Bunion operation
15. Removal of metalwork
16. Extraction of cataract with/without implant
17. Correction of squint
18. Myringotomy
19. Tonsillectomy
20. Sub-mucous resection
21. Reduction of nasal fracture
22. Operation for bat ears
23. Dilation and curettage / hysteroscopy
24. Laparoscopy
25. Termination of pregnancy

Appendix II

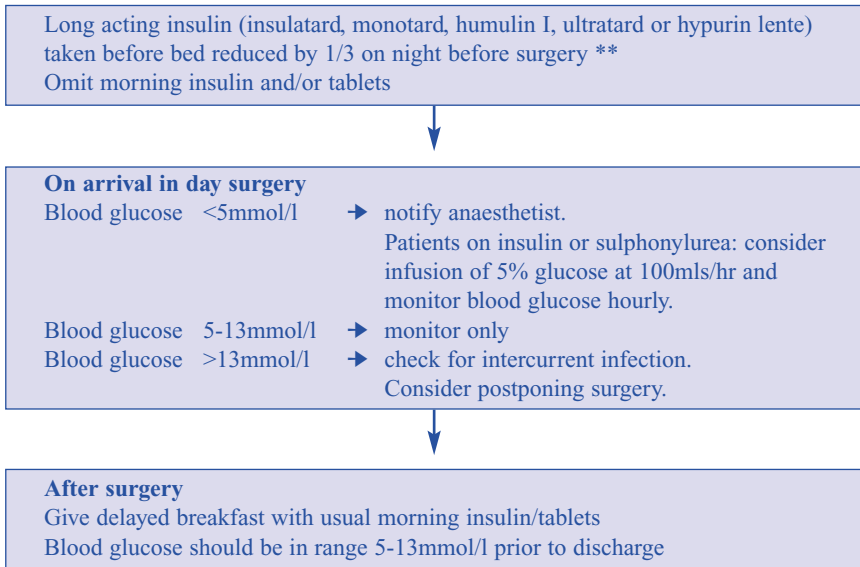
Maintaining the supermarket analogy, the British Association of Day Surgery proposed a "trolley" of procedures that are suitable for day surgery in some patients. Those not in the Audit Commission's revised 2000 basket are:

1. Laparoscopic hernia repair
2. Thoracoscopic sympathectomy
3. Submandibular gland excision
4. Partial thyroidectomy
5. Superficial parotidectomy
6. Wide excision of breast lump with axillary clearance
7. Urethrotomy
8. Bladder neck incision
9. Laser prostatectomy
10. Trans-cervical resection of endometrium (TCRE)
11. Eyelid surgery
12. Arthroscopic meniscectomy
13. Arthroscopic shoulder decompression
14. Subcutaneous mastectomy
15. Rhinoplasty
16. Dento-alveolar surgery
17. Tympanoplasty

Appendix III

Flowcharts for the management of diabetic patients in day surgery and pre-operative patient information

Flowchart 1. Minor surgery in the morning



**Insulin glargine

There is limited experience of perioperative management of patients taking insulin glargine. Insulin glargine is a type of long acting insulin. However, perioperative management of patients on insulin glargine has been successful *without* the perioperative dose reduction suggested above. Close monitoring is suggested whilst more experience is accumulated.

Patient Information 1.

Instructions for Diabetic Patients having morning operations

The day before your operation

- Eat and drink normally and take your usual tablets or insulin during the day. *However*, if you normally have 3 or 4 injections of insulin per day *and also an injection before bed*, reduce the dose of your bedtime injection by one third i.e. if you normally take 12 units, reduce this to 8 units)
- Do not eat or drink anything from midnight except for water until 6 a.m.

The day of your operation

- Aim to arrive at the hospital at 8 a.m
- Do not have your diabetes tablets or any insulin or any breakfast. Measure your blood sugar at home.
- Have a sugar-containing drink (e.g. Lucozade) available, and bring it with you on the way to hospital.
- If your blood sugar is less than 4, drink half a cup of the drink even if you have no symptoms to suggest that your sugar is low. Tell the staff you have done so when you arrive.
- If you feel faint or dizzy and think your sugar level is low or you are having a “hypo”, drink half a cup of this drink and tell the staff you have done so when you arrive.
- Please bring your tablets and your insulin with you.

