



Guidance for Insulin Pump (CSII) use in hospital

Information for staff
Diabetic Care

Extended until Oct 2021 (Covid-19)

Refer all Insulin Pump patients to the Hospital Diabetes team as soon as possible after admission:

- ❖ University Hospital Monklands - **01236 712430** DSN or pager **260** or contact Diabetes Consultant via ward 14
 - ❖ University Hospital Wishaw - **01698 366361** or DECT **8593**
 - ❖ University Hospital Hairmyres - **01355 584116** DSn or Diabetes Consultant as per Endocrine rota
- At Weekends all Insulin Pump patients MUST have daily review**

INSULIN PUMP DAILY REVIEW CHECKLIST CHART

This chart should be completed by junior medical staff, nurse practitioners or senior ward nurses e.g. nurse in charge **EVERY DAY** and used alongside these guidance notes. It is a simple checklist to document if patients are safe to self manage their insulin pump in hospital. In the event the chart flags any 'No' answers, medical review is needed. The Checklist chart is stocked on diabetes wards, medical admissions for printable from NHS Lanarkshire's Diabetes Clinical Guideline site.

GENERAL INFORMATION ABOUT INSULIN PUMPS

- ❖ Continuous Subcutaneous Insulin Infusion (CSII) or insulin pump therapy is administered via a battery driven pump.
- ❖ Rapid acting insulin (e.g. Novorapid, Humalog, Apidra) is delivered by pump via an infusion set which is inserted into the subcutaneous tissue.
- ❖ The infusion set should be changed every 2-3 days.
- ❖ The **background** (basal) rate at which the insulin is pumped can be pre-programmed to provide a number of different rates across a 24 hour period. These can be adjusted in response to current needs, e.g. during fasting, lifestyle change, illness.
- ❖ **Bolus** insulin doses are calculated according to carbohydrate food intake (e.g. 1 unit per 10g CHO) and administered by pressing a button on the pump.
- ❖ Regular blood glucose monitoring is essential to guide with insulin dosing.
- ❖ Ketone monitoring is essential in illness, vomiting and/or hyperglycaemia (see below)
- ❖ Ensure that all patients using CSII have sufficient spare consumables e.g. spare batteries and infusion sets (i.e. reservoirs, lines and cannulae). If not, ask a relative to bring these in **the same day**.
- ❖ All insulin pump patients have an alternative insulin pen MDI (basal bolus) regime for use in case of insulin pump failure or inability to self-manage e.g. during serious illness. Please record this alternative regimen on Page 2 of 'Insulin Pump Daily Review Checklist'
- ❖ Insulin pumps should not be immersed in water.

❖ **Never disconnect the insulin pump unless an alternative subcutaneous insulin regime or IV insulin infusion therapy has been prescribed and administered to the patient.** Remove the pump 30 minutes after alternative insulin is given either subcutaneously or intravenously.

❖ Patients receiving CSII therapy in the community are experts in their own management. Once admitted to hospital - **LET THEM MANAGE THEIR OWN PUMP.** However in some situations this is not safe or appropriate - see 'Pump Safety Points' section.

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PUMP SAFETY POINTS

Hyperglycaemia

- ❖ If blood glucose levels rise above 14 mmol/L, there is a risk of Diabetic Ketoacidosis (DKA). Blood ketones **MUST** be measured to guide additional sick day doses of rapid acting insulin by patients.
- ❖ **If ketones persist at > 1.5 mmol/L for 4 hours, request review by MEDICAL TEAM / HECT and send laboratory glucose and U+Es to confirm/exclude DKA.**
- ❖ **Start IV actrapid and fluids as per DKA protocol.** If laboratory results indicate decompensated diabetes rather than DKA, adjust the IV insulin to a variable rate infusion (“sliding scale”).
- ❖ Insulin pump patients should change their infusion set, line and reservoir every 2 to 3 days.
- ❖ In the event of a high blood glucose result with ketones, the patient should be reminded to do an infusion set, line and reservoir change.

Hypoglycaemia

- ❖ Treat hypoglycaemia with 15-20g glucose as per HYPOBOX advice, remembering to retest glucose after 15 minutes to ensure resolution
- ❖ There is no need to remove or suspend the pump if a hypo occurs
- ❖ Once hypoglycaemia is resolved, look for underlying cause and review the pump regimen.

