Intravenous Insulin Therapy in Critical Care

Title: Intravenous Insulin therapy in Intensive Care	
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Guideline Summary

This guideline is designed to identify which method of insulin administration should be used for any individual patient with hyperglycaemia **in Critical Care. This protocol should not be used on the General Ward and patients should be transitioned to the ward based insulin protocol at the point of discharge from Critical Care.**

Patients requiring insulin therapy fall into 2 separate groups: those with active organ failure and those without active organ failure.

Because of this difference we use 2 separate insulin protocols.

This guideline is NOT designed for use in Diabetic Emergencies (DKA, HHS) or following Simultaneous Kidney Pancreas (SKP) transplantation and is not designed to apply where insulin is used for reasons other than glycaemic control (ie drug overdose).

When to use Protocol 1:
A proportion of patients admitted to critical care (whether level 2 or 3) will have hyperglycaemia as part of their overall organ dysfunction. These patients may or may not have a history of diabetes and may or may not have pre-existing insulin use. There is evidence that control of these patients' blood sugar influences critical care outcome[1] Patients in this group should use protocol 1. When these patients are in the recovery phase of their organ failure it may be reasonable to consider switching to protocol 2.

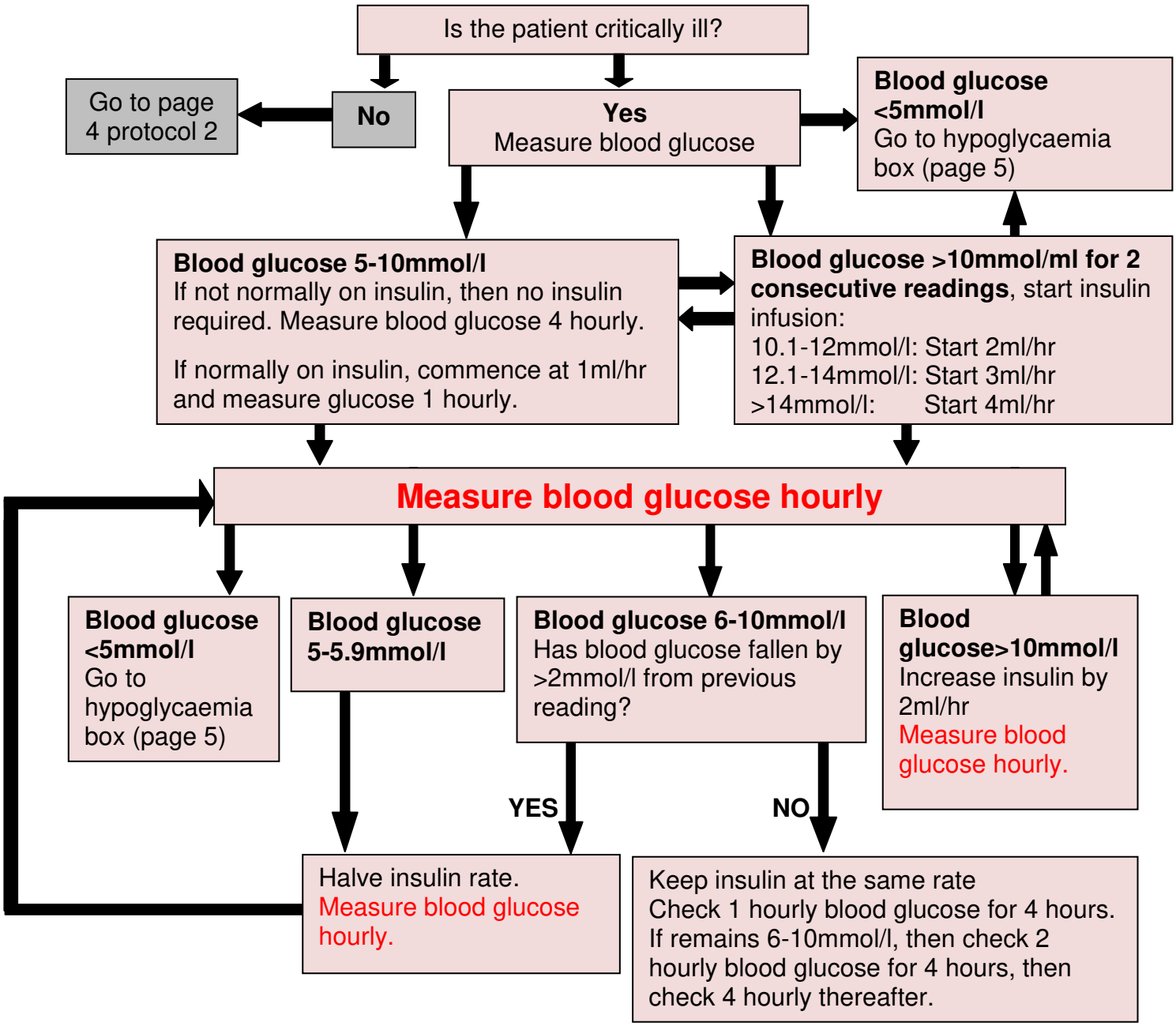
Examples of when protocol 1 should be used:
-Most emergency level 2 and 3 admissions with any organ failure