Being in Hospital

- When you arrive, your sugar level will be checked. If it is above 13 and/or you have an infection, your operation will have to be postponed and you will be allowed home.
- If it is below 13, the staff will explain how your diabetes will be managed. Please feel free to ask any questions

After your operation

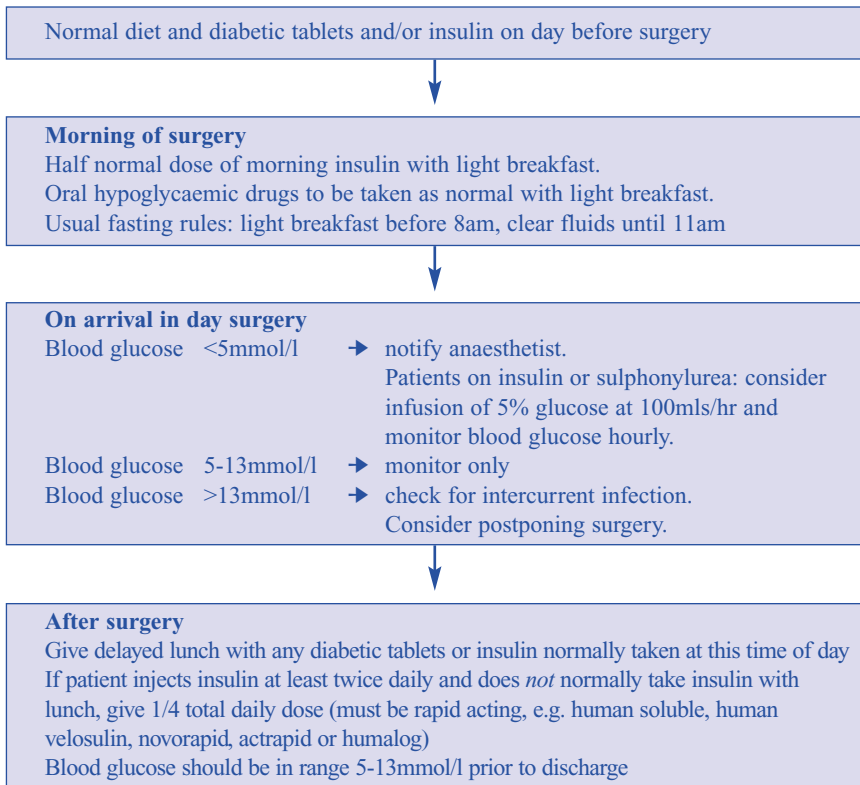
- After surgery, you will have your sugar checked again and be given your late breakfast together with your usual morning diabetic tablets or insulin. Your blood sugar level will be checked again after you have eaten. Provided this is satisfactory, you will be able to go home.
- If you cannot eat and drink without feeling sick, you will need to stay for longer and possibly overnight.

When you get back home

- Check your blood sugar at home during the afternoon. You may find that the results are a little higher or lower than usual and this will normally settle down over the next day or two.
- We expect that you will be able to eat and drink normally after you get home and take your usual diabetes tablets or insulin. If you are unable to do this you should contact the day surgery unit.

Please ring: Day Surgery Unit (8 a.m. to 8 p.m. daytime every day) or Helpline number (on the first night after your operation only from 8 p.m to 8 a.m)

Flowchart 2. Minor surgery in the afternoon



Patient Information 2.

Instructions for Diabetic Patients having afternoon operations

The day before your operation

- Eat and drink normally and take your usual tablets or insulin during the day.

The day of your operation

- If you are on tablets for your diabetes, take your usual morning tablets with your breakfast. If you are on insulin, *take only half of your usual morning dose of insulin* with your breakfast i.e. if you usually take 24 units of insulin then you should reduce to 12 units.
- Finish your breakfast by 8am. You may not have anything else to eat but you may continue to drink water until 11am.

