

INSULIN DEXTROSE INFUSION PROTOCOL FOR LABOUR

NOT FOR USE IN KETOACIDOSIS

INTRODUCTION

This is an intravenous insulin dextrose infusion protocol designed to maintain blood sugar levels (BSL) between 3.9 and 8.0mmol/L during labour in women with Type 1 diabetes. It may also be continued briefly in the early postpartum period until the woman is able to recommence her regular subcutaneous (subcut) insulin regimen. This protocol should be used in conjunction with advice from the on call obstetric physician/endocrinologist.

PRINCIPLES OF THE INFUSION

Glucose is infused intravenously at a fixed rate. Insulin is administered intravenously at a variable rate. Capillary BSL's are checked hourly. The insulin infusion rate is adjusted according to the blood sugar levels to maintain BSL between 3.9 and 8.0 mmol/L.

The half life of *intravenous* insulin is only a few minutes, and women with Type 1 diabetes need to have some insulin in their system at all times - otherwise they are at risk of diabetic ketoacidosis. Most women will be receiving long acting insulin (Protaphane, Lantus or Levemir) which reduces these risks. Long acting insulin should be given concurrently as a dosage prescribed by the endocrinologist/physician.

If the insulin infusion needs to be turned off for any reason, the medical officer needs to be informed immediately. Continue hourly BSL monitoring and second hourly finger prick ketone monitoring, or regular urinalysis for ketones if KetoStix are unavailable.

Care must be taken not to accidentally disconnect the insulin or dextrose infusions. Where possible, the insulin should be given through a dedicated cannula, and the capillary blood glucose should be collected from the opposite hand.

INDICATIONS FOR USE

In any woman with Type 1 diabetes during labour, as an alternative to subcutaneous insulin. The benefit of the infusion is that it may provide tighter blood glucose control in a patient who is not eating. In patients with Type 2 diabetes or gestational diabetes, an insulin infusion is usually not required. **This protocol is not for women who have diabetic ketoacidosis.**

Women will generally receive their usual doses of long-acting insulin (eg protaphane, lantus or levemir) prior to labour and resume these (at a lower dose) post-partum. The insulin infusion is a temporary substitute for short-acting subcutaneous insulin (eg novorapid, actrapid). Advice on dosages of short and long acting insulin should be sought from the endocrinologist/obstetric physician.

INDICATIONS FOR CESSATION OF THE INFUSION

The infusion can be ceased when the patient is able to recommence her usual subcutaneous insulin i.e. when she is able to eat after delivery. There needs to be an overlapping period during which the patient receives both the insulin infusion and the subcutaneous insulin, to allow time for the subcutaneous insulin to work. Thus, the insulin dextrose infusion should be ceased 1 hour after the patient has been given s/c novorapid (with her meal), 2 hours after the patient has been given s/c actrapid, or 4 hours following re-attachment of an insulin pump.

INSULIN DEXTROSE INFUSION PROTOCOL FOR LABOUR cont'd

THE PROTOCOL

- Follow RHW policy on Administration of Intravenous Medications.
 - Only category 1&3 accredited RNs or RMs are permitted to load or administer this infusion.
 - Patients on an insulin infusion and in labour should be cared for solely by one nurse/midwife.
 - The prescription for both infusions must be prescribed on the intravenous fluid order chart.
 - BSLs must be recorded on the monitoring sheet.
 - The patient will require one dedicated IV cannula with both infusions administered concurrently through an infusion pump and connected to the IV cannula with a 3 way tap.
1. Load 100 units of actrapid insulin into a 100 mL bag of sodium chloride 0.9% (1 unit of insulin / mL). Flush 10mls of the prepared insulin infusion through the giving set to saturate the binding sites in the giving set with the insulin solution before connecting to the patient.
 2. Prepare bag of 5% dextrose solution to be run concurrently at a fixed rate of 75-125mL/hr as prescribed by the endocrinologist/obstetric physician. Occasionally 10% dextrose will be substituted if fluid restriction is required.
 3. Determine the initial infusion rate: using **Table 1** eg. if the BSL is 5.2mmol/L, start the infusion at 1mL/hr (= 1 unit/hr).
 4. Check capillary BSL at 1 hour and then as per Table 2. Record BSLs on the sheet provided along with the infusion rate.
 5. Adjust the infusion rate every hour according to the patient's BSLs-using **Table 2.** All infusion rate changes are to be checked by two RN/RMs. If the patient is not responding to increasing the insulin infusion, consider errors relating to: the insulin infusion preparation, intravenous tubing, IV cannula and/or blood glucose monitor. The endocrinologist/obstetric physician should be contacted if this occurs.
 6. Insulin requirements decrease after the birth of the placenta, and women are at increased risk of hypoglycemia. Target BSLs of 5-10 mmol/L are adequate. Check BSLs every 30minutes for the 1st two hours after birth, and then hourly as usual. The infusion should be ceased as soon as possible after labour i.e. when the patient is able to eat and take her normal insulin, as per Diabetes Mellitus Management in pregnancy LOP
 7. Check ketones on urinalysis with each void in all patients with Type 1 diabetes, or 4th hourly in labor using finger prick KetoStix.