CSII PUMPS IN ACUTE ILLNESS

Use of CSII is **NOT** recommended in situations where self management is **UNSAFE** as follows:

- ❖ Acute illness preventing self management, including delirium or unconscious states
- ❖ Diabetic ketoacidosis (DKA) – follow the hospital DKA protocol.
- ❖ Prolonged fast peri-operatively for major surgery involving general or spinal anaesthetic
- ❖ If the patient does not have sufficient consumable supplies for pump use in hospital.
- ❖ Patient choice – patients may prefer to revert to MDI (basal bolus regime) temporarily in hospital if they don't feel up to pump self management which can be demanding during intercurrent illness as they may not have their usual family support on hand.
- ❖ In these situations an alternative insulin regime (subcutaneous or IV) is required. Remove the CSII infusion set from the subcutaneous site and store the insulin pump in a safe and secure place.

CSII Pumps and Radiology Procedures

X-ray procedures, CT and MRI scanners can interfere with the pump operation, therefore CSII should be removed prior to and during these. If the procedure is planned to take more than one hour then provide subcutaneous short acting insulin (e.g. Novorapid) to reduce the risk associated with insulin omission.

- ❖ ALWAYS commence IV or administer subcutaneous insulin **before** disconnecting CSII pump.
- ❖ Allow CSII to run for 30 – 60 minutes after a subcutaneous insulin injection
- ❖ After an IV infusion has been used, allow CSII and IV infusion to run concurrently for 60 minutes **before** discontinuing the IV insulin infusion.
- ❖ Remove the CSII infusion set and store the insulin pump in a safe and secure place.

PRESCRIBING INSULIN FOR INSULIN PUMP INPATIENTS

1. Drug kardex

- ❖ Prescribe the insulin used in pump reservoir on the RED parenteral section of the drug kardex
- ❖ Write insulin name in BLOCK CAPITALS, route s/cut, dose As Per Chart (APC) and indicate in time section it is a continuous infusion.
- ❖ Insulin pumps use rapid acting insulin i.e. NOVORAPID or HUMALOG
- ❖ A 10 ml insulin vial (NOT penfills) are required for insulin pump reservoir filling

2. Subcutaneous Insulin Chart

- ❖ On page 1 - complete the usual daily insulin as “ CSII or insulin pump” with the name of insulin in pump reservoir (same as prescribed on Drug Kardex).
- ❖ On page 1 also record the average daily insulin dose (Total Daily Dose) taken in the preceding 2-3 days. Do not include the current day as that record will be an incomplete 24 hour period. This is found for Medtronic Veo pump – in Utilities Menu, TDD and for Medtronic 640G pump - in History Summary menu, TDD and Animas pump – in History Menu, Daily Totals
- ❖ On page 1 also record the current daily Basal Insulin dose. This is found for Medtronic Veo pumps in Basal review menu, for Medtronic 640G pumps in History Summary menu, and for Animas Vibe pumps in History menu and Daily Totals.
- ❖ Remember the patient is expert and should be able to assist with providing all this information

GLUCOSE AND KETONE MONITORING OF INSULIN PUMP: INPATIENT SAFETY

It is essential during in-patient periods that ward staff monitor and record finger prick blood glucose levels.

- ❖ Use standard ward blood glucose meters to test patients at least four times daily during waking hours
- ❖ Pre-breakfast, pre-lunch, pre-evening meal and 22:00 are standard times but also check once overnight .
- ❖ Record finger prick blood glucose results on page 3 of the subcutaneous insulin chart.

Patient self managing with their pump should monitor their blood glucose levels more frequently than this during illness, usually 7- 10 times daily. Patients should have their own meter and test strips or will request additional tests from ward staff. Patients should enter all blood glucose results into their pump. All pump patients should have their own blood ketone meter to monitor ketones if blood glucose is above 14 mmol/L.

DOCUMENTING SICK DAY DOSE INSULIN PEN DEVICE FOR PUMP INPATIENTS

If patients using insulin pump devices develop hyperglycaemia with significant blood ketones (>1.5 mmol/L) they require to take their calculated Sick Day Rule Corrective Insulin Dose (NOVORAPID or HUMALOG pen device) immediately and then look into cause e.g. insulin pump failure.

1. Drug Kardex

Prescribe the rapid acting insulin pen device used by patient (NOVORAPID Flexpen or HUMALOG Kwikpen)

in the 'As Required section' of the Drug Kardex and under dose document Sick Day Rules (SDR) and frequency Maximum every 2 hours.

2. Subcutaneous Insulin Chart

Patient's requiring Sick Day Rule pen insulin should alert ward nursing staff to document dose taken on subcutaneous chart page 2, in comments section, **which MUST be a trigger for medical review.**

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Pub. date:	June 2018
Review date:	December 2020
Issue No:	01