- Have a sugar-containing drink (e.g. Lucozade) available, and bring it with you on the way to hospital.
- If your blood sugar is less than 4, drink half a cup of the drink even if you have no symptoms to suggest that your sugar is low. Tell the staff you have done so when you arrive.
- If you feel faint or dizzy and think your sugar level is low or you are having a “hypo”, drink half a cup of this drink and tell the staff you have done so when you arrive.
- Please bring your tablets and your insulin with you.

Being in hospital

- When you arrive, your sugar level will be checked. If it is above 13 and/ or you have an infection, your operation will have to be postponed and you will be allowed home.
- If it is below 13, the staff will explain how your diabetes will be managed. Please feel free to ask any questions

After your operation

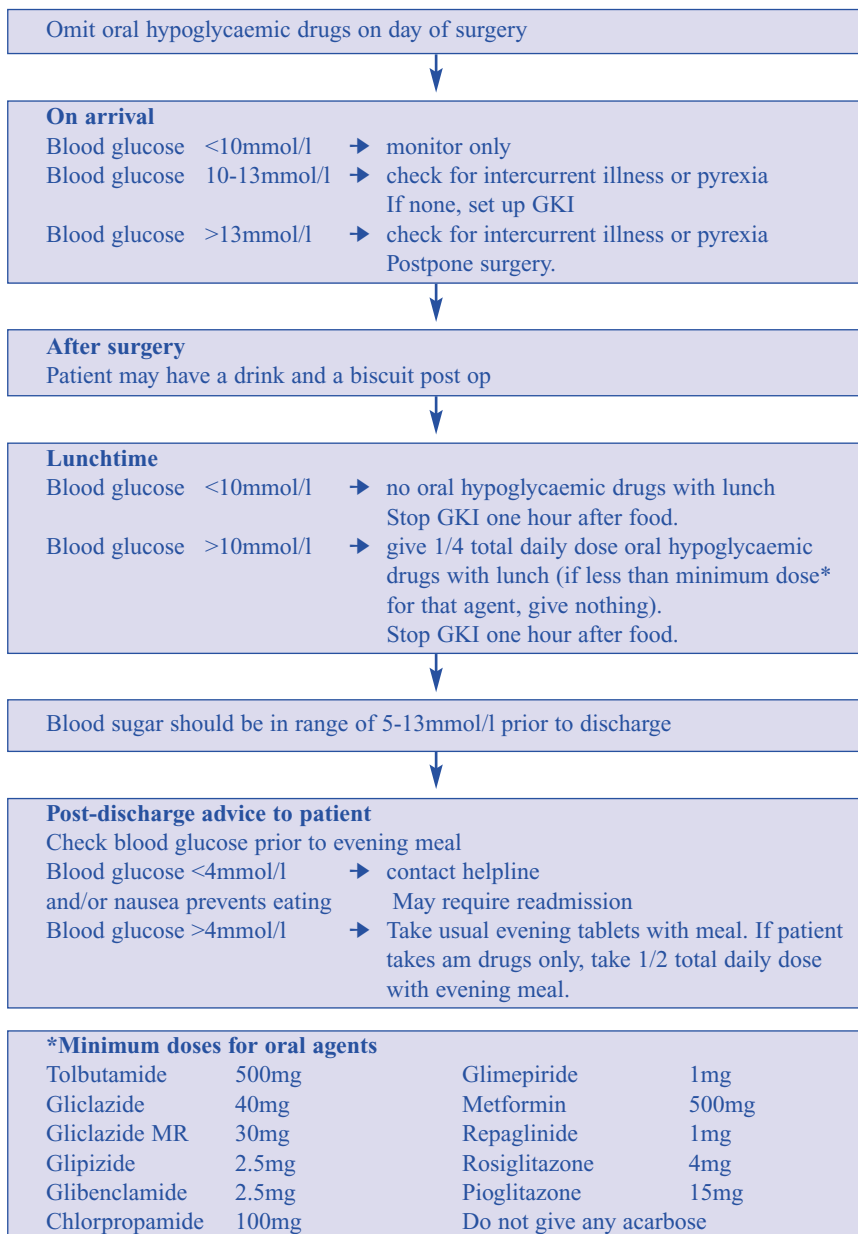
- Your operation will be done early in the afternoon. Afterwards, you will have your sugar checked again and be given your late lunch together with any lunchtime diabetic tablets or insulin you usually take. If you are on insulin but do not normally take insulin at lunchtime, you may be prescribed a small dose to have while you are in the day surgery unit.
- Your blood sugar level will be checked again after you have eaten. Provided this is satisfactory, you will be able to go home.
- If you cannot eat and drink without feeling sick, you will need to stay for longer and possibly overnight.