When to use Protocol 2:
Many patients with pre-existing diabetes will be admitted to Critical Care following elective surgery and will not have active organ failure. These patients (whether level 2 or 3) should be managed with protocol 2. If these patients develop organ failure consider switching to protocol 1.

Examples of when to use protocol 2:
-Most elective admissions without organ failure

Protocol 1: Glucose Control for Patients who are Critically ill

Before starting insulin always check the A-line flush line is 0.9% NaCl and not 5% Glucose
It is vital that patients who are normally on insulin always receive insulin.
Please ensure the Insulin Prescription specifies which Protocol is to be followed.



If any change in rate then start at 1 hourly blood glucose monitoring

All patients receiving IV insulin must be receiving sugar at the same time. This may be in the form of TPN, enteral feed or IV fluid containing glucose.
If the insulin infusion is stopped for any reason, measure blood glucose and if >10mmol/l then start at previous rate and resume hourly blood glucose monitoring.
Insulin is always made up as 50units of Actrapid in 50ml of 0.9% sodium chloride, ensure prescribed on kardex and charted on 24 hour chart.
The insulin prescription should specify whether Protocol 1 or 2 is to be used. If there is a change in Protocol used, the prescription should be re written.

Protocol 2: Glucose Control for Stable Critical Care Patients.

Before starting insulin always check the A-line flush line is 0.9% NaCl and not 5% Glucose
It is vital that patients who are normally on insulin always receive insulin.
Please ensure the Insulin Prescription specifies which Protocol is to be followed.

The glucose level at which Protocol 2 is initiated will be stipulated by the Crit. Care medical team. Patients who are not critically unwell should continue on their normal long acting insulin. (dose adjustment may be required).

Measure blood glucose
If <5mmol/l then go to hypoglycaemia box (page 5).

⬇

5.1-8mmol/l:	1ml/hr
8.1-12mmol/l:	2ml/hr
12.1-16mmol/l:	4ml/hr
16.1-20mmol/l:	5ml/hr
20.1-24mmol/l:	6ml/hr
>24mmol/l:	8ml/hr

If blood glucose >20mmol/l or >16mmol/l for more than 2 hours, then inform medical staff.

Blood glucose should be measured hourly initially, then 2 hourly if remains 6-11mmol/ml. If outwith this range, consider returning to hourly blood glucose monitoring.

This variable rate insulin infusion prescription is a suggested starting point which is suitable for most patients. Some patients may be relatively insulin resistant or sensitive. If patients are having persistent periods of hyperglycaemia or hypoglycaemia then they may need an individual prescription.
Further advice can be found in appendix 1. Once recovered and eating the patient may be able to re-commence their usual s/c insulin regime.

