

CHILDREN'S SERVICES

Insulin Pump Therapy

These guidelines are not intended for starting a patient on an insulin pump. They are intended to give staff not part of the diabetic team information regarding pump therapy if they are asked by patients or parents.

Background

Continuous subcutaneous insulin infusions (CSII) or insulin pumps are becoming part of the standard management of type 1 diabetes in children. The research suggests that it is possible to achieve a substantial reduction in HbA1c, reduce complications and return hypo awareness.

However it is not a quick fix for all patients with diabetes and many patients may not want a pump or may not be suitable.

Pumps Available

We use the Medtronic 640 G or Paradigm Veo, Accu-Chek Insight or Combo from Roche and Animas Vibe Insulin pumps. Each works on a similar principle as below but there is a difference in the setup for each pump.

How it Works

The pump delivers a continuous background infusion of short acting insulin (NovoRapid® or Humalog®) via a line to a small needle inserted just under the skin, usually on the abdomen. The basal rate can be programmed to change every half hour if needed. Patients are then able to give bolus doses with food and for correction for high glucose levels. The doses for meals are calculated on the amount of carbohydrate eaten in that meal (see later). It is still necessary to check blood glucose levels on a regular basis (at least four times a day).

Carbohydrate Counting

As insulin works on carbohydrates it is possible to adjust the dose on insulin required for a meal based on the amount of carbohydrate in the meal. Carbohydrate counting calculates the amount of "carbs" in a meal and the dose of insulin is based on this using an insulin-to-carbohydrate ratio that is calculated for each patient and each meal. The Paediatric Dietician will teach carbohydrate counting to all patients who are interested in pump therapy. Follow-up sessions will be arranged regularly to support patients through this process. There are various tables with this information available and food packages now give the carbohydrate content of they contain.

Blood Ketone Meters

All patients will have a blood ketone meter. If they are on a pump they will not be receiving any long acting insulin therefore if there is a problem with the delivery of insulin they can develop DKA quicker than patients on SC insulin..

Ketone Level	Explanation
< 0.6 mmol/L	Within the normal range
0.6 – 1.5 mmol/L	Moderately high ketone levels. May indicate the development of a problem if associated with a high glucose level (> 14 mmol/L)
> 1.5 mmol/L	If associated with glucose level > 14 mmol/L suggests that there is a risk of developing DKA

Common Problems

Training is given to all patients when they start on a pump about how to manage common problems, however they may call out of hours for further clinical advice.

Pump Support

For technical advice the pump companies provide 24/7 support.

Medtronic **01923 205167**

Accu-chek **0800 701000**

Animas **0800 0556606**

Hyperglycaemia

Common causes:

- Overused/irritated sites
- Incorrect basal rates or inaccurate boluses
- Incorrect priming
- Blood in or leakage from infusion set
- Dislodged or blocked needle
- Empty reservoir

See attached guideline for management.

Hypoglycaemia

See attached guideline.

Other Useful Information

Temporary Basal Rates

It is possible to quickly change the basal rate on the pump by using the temporary basal rate setting. With this you can increase or decrease the basal rate as needed for a set period of time.

If patients are running high glucose levels then they need to *increase* the basal rate. Similarly if they are running low glucose levels then they need to *decrease* the basal rate.

Parents and patients know how to do this, but may need reminding. We would normally suggest a 10% change to begin with but it will depend on the clinical situation.

Insulin Pens

Patients of pumps will still need to have supply of NovoRapid or Humalog to use in case there is a problem with the pump that cannot be fixed. Correction and bolus doses can be given this way until the problem with the pump is resolved. They will need to monitor and inject more frequently as there is no background insulin.