When you get back home

- Check your blood sugar at home during the evening. You may find that the results are a little higher or lower than usual and this will normally settle down over the next day or two.
- We expect that you will be able to eat and drink normally after you get home and take your usual diabetes tablets or insulin. If you are unable to do this you should contact the day surgery unit.

Please ring: Day Surgery Unit (8 a.m. to 8 p.m. daytime every day) or Helpline number (on the first night after your operation only from 8 p.m to 8 a.m)

Flowchart 3. Intermediate surgery in tablet treated Type 2 diabetic patients



Patient Information 3.

Instructions for Diabetic Patients on Tablets alone

The day before your operation

- Eat and drink normally and take your usual tablets.
- Do not eat or drink anything from midnight except for water until 6 a.m.

The day of your operation

- Aim to arrive at the hospital at 8 a.m
- Do not have your diabetes tablets or any breakfast. Measure your blood sugar at home.
- Have a sugar-containing drink (e.g. Lucozade) available, and bring it with you on the way to hospital.
- If your blood sugar is less than 4, drink half a cup of the drink even if you have no symptoms to suggest that your sugar is low. Tell the staff you have done so when you arrive.
- If you feel faint or dizzy and think your sugar level is low or you are having a “hypo”, drink half a cup of this drink and tell the staff you have done so when you arrive.
- Please bring your tablets with you.

Being in Hospital

- When you arrive, your sugar level will be checked. If it is above 13 and/ or you have an infection, your operation will have to be postponed and you will be allowed home.
- If it is below 10, you will simply have your sugars checked during the day.
- If it is between 10 and 13, the staff will explain how your diabetes will be managed. Please feel free to ask any questions

After your operation

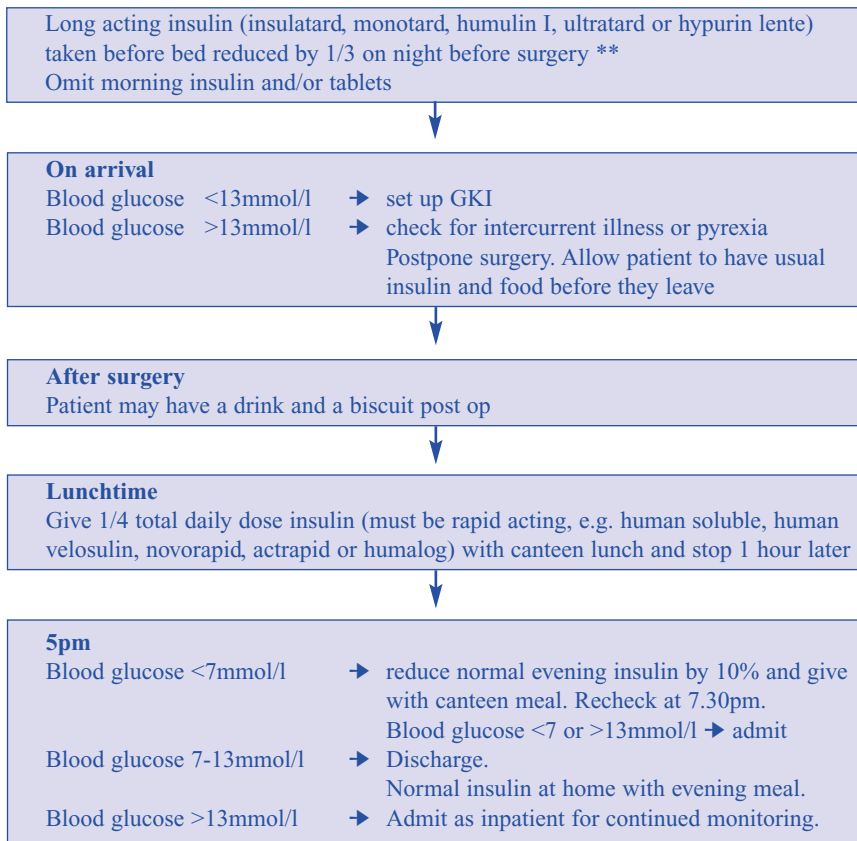
- After surgery, you will have your sugar checked at midday and be given lunch. If it is above 10, you will be given a reduced dose of your diabetes tablets with lunch.
- Your blood sugar level will be checked again during the afternoon. Provided this is satisfactory, you will be able to go home.
- If you cannot eat and drink without feeling sick, you will need to stay overnight.

