**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)**

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**This leaflet is to help people with diabetes understand what to expect when 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 blood glucose is 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, your insulin pump will be temporarily removed and kept in a safe place. An insulin infusion (insulin given through a cannula into your vein) or insulin injections will be started.

**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 insulin during this time.

If your blood glucose levels are running higher than usual and you would normally use “sick day rules” (found in this leaflet) to 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 can be produced when there is a lack of insulin to match your body’s requirements. If your blood glucose is elevated (2 consecutive readings of above 13mmol/L or one-off reading of 17mmol/L) ketones can be checked using the same method as a blood glucose check. 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.

If you use a continuous glucose monitor you are welcome to continue using this if you are well enough, however if you are unwell staff will still need to check a capillary glucose from your finger before meals and before bed, or if you need to suspend your pump and are treated with insulin into a vein.

**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.

You will be required to inform the nurses the exact amount of insulin you delivered via your insulin pump for meals.

Please ensure any 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 lockerexcept 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.

**Stopping the insulin pump therapy in Hospital**

While in hospital if you are unable to self-manage your insulin pump it will be temporarily disconnected. 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 steps below

* Step 1: Calculate your basal rate as mentioned below and take your background insulin (e.g., Levemir, Lantus, Tresiba) using an insulin pen prior to stopping your pump.
* Step 2: Make a record of your current basal and bolus settings.
* Step 3: Remove cannula/detach pump/pod.
* Step 4: Keep your insulin pump somewhere safe and do not turn it off; the amount of insulin “lost” will be minimal. If continuous glucose monitor (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 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 (sick day rules).
* Step 8: Ensure you have a plan for who to contact for advice if needed and arrange an outpatient appointment with the diabetes team.

**Converting back to injections if pump therapy is suspended**

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

* Review your current total basal rate
* Add 20%
* Take this as basal/background insulin once a day or split into two equal doses for morning and bedtime

*E.g. Total basal rate = 30 units/day*

*20% of 30 = 6*

*30 + 6 = 36*

*Once daily 36 units/twice daily 18 units morning and 18 units at bedtime*

My total daily basal dose\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Plus 20%\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Background insulin doses:

Once daily \_\_\_\_\_\_\_\_

Twice daily­\_\_\_\_/\_\_\_\_

Give the background insulin 1 hour before removing your pump if possible.

Continue to carbohydrate count, inject your usual quick acting insulin 15 minutes before meals using your usual ratios and correct your blood glucose as needed at the same time.

My insulin: carbohydrate ratios \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

My insulin correction factor ­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Sick Day Rules on Insulin Pump Therapy**

**BLOOD KETONES LESS THAN 1.5 mmol/L**

**BLOOD GLUCOSE ABOVE 13mmol/l**

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

* 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

Ketones above 3mmol/l

Ketones 1.5 - 3mmol/l

**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.

* 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**

**Diabetes Nurses**

**01908 995967**

**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\*\***

**There is a guide at the end of this leaflet for calculating 10% or 20%**

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

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If eating, give insulin as per Carb ratio

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

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

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If eating, give insulin as per Carb ratio

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

Calculate TDD (Total Daily Dose) from day before

* 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**

**Insulin pump insertion sites**

Lipo’s (lipohypertrophy) are abnormal fatty deposits under the skin that can affect the action of insulin. They may make the skin feel lumpy or hard. These can cause variability in blood glucose levels and need to be avoided when inserting your pump cannula. Remember to check your sites regularly.

**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.

**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 your insulin pump therapy in hospital**

If your pump was disconnected for any reason, it can be reconnected once you are well enough to self-manage it and the diabetes team has agreed for you to leave the hospital.

Reconnect your pump and check the settings. You may need to temporarily reduce background insulin infusion rate (reduce to a 70% temporary basal rate for 24hrs) while the basal subcutaneous insulin is still active - increased glucose monitoring may be required. No further subcutaneous insulin doses (using a pen) should be required once your pump is restarted. Re-check your blood glucose 1-2 hours after re-start.

Please review the following questions and if needed ask the Diabetes inpatient team for advice before leaving the hospital

|  |  |  |
| --- | --- | --- |
| # | **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 | Do you have the contact details of 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, carbohydrate ratios, correction factors and active insulin time)? | Yes/ No |
| 7 | Do you have a ketone meter at home? Have you read 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 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 |

**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 or TDSNT@mkuh.nhs.uk (outpatient team) or 01908 996018 (Inpatient team). Alternatively, the Ward staff can contact us on your behalf.

Contact the manufacturer or distributor of your insulin pump 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 |