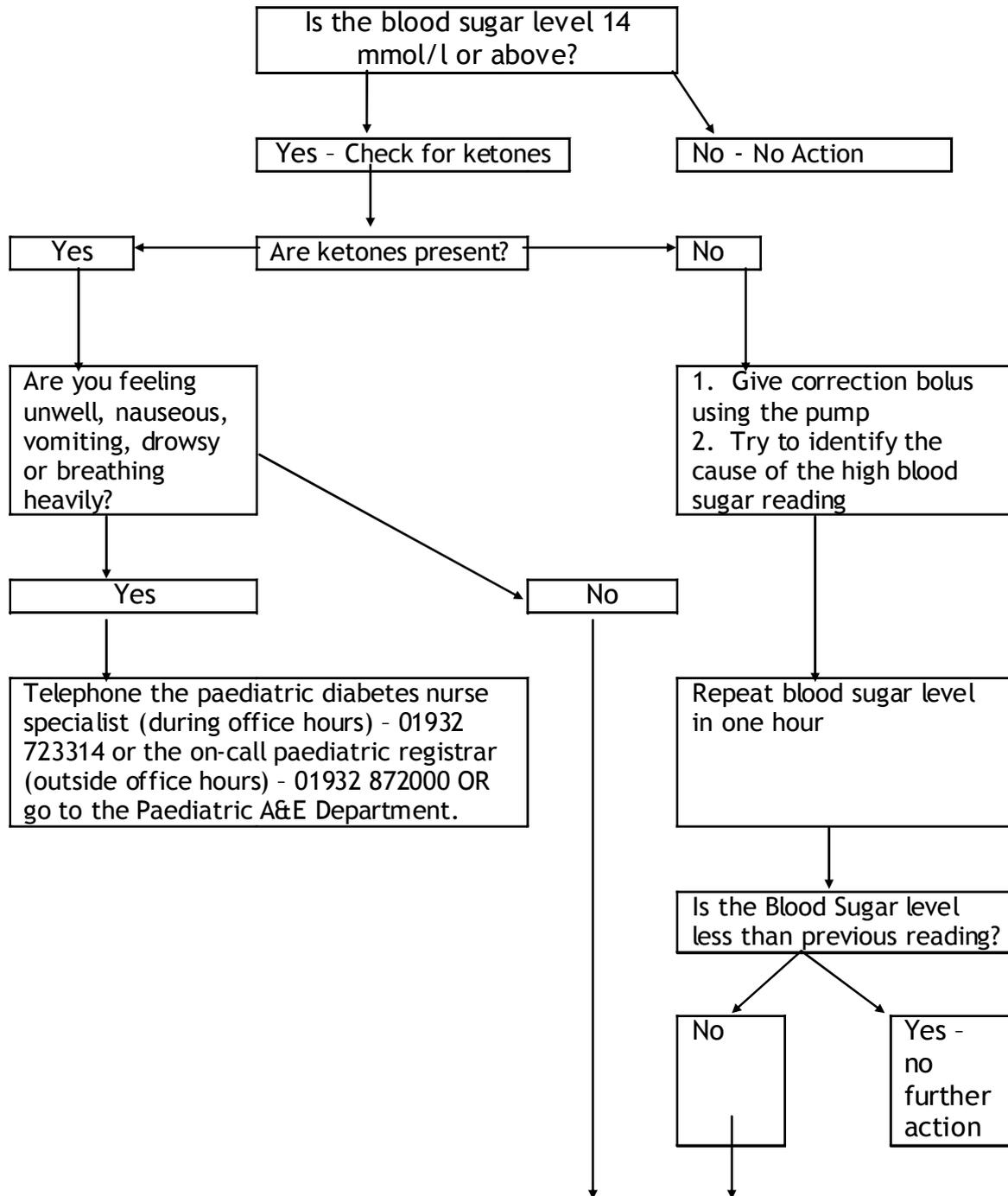
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Ratified by on behalf of Children's Services Clinical Governance Committee on: 08/06/12

Updated by Jocelyn Hall (PDSN) and Dr Shailini Bahl 23rd May 2016

GUIDELINES FOR MANAGEMENT OF HIGH BLOOD SUGAR LEVELS



- Give a correction bolus using an insulin pen *NOT* the insulin pump.
- Change the whole infusion set and reservoir.
- Drink plenty of liquids that contain no calories (e.g. water, sugar free juice).
- Try to identify the cause of the high blood sugar levels.
- When ketones or an infection are present, extra insulin is usually required. Discuss this with the diabetes team.

Guideline for Management of Hypoglycaemia

This is defined as a blood sugar level under 4mmol/L. Most hypoglycaemic episodes will be mild.

Follow the 15 rule

Test the blood sugar level

Give 15g rapid acting carbohydrate e.g. 120-150 ml juice

Check the blood sugar level 15 minutes later

If over 4mmol/L – no further action

If under 4mmol/L give another 15g rapid acting carbohydrate

Check the blood sugar level 15 minutes later

If over 4mmol/L – no further action

NB A starchy carbohydrate follow up snack is no-longer necessary to maintain the blood sugar level so if the child is hungry after a hypo a normal bolus of insulin will be necessary. The calculation of the insulin will need to be done by Bolus Wizard as this programme will take into account the fact that the blood sugar has been low and it will reduce the insulin dose accordingly.

Moderate Hypoglycaemia

The child becomes confused and disorientated and unwilling to take the usual hypoglycaemic treatment.

Suspend / disconnect the insulin pump for 15-30 minutes

Administer Glucogel to inside of cheeks, and massage cheeks

Contact parent

When orientated, treat as a mild hypo

Severe Hypoglycaemia

Loss of consciousness (may have a convulsion):

Suspend / disconnect the insulin pump

Dial 999 – tell services you have an unconscious diabetic child on an insulin pump