

Diabetes Department

Patient information leaflet (PIL)

Information for people with diabetes on insulin pump therapy – What to expect whilst in hospital.

(for 16 years and above)

Author Panagiotis Siekkeris (Diabetes Specialist Nurse)
Melanie Kennedy (Diabetes Specialist Nurse)
Imelda Robson (Diabetes Specialist Practitioner)

Published November 2020

Review November 2022



As a teaching hospital, we conduct education and research to improve healthcare for our patients. During your visit students may be involved in your care, or you may be asked to participate in a clinical trial. Please speak to your doctor or nurse if you have any concerns.

Chief Executive: Joe Harrison
Chairman: Simon Lloyd

This leaflet is to explain to people with diabetes what to expect when you have been admitted to hospital.

This leaflet has been designed to provide you with information to help you during your hospital stay.

During your time in hospital whether it is a planned or emergency admission you may find your capillary blood glucose will be monitored more frequently than you would at home. This is because illness can affect your glucose levels. Usually, it will be checked before meals and before bed.

If you are unable to manage your insulin pump device, and no specialist advice is immediately available, your insulin pump will be removed. A conventional intravenous insulin infusion (insulin given through a cannula into your vein) or S/C basal-bolus insulin regimen will be started.

If you take insulin for your diabetes this **should never be stopped** or missed out. If you are on a long-acting insulin e.g., Detemir (Levemir), Glargine (Lantus, Abasaglar, Semglee) or Tresiba (Degludec) these should be continued even if you are on intravenous insulin.

Your insulin pump device is an expensive piece of equipment and steps should be taken to ensure they are not lost when you are admitted to hospital.

Your insulin pump should only be adjusted by its owner (who has received extensive training) or a member of the Diabetes team in possession of the correct knowledge and skills.

Low blood glucose (hypo) and treatment

If you have a reading below 4mmol/l this is called a 'hypo' and you may experience the following symptoms:

Shakiness ~ dizziness ~ headache ~ fatigue ~ confusion ~ weakness

Some people do not get symptoms, or get them at readings much lower than 4mmol/l. This is called 'Impaired hypo awareness'. Please let staff know if you do not feel your hypos. If your glucose level is below 4mmol/l you need to take or be given fast acting glucose (15-20g carbohydrate, even if you feel well)

Each ward has a "hypo box" which contains recommended treatments including Lift GlucoJuice or Lift GlucoTabs. Please take the whole juice (60mls) or 4x GlucoTabs. You can use your own hypo treatment providing it contains the correct amount of fast acting carbohydrate.

Your blood glucose will be checked after 15 minutes and when it is above 4mmol/l again you will be offered a small snack of longer acting carbohydrate (if on insulin injection therapy). If you are experiencing regular hypo episodes the ward staff will review your medications or refer you to our team.

High blood sugar levels

Sometimes during periods of illness and stress blood glucose levels can be higher than usual even if you are not eating much. You may need more medication or insulin during this time.

If your blood glucose levels are running higher than usual and you would normally use "sick day rules" and adjust your insulin doses via your insulin pump initially, please inform the staff to record the dose on your drug chart.

Ketones can be produced by periods without food but in patients with diabetes they are produced when there is a lack of insulin. If your blood glucose is elevated (hospital guidance is above 18mmol/l, you may be advised to check at lower levels when at home) ketones can be checked using a ketone machine. Ketones above 1.5mmol/l may indicate the need for more insulin.

If you have had elevated ketones during your admission or a condition called Diabetic Ketoacidosis (DKA), this can affect insulin absorption, making insulin pump therapy unreliable.

Symptoms of elevated ketones:

Abdominal pain ~ Nausea ~ Vomiting ~ 'Pear drop' smell on breath.

Stopping the insulin pump therapy in Hospital

While in hospital, the team on the ward will follow a standard DKA hospital protocol. Your Insulin Pump should be temporarily discontinued if you are in DKA. Your body will still require insulin when the insulin pump is disconnected, likely to be a different insulin infusion. It is important not to cut tubing or disconnect the pump from the tubing as the remaining insulin in the tube may infuse quickly risking hypoglycaemia.