Risk Rating

- High

NATIONAL STANDARD

- Standard 4 - Medications

REVISION & APPROVAL HISTORY

Reviewed and endorsed Therapeutic & Drug Utilisation Committee March 2020
Approved Quality & Patient Care Committee 16/2/17
Reviewed and endorsed Therapeutic & Drug Utilisation Committee 13/12/16
Previously titled *Insulin Infusion Protocol*
Approved Quality & Patient Safety Committee 17/4/14
Reviewed and endorsed Therapeutic & Drug Utilisation Committee 8/4/14
Approved Patient Care Committee 5/3/09
Endorsed Therapeutic & Drug Utilisation Committee 16/12/08

FOR REVIEW : APRIL 2022

Royal Hospital for Women

**Adult Intravenous Insulin
Infusion Protocol**

Surname.....MRN.....
 Other names.....DOB.....
 Address.....
 DOB.....AMO.....

Table 1: Commencement rate for insulin infusion

Capillary BSL (mmol/L)	mL per hour (= units of actrapid per hour)
≤ 3.5	No insulin. Check BSLs every 15minutes and call medical officer to advise.
3.5 - 5.0	Nil
5.1 - 7.0	1
7.1 - 9.0	2
9.1 - 11.0	3
11.1 - 13.0	4
13.1 - 15.0	5
≥ 15.0	Contact Endocrinology team

Table 2: Adjusting insulin infusion

BSL IN MMOL/L	ACTION REQUIRED 1ml=1unit insulin Do not increase more rapidly than every hour.	FREQUENCY OF BSL (See diabetes management plan)
>15mmol/L	Give 4mL bolus stat. Increase infusion rate by 1mL/hr Check for ketones	Retest BSL in 1 hour. (IF BSL REMAINS >15MMOL/L NOTIFY PHYSICIAN)
8-15mmol/L	Increase insulin rate every hour by 1mL/hr until <8 mmol/L. If exceeding 5mL/hr inform endocrinologist/obstetric physician. Check for ketones	Retest BSL in 1 hourly.
5-7mmol/L AND recent increase to insulin infusion rate in the last hour .	Reduce insulin rate by 1mL/hr	Retest BSL in 1 hour.
5-7mmol/L AND NO increase to insulin infusion rate in the last hour .	Maintain infusion rate.	Retest BSL in 1 hour.
4-5mmol/L	Halve insulin infusion rate.	Retest BSL in 1 hour.
<4mmol/L	Stop Insulin infusion allow patient to eat as per hypo management or give 50mL bolus of 10% Dextrose IV If still <4 mmol/L, leave infusion off and consult with physician. If BSL 4-6 mmol/L leave infusion off Once BSL > 6.0 mmol/L, recommence infusion at HALF the previous rate.	Retest BSL in 15 minutes. Retest BSL in 15 minutes. Retest BSL in 1 hour and follow Table 2 IF BSL REMAINS <4 MMOL/L NOTIFY ENDOCRINOLOGY / OBSTETRIC PHYSICIAN ON CALL

