DIABETES MELLITUS (TYPE 1): INPATIENTS USING INSULIN PUMPS - NURSING CARE - CHW

PRACTICE GUIDELINE ©

DOCUMENT SUMMARY/KEY POINTS

- Patients with Type 1 Diabetes Mellitus (T1DM) that are already using an insulin pump may require admission periodically stabilisation of their diabetes or other unrelated reasons. Understanding how to care for these patients wearing an insulin pump in a ward setting is essential.
- The Endocrine team must be made aware of admission.
- On admission the Endocrine team must write up the insulin pump settings plus the order for insulin which will be used to refill the pump reservoir twice weekly; the Diabetes Nurse Practitioner (NP) will review the insulin pump settings on a regular basis and document changes when they occur
- On admission nursing staff must establish~~ed~~ **who is capable and who will be available to run the pump: the patient, family, or staff**.
- Nursing staff must supervise the patient/parent when insulin is delivered for:
  - Carbohydrate intake
  - A correction dose
- In the absence of parents/carers, nursing staff are responsible for the delivery or supervision of the delivery of insulin. The nursing staff must liaise with the Diabetes Educator to ensure that they are familiar with the pump and able to care for the child using the pump. See Bolus Instructions for Animas and Medtronic pumps.
- At the discretion of the Endocrinologist, an IV insulin infusion may be considered an appropriate replacement for insulin pump therapy during admission.
- If blood glucose level (BGL) ≤ 4mmol/L, hypoglycaemia treatment is required.
- If BGL ≥15mmoml/L (hyperglycaemia), check blood for the presence of ketones and follow the flowchart on page 5.
- The Endocrine team must review the patient daily to review the insulin pump settings and document any changes when they occur.

Approved by:	SCHN Policy, Procedure & Guideline Committee	
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Team Leader:	Nurse Manager Diabetes Services	**Area/Dept**: CHW Endocrinology

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CHANGE SUMMARY

- The Endocrine team must be notified of admission
- The Endocrine team must review the patient/insulin doses/pump settings daily
- The Endocrine team must write up the insulin to be used for refilling reservoir twice weekly
- The ward nursing staff must use Insulin Pump Flowchart A and B to document insulin pump settings, BGLs, insulin boluses etc
- Added links to the bolus instructions for Animas and Medtronic pumps.

READ ACKNOWLEDGEMENT

- All nursing staff involved in caring for a patient using an insulin pump during an admission must read and acknowledge they understand the contents of this document.
- Staff notification sign-off record can be found at: http://chw.schn.health.nsw.gov.au/o/groups/ppc/resources/policy_notification_-_staff_record_.pdf

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Introduction

An increasing number of children and adolescents with type 1 Diabetes Mellitus (T1DM) are being managed with an insulin pump. Patients with T1DM that are already using an insulin pump may periodically require admission for stabilisation of their diabetes or other unrelated reasons. Understanding how to care for them in a ward setting is essential.

The pump delivers insulin in two ways:

1. The basal rate is the rate at which the pump delivers insulin continuously 24hrs a day to keep the blood glucose levels (BGLs) stable between meals and at night. The rate is programmed according to the patient's individual requirements. The background or basal insulin helps to control the glucose released from the liver.
2. The bolus dose is the amount of insulin delivered over a short period of time and is used to cover the carbohydrate in meals and snacks. A correction bolus can also be administered to reduce elevated BGLs.

Patients (and their parent/carer) admitted to CHW with an insulin pump will have previously received education by the Diabetes Education Department. Therefore patients and their family would have fundamental knowledge and skills in the use of an insulin pump.

Expected Results

Ward nursing staff know how to care for a T1DM child wearing an insulin pump.

Guidelines

Important: On admission, nursing staff must establish who will be responsible and available to run the pump: the patient, family or staff. In the absence of parents and carers, nursing staff are required to be responsible to run the pump. The nursing staff must liaise with the Diabetes Educator to ensure that they are familiar with the pump and therefore able to care for the child.

Nursing staff are to:

- Page the Endocrinology Team to document on the **Insulin Pump Chart**: http://chw.schn.health.nsw.gov.au/o/forms/endocrinology/insulin_pump_chart.pdf :
  - Insulin basal rates,
  - The patient's insulin to carbohydrate ratio and Insulin sensitivity factor
  - The insulin to be used to refill the reservoir every 72 hours or when the site/set fails must be written up on the PRN medication chart.
- Check BGLs frequently; pre and 2 hours post main meals plus 11pm and 3am and record on the Insulin Pump Chart.
- Ensure that there is insulin in the reservoir, and be aware the reservoir cannula and tubing needs to be changed every three days. The patient/family will have been taught by the Diabetes team how to change the cannula and tubing and may have spare

supplies available. If not page a Diabetes Educator or after hours the Endocrine Registrar on-call (spare stock available in the Dept of Endocrinology). If stock not available sub cutaneous injections need to replace the function of insulin pump until supplies obtained.

- Order a normal diet for the patient.
- Supervise the patient/parent when insulin is delivered for carbohydrate intake.
- Supervise the patient/parent when insulin is delivered for a correction dose. The order for carbohydrate and correction dose must be recorded on the medication chart on admission along with an order for the insulin to be used to refill the reservoir twice weekly.
- In the absence of parents and carers familiar with the use of the insulin pump, the nursing staff must liaise with the Diabetes Educator to ensure that they are familiar with the pump and able to care for the child using the pump.