If you need to disconnect the insulin pump, disconnect the cannula from the skin.

Follow the following steps.

- Step 1: Remove cannula/detach pump/pod.
- Step 2: Calculate and take your background insulin within an hour of removing your insulin pump.
- Step 3: Make a record of your current basal and bolus settings.
- Step 4: Keep your insulin pump somewhere safe and do not attempt to turn off; the amount of insulin “lost” will be minimal. If CGM is attached to your insulin pump, consider turning off the alerts.
- Step 5: Make sure you have enough supplies with you when you are returning to your insulin pump.
- Step 6: Ensure when you restart the insulin pump to monitor your BG closely (every 2 to 4 hours initially) and if any CGM alerts need to be turned back on.
- Step 7: Ensure that you go home with a working ketone meter, ketone strips (available on request) and advice on how to manage elevated ketones.
- Step 8: Ensure clear plan and an Outpatient appointment with the diabetes service before discharge to review the insulin pump settings which may need adjusting to prevent subsequent DKA and to re-enforce “sick day rules”.

Sick Day Rules on Insulin Pump Therapy

**BLOOD KETONES LESS THAN 1.5 mmol/L
BLOOD GLUCOSE ABOVE 13mmol/l**



- Potential cannula/Line/Cartridge issue.
- Check pump and infusion set for blockages or connectivity and insertion site issues
- Give a bolus of insulin via pump/ PDM
- Drink plenty of sugar free fluids
- Check blood glucose and ketones every 2 hours**



- Give normal insulin as per Carb ratio if eating
- Give correction doses if BG raised
- If not eating to remain on basal insulin
- Consider increase of basal by 10-20% if BGs continuously raised and ill for longer than a day



Diabetes Nurses
01908 995967,07773578427
TDSNT@mkuh.nhs.uk

Get advice from the government's website or call 111 if you experience Covid-19 symptoms:

- a high temperature
- a new, continuous cough
- a loss or change to your sense of smell or taste.

If you vomit and unable to keep fluids down, you must go to A and E.

****Please do not stop or suspend your pump at any time****

**BLOOD KETONES 1.5 mmol/L OR ABOVE AND
BLOOD GLUCOSE ABOVE 13mmol/l**



- Potential cannula/Line/Cartridge issue.
- Check pump and infusion set for blockages or connectivity and insertion site issues
- Give a bolus via pen device
- Change cannula and infusion set/ Pod**
- Drink at least a litre of sugar free fluids
- Check blood glucose and ketones every 2 hours**

Ketones 1.5 - 3mmol/l

Ketones above 3mmol/l



Calculate TDD (Total Daily Dose) from day before

Give 10% of TDD as bolus every 2 hours via pump

If eating, give insulin as per Carb ratio

Start a temporary basal rate of + 30% for 4 hours

Give 20% of TDD as bolus every 2 hours via pump

If eating, give insulin as per Carb ratio

Start a temporary basal rate of + 50% for 4 hours

If ketones remain above 1.5 mmol/L consider increasing temporary basal rate further

Or

*Convert to your long and short acting insulin via insulin pen if you suspect any insulin pump failure.

Continue drinking/ eating as carbs can stop the development of starvation ketones if possible.



*Converting back to Injections:

If you need to convert back to injections, please follow this process:

- 1) In insulin pump menu, find “daily totals” for last 6 days.
- 2) Add up these totals and divide by 6 to obtain the average daily pump dose.
- 3) Divide the average daily pump dose by 2.
- 4) Add 10% to obtain the approximate dose for background insulin.

1. Daily Totals:

Day 1: Day 2: Day 3:

Day 4: Day 5: Day 6:

2. Total Day 1-6: _____ Divided by 6=average TDD
3. TDD divided by 2=_____ (This splits the basal and bolus)
4. Add 10%=

Inject _____ Units of Glargine/ Detemir as basal insulin, using pen/syringe.