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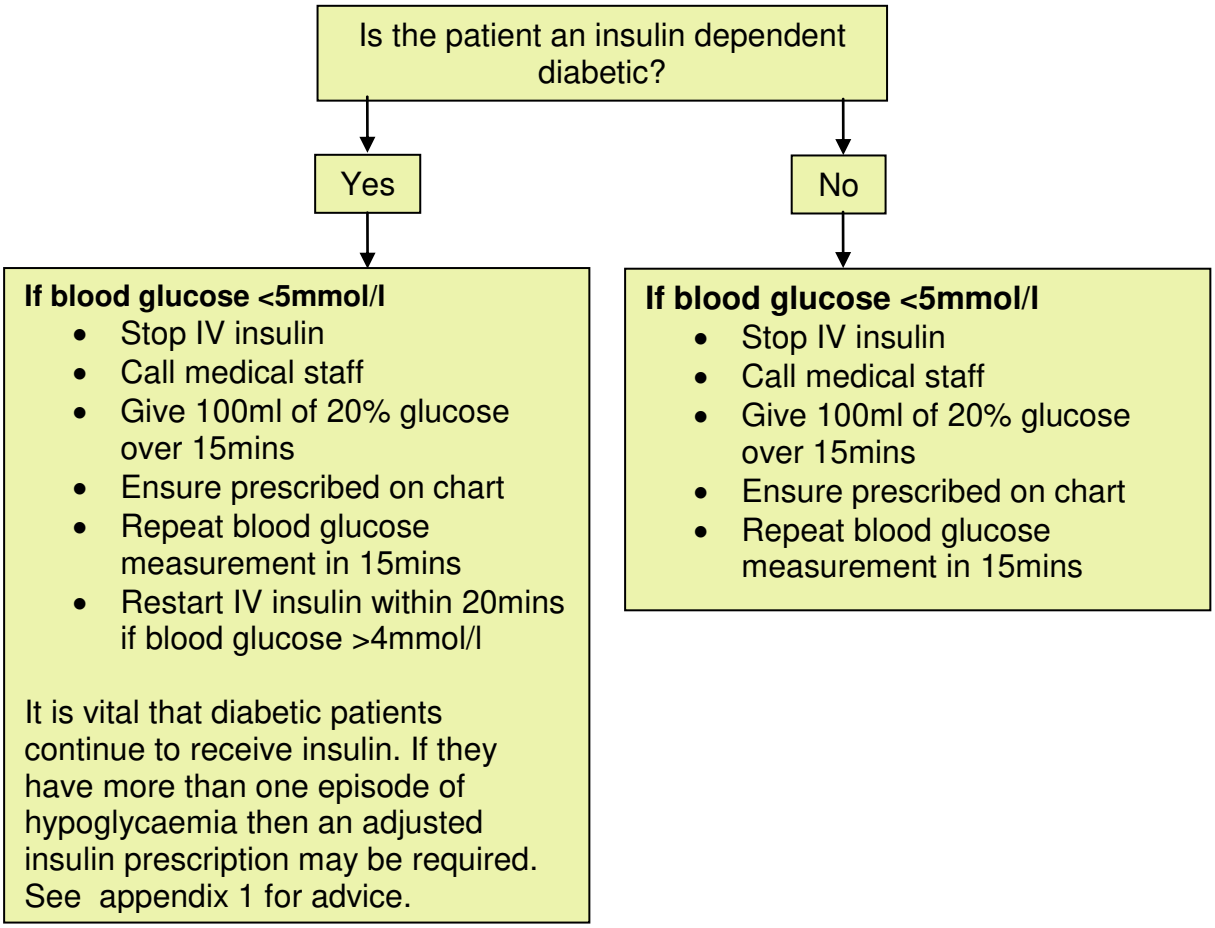
Treatment of Hypoglycaemia



1- NICE-SUGAR: Intensive versus Conventional Glucose Control Finfer et al. N Engl J Med 2009; 360:1283-97

Appendix 1

Guidance on variable rate insulin scales for patients who have evidence of insulin sensitivity or insulin resistance adapted from the ABCD 2014 guidance:

Glucose mmol/L	Insulin Rates (ml/hour) Start on standard rate unless otherwise indicated		
	Reduced rate (for INSULIN SENSITIVE patients eg <24 units per day)	Standard Rate (first choice in most patients)	Increased rate (for INSULIN RESISTANT patients eg >100 units per day)
If a patient is on basal s/c insulin –continue this alongside Protocol 2			
<5.0	0	0	0
5.1-8.0	0.5	1	2
8.1-12.0	1	2	4
12.1-16.0	2	4	6
16.1-20.0	3	5	7
20.1-24.0	4	6	8
>24.1	5	8	10