Nursing care during other procedures whilst an inpatient:

- The pump must be disconnected for X-rays, and CT or MRI scans and not taken into the scan room.
- Never disconnect the pump or cease insulin for more than 2 hours without discussion with the Endocrine team.
- If the patient is due to fast, page the Endocrine registrar for instructions. The basal rate and bolus factors should only be adjusted under instruction by the team.
- BGLs should be checked frequently; pre and 2 hours post main meals plus 11pm and 3am.
- If steroids are prescribed during admission the nursing staff must notify the Endocrine team.

Treatment of Hypoglycaemia and Hyperglycaemia

Hypoglycaemia (BGL ≤ 4mmol/L)

- Any BGL ≤ 4mmol/L needs to be treated as hypoglycaemia, even if the patient is asymptomatic.
- **Hypoglycaemia treatment**:
  - Administer 15grams (one exchange) of fast-acting carbohydrate, such as 200mL of fruit juice, ordinary soft drink or cordial or 3 teaspoons of sugar, honey or 4 large or 7 small jelly beans.
- Do not enter hypoglycaemia treatment into the pump.
- Repeat the BGL in 15-20minutes. If BGL result is still ≤ 4mmol/L, repeat the treatment.

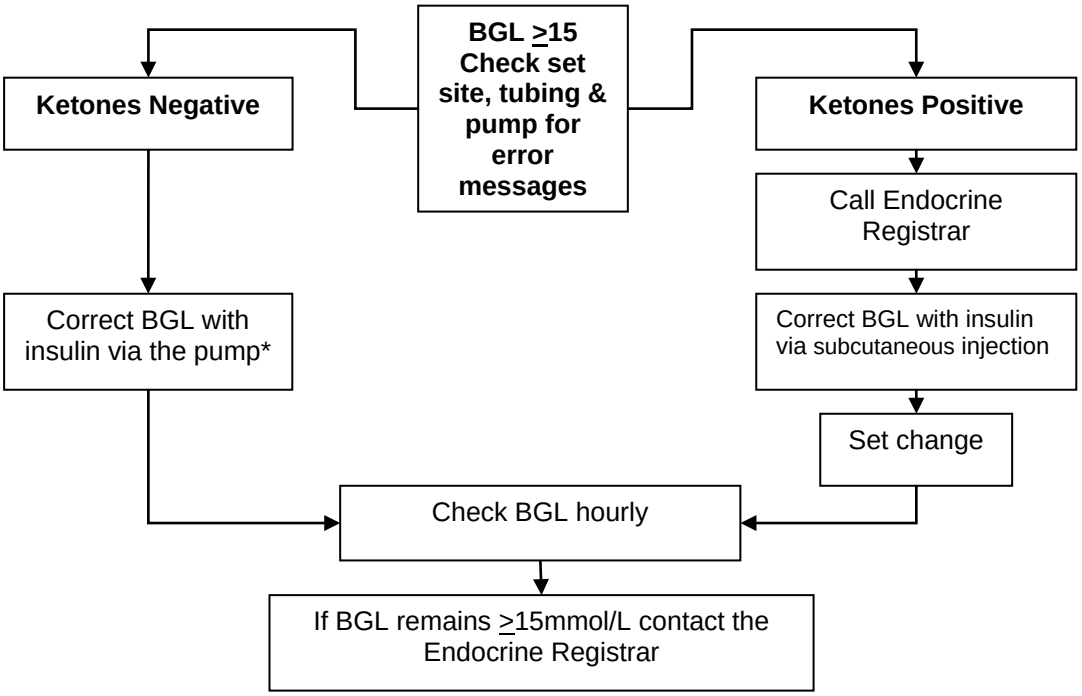
- In the event of a severe hypoglycaemia with coma or where the person is too drowsy to safely eat or drink, the diabetes team should be contacted **immediately**.

  At CHW, **treatment for severe hypoglycaemia is IV 2mL/kg of 10% Dextrose**.
- PRN prescription for IV bolus/glucagon prescribed in case of severe hypoglycaemia for all type 1 diabetes patients.
- If IV access is not readily available, alternative is Glucagon IM 0.5 mg when child under < 6yrs old and 1 mg when child > 6 years old.

Hyperglycaemia (BGL ≥ 15mmol/L)

- Check blood for Ketones and follow the flowchart below.
  - ≤ 0.6mmol/L = negative
  - > 0.6mmol/L = positive
- Also check the:
  - site for redness, swelling or leaking.
  - tubing for air bubbles, kinks and for the presence of insulin in the syringe.
- If any of the above checks is in doubt, the set should be changed.
- Recheck BGLs hourly. If BGL remains ≥15mmol/L contact Endocrine Registrar.

Hyperglycaemia Treatment Flowchart



*****See Bolus Instructions for Animas Pumps and Medtronic Pumps

Patients on insulin pumps fasting for surgery or other procedures

- The diabetes team will determine the approach depending on the individual patient and procedure. The following principles apply.
- *Minor procedures*
  - Ensure that the infusion site is well secured: The pump can be continued at basal rate, keeping IV fluids at maintenance rate (0.45% saline, 5% glucose).
  - Monitor BGL hourly. Correction doses can be given preoperatively and postoperatively as needed and carbohydrate boluses when the patient is ready to eat. (see Bolus Instructions for Animas pump and Medtronic pump)
    Record any boluses or rate changes.
  - Alternatively, the pump can be discontinued preoperatively and a basal-bolus regimen instituted as per advice from the diabetes team.
- *Major surgery:* The subcutaneous insulin pump is discontinued and an IV insulin infusion used.

Reference

1. Caring for Diabetes in Children and Adolescents 3rd edition 2010. Ed. Ambler & Cameron