Continue to carb count and bolus using either Humalog/ Novorapid/ Apidra via pen/ syringe.

Self-managing your insulin in hospital

You should be supported to self-manage your diabetes as you would at home unless you are not well enough to do so.

If you normally have your insulin immediately before meals, you will be required to inform the nurses to record the exact amount of insulin you delivered via your insulin pump.

Please ensure needles are disposed of in a sharps bin to protect other patients and staff from needlestick injuries.

Your insulin will become unusable 28 days after opening. It can be kept outside of the fridge at room temperature in the bedside locker except on extremely hot days.

It is possible to order snacks from the hospital food menu however it is a good idea to bring in a supply from home if you have specific needs/likes. If you would like to speak to the catering team there is a tick box option on the menu.

Infusion sets/ Insulin pump insertion sites

Lipo’s (lipohypertrophy) are abnormal fatty deposits under the skin that can affect the action of insulin. For guidance on injection technique and how to manage Lipo’s please refer to your insulin pump training guide, given to you on the insulin pump initiation date.

Footcare

Please do not walk around the ward with bare feet. Your feet should be checked on admission and any issues reported to the podiatry service or the diabetes specialist nurses. If you notice any problems or have issues with your feet, please inform the ward staff.

Restarting the insulin pump therapy in Hospital

Insulin Pump can be restarted once DKA is treated and the diabetes team has agreed for you to leave the hospital.

You are safer to leave the hospital if the answer to the following questions is “yes”.

#	Questions	Answers
1	Do you feel confident to use your insulin pump device?	Yes/ No
2	Are you confident that your insulin pump is working?	Yes/ No
3	Do you know how to contact the manufacturer of your insulin pump?	Yes/ No
4	Have you contacted the manufacturer of your insulin pump?	Yes/ No
5	Do you know what to do when your insulin pump is not working?	Yes/ No
6	Do you feel confident to adjust your insulin pump settings (i.e. basal insulin rates, carb ratios, correction factors and active time insulin)? If not, please refer to the relevant information leaflet (MK- Way - Pump Settings Review).	Yes/ No
7	Are you aware of the “sick day rules”?	Yes/ No
8	Do you have enough consumables and insulin to load your insulin pump? (Cannulas/pods/ cartridges, insulin, batteries, charger)	Yes/ No
9	Do you have an urgent outpatient appointment with the diabetes teams arranged?	Yes/ No
10	Do you have access to long and fast acting insulin injections in case of insulin pump failure at home?	Yes/ No
11	Do you know how to convert back to injections if needed?	Yes/ No
12	Did you complete the “Discharge Checklist”?	Yes/ No

Useful numbers/ helplines/websites:

Please let the diabetes team or ward staff know if there are any issues/ queries with your diabetes that we can help you with during your stay.

The Insulin Pump service and the Diabetes Inpatient Specialist Nursing Team are contactable on 01908 995967. Alternatively, the Ward staff can refer to us via eCARE.

Contact the manufacturer or distributor of your insulin pump (24-hour product helpline), for advice if you have any technical problems with the insulin pump device.

Insulin Pump manufacturers/ distributors	Telephone Numbers
Medtronic	0192 321 2213
Roche Diabetes	0800 731 2291
Insulet (Omnipod)	0800 011 6132
Ypsomed	0344 856 7820
Air Liquide (T-Slim x2)	0800 012 1560

The 10% and 20% ready-reckoners

Use the table below as a guide to help you to calculate 10% or 20% of your Total Daily Dose (TDD).

TDD	10%	TDD	20%
15	2	15	3
20	2	20	4
25	3	25	5
30	3	30	6
35	4	35	7
40	4	40	8
45	5	45	9
50	5	50	10
55	6	55	11
60	6	60	12
65	7	65	13
70	7	70	14

www.mkuh.nhs.uk/diabetes-education,

<https://www.mkdiabetescare.org.uk/>,

<https://www.diabetes.org.uk/>.