When you get back home

- Check your blood sugar at home before your evening meal. If it is below 4, or if you are still feeling sick, please contact the Day Surgery Centre on the number below.
- If your sugar is greater than 4, take your usual evening dose of diabetes tablet.
- If you don't usually take tablets in the evening, please take half your usual morning dose of your diabetes tablet with your evening meal.
- Please check your blood sugar before going to bed. You may find that your blood sugar results are a little higher or lower than usual and this will normally settle down over the next day or two.
- However, if you are worried or are feeling sick and unable to eat, please contact the Day Surgery Centre on the number below.

Please ring: Day Surgery Unit (8 a.m. to 8 p.m. daytime every day) or Helpline number (on the first night after your operation only from 8 p.m to 8 a.m)

Flowchart 4. Intermediate surgery in Type 1 and insulin treated Type 2 diabetic patients



**Insulin glargine

There is limited experience of perioperative management of patients taking insulin glargine. Insulin glargine is a type of long acting insulin. However, perioperative management of patients on insulin glargine has been successful *without* the perioperative dose reduction suggested above. Close monitoring is suggested whilst more experience is accumulated.

Patient Information 4.

Instructions for Diabetic Patients on Insulin alone

The day before your operation

- During the day eat and drink normally and take your usual doses of insulin before meals. **BUT** if you usually take any insulin before going to bed, take the dose prescribed below.
- Do not eat or drink anything from midnight, except for water until 6 a.m. **(BUT make sure that you have your usual snack before going to bed).**

Take the following amount of insulin

Date:	Before bed
Type of insulin	
Dose (in units)	
Signed	

The day of your operation

- Aim to arrive at the hospital at 8 am
- Do not have your morning insulin or any breakfast.
- Measure your blood sugar at home. Have a sugar-containing drink (e.g. Lucozade) available, and bring it with you on the way to hospital.
- If your blood sugar reading is less than 4 mmol/l, drink half a cup of this drink even if you have no symptoms to suggest that your sugar is low. Tell the staff you have done so when you arrive.
- If you feel faint or dizzy and think your sugar level is low or you are having a “hypo”, drink half a cup of this drink and tell the staff you have done so when you arrive. Bring your own insulin, and any instructions you have for giving it, with you.

Being in Hospital

- When you arrive, your sugar level will be checked. If it is above 13 and/ or you have an infection, your surgery will have to be postponed. You will then be allowed home after having your normal insulin and some breakfast.
- If your sugar level is under 13, the staff will explain how your diabetes will be managed during the day. Please feel free to ask any questions.

After your operation

- After surgery, you will be given lunch, with a dose of insulin prescribed by the staff.
- Your blood sugar will be checked again in the afternoon. If your sugar level is above 7 but below 13, you will be allowed home, as long as you are eating and drinking normally.
- If you are not eating normally by 5 p.m., or if your sugar level is higher than 13, you will be admitted overnight to ensure that your diabetes is stable.

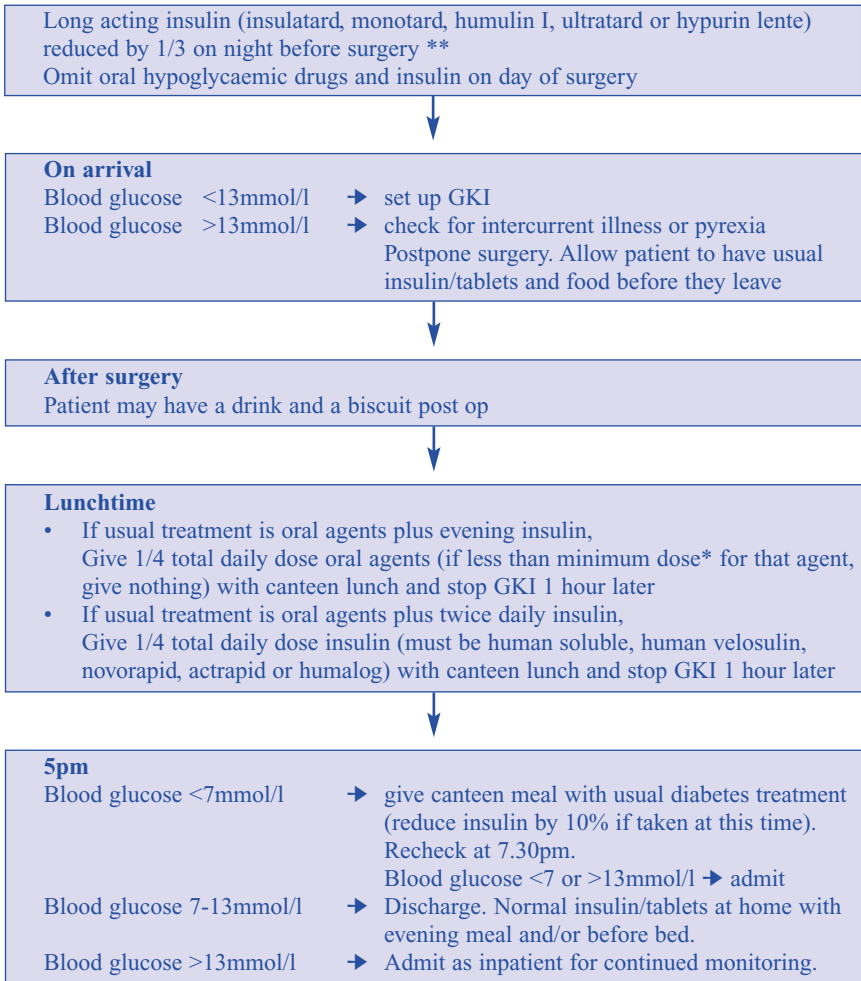
- If your sugar level is less than 7 at 5 p.m., you will be provided with an evening meal and told how much insulin you need to take. If your blood sugar level at 7.30 p.m. is between 7 and 13, you will be allowed home. Otherwise you will need to stay overnight.

When you get back home

- Please check your blood sugar before going to bed
- If you usually have an injection of insulin before going to bed, you should take this as usual with your pre-bed snack.
- You may find that your blood sugar results are a little higher or lower than usual and this will normally settle down over the next day or two.
- If you are not feeling well or are at all worried, please ring the staff on the number below.

Please ring: Day Surgery Unit (8 a.m. to 8 p.m. daytime every day) or Helpline number (on the first night after your operation only from 8 p.m to 8 a.m)

Flowchart 5. Intermediate surgery in Type 2 diabetic patients treated with insulin *and* tablets



***Minimum doses for oral agents**

Tolbutamide	500mg	Glimepiride	1mg	Gliclazide	40mg
Metformin	500mg	Gliclazide MR	30mg	Repaglinide	1mg
Glipizide	2.5mg	Rosiglitazone	4mg	Glibenclamide	2.5mg
Pioglitazone	15mg	Chlorpropamide	100mg	Do not give any acarbose	

****Insulin glargine**

There is limited experience of perioperative management of patients taking insulin glargine. Insulin glargine is a type of long acting insulin. However, perioperative management of patients on insulin glargine has been successful *without* the perioperative dose reduction suggested above. Close monitoring is suggested whilst more experience is accumulated.

Patient Information 5.

Instructions for Diabetic Patients on Insulin and tablets

The day before your operation

- During the day eat and drink normally and take your usual doses of insulin and tablets before meals. **BUT** if you usually take any insulin before going to bed, take the dose prescribed below.
- Do not eat or drink anything from midnight, except for water until 6 a.m. **(BUT make sure that you have your usual snack before going to bed).**

Take the following amount of insulin

Date:	Before bed
Type of insulin	
Dose (in units)	
Signed	

The day of your operation

- Aim to arrive at the hospital at 8am
- Do not have your morning insulin and/or tablets or any breakfast.
- Measure your blood sugar at home. Have a sugar-containing drink (e.g. Lucozade) available, and bring it with you on the way to hospital.
- If your blood sugar reading is less than 4 mmol/l, drink half a cup of this drink even if you have no symptoms to suggest that your sugar is low. Tell the staff you have done so when you arrive.
- If you feel faint or dizzy and think your sugar level is low or you are having a “hypo”, drink half a cup of this drink and tell the staff you have done so when you arrive. Bring your own insulin, and any instructions you have for giving it, with you.

Being in Hospital

- When you arrive, your sugar level will be checked. If it is above 13 and/or you have an infection, your surgery will have to be postponed. You will then be allowed home after having your normal insulin and some breakfast.
- If your sugar level is under 13, the staff will explain how your diabetes will be managed during the day. Please feel free to ask any questions.

After your operation

- After surgery, you will be given lunch, with a dose of insulin prescribed by the staff.
- Your blood sugar will be checked again at 5pm. If your sugar level is above 7 but below 13, you will be allowed home, as long as you are eating and drinking normally.
- If you are not eating normally by 5 p.m., or if your sugar level is higher than 13, you will be admitted overnight to ensure that your diabetes is stable.
- If your sugar level is less than 7 at 5 p.m., you will be provided with an evening meal and told how much insulin you need to take. If your blood sugar level at 7.30 p.m. is between 7 and 13, you will be allowed home. Otherwise you will need to stay overnight.

When you get back home

- Please check your blood sugar before going to bed
- If you usually have an injection of insulin before going to bed, you should take this as usual with your pre-bed snack.
- You may find that your blood sugar results are a little higher or lower than usual and this will normally settle down over the next day or two.
- If you are not feeling well or are at all worried, please ring the staff on the number below.

Please ring: Day Surgery Unit (8 a.m. to 8 p.m. daytime every day) or Helpline number (on the first night after your operation only from 8 p.m to 8 a.m)

Appendix IV

Day Surgery Unit Blood Glucose Record for Diabetic Patients

Patient ID **Date:**

When to measure blood glucose

- Patients on GKI infusion: measure blood glucose hourly.
- All other diabetic patients: measure blood glucose at the following times (and more frequently if indicated)
 - on admission
 - pre-induction
 - in the recovery room
 - before and after eating
 - before discharge

Glucose/potassium/insulin (GKI) infusion

1000mls 5% glucose + 20mmol KCl * + insulin as below:

Blood glucose 4 – 11mmol/l ➔ add 10 units human actrapid

Blood glucose > 11mmol/l ➔ add 16 units human actrapid

Infuse at 100mls/hr using a multilumen IV set connector incorporating a one-way valve so that the cannula can also be used for anaesthetic drugs

Insulin prescribed: _____ Date _____

Date			
Time	Blood glucose mmol/l	Units of insulin per 1000ml bag	Initials

*This regime includes more potassium than other conventional regimes and has evolved in order to avoid the need to add potassium to bags of IV fluids. This practise has been audited locally (King's Lynn) and found to be satisfactory.

Handbook Series

Editor - Dr Anthony Hart

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These publications may be obtained from

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The background of the entire page is a repeating geometric pattern. It consists of stylized, three-dimensional buildings with arched windows and doors, arranged in a grid. Interspersed between these buildings are stylized birds in flight, their wings spread. The pattern is rendered in a dark blue color on a white background.

A British Association of Day Surgery Handbook