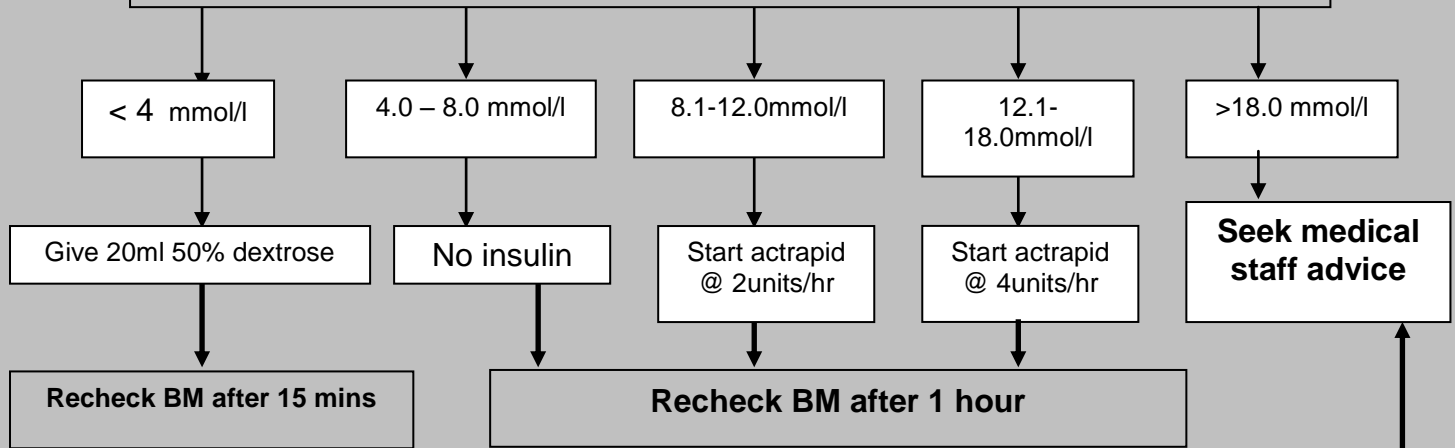
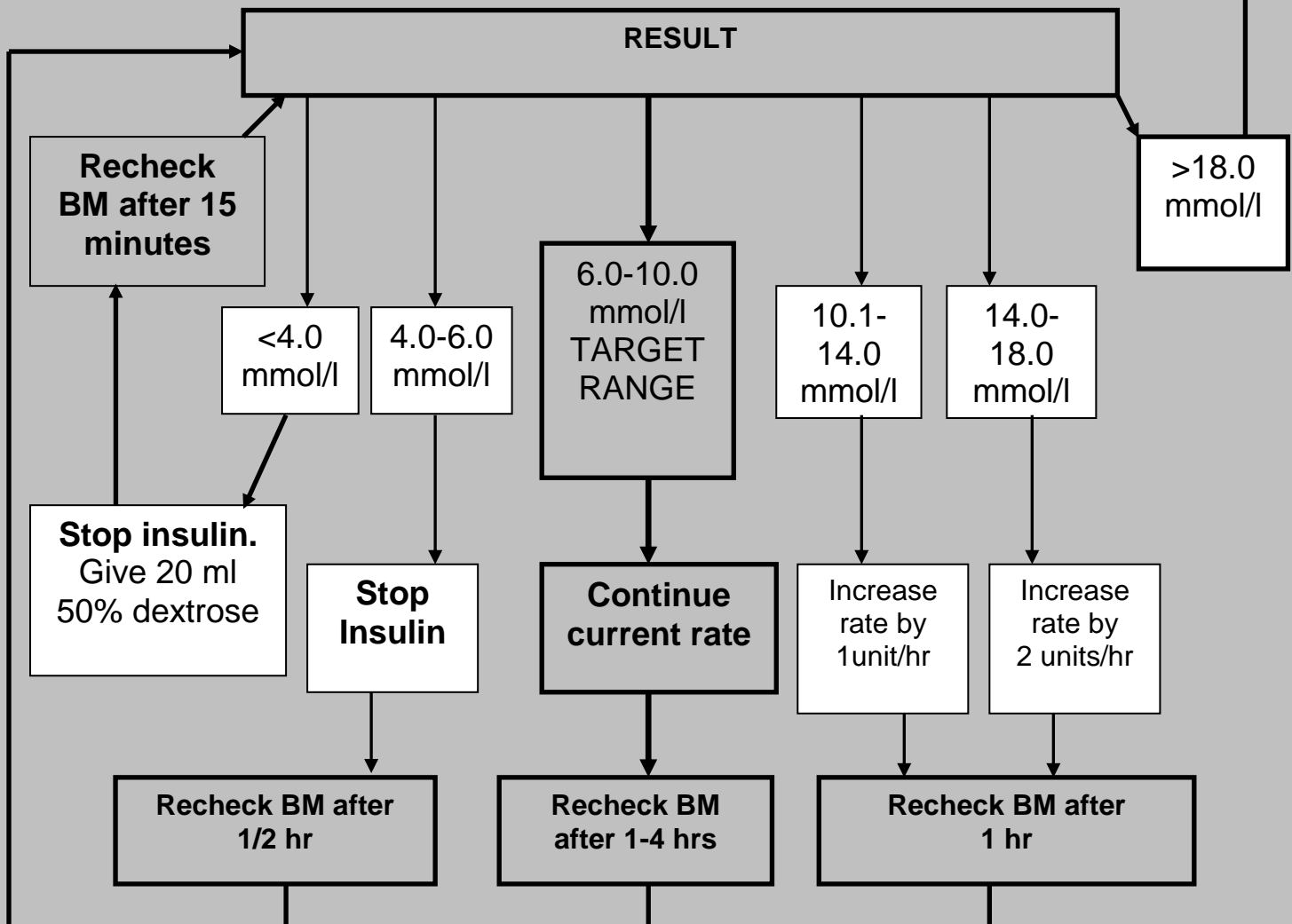


Initiating Freeman ICCU Insulin Regime

Measure baseline blood glucose
Commence dextrose infusion: 84 mls/hr 10% or 42 mls/hr 20%
and an actrapid infusion as below.
Dextrose can be substituted for TPN or feed as per separate protocol



Maintaining Insulin Regime



The Newcastle upon Tyne Hospitals NHS Foundation Trust

Insulin Infusions for Critically Ill patients

Version No.:	1
Effective From:	4 th December 2013
Expiry Date:	1 st February 2016
Date Ratified:	20 th November 2013
Ratified By:	Critical Care Guideline Group

1 Introduction/Guideline Scope

Good plasma glucose level control should be a standard of care in critical care patients.

2 Evidence Review

The evidence for glucose level control can be contradictory but the most recent studies suggest a level of 4.5- 8 mmol/l should be the target range

3 Main Body of Guideline

3.1 Patient Selection

All patients should be treated with this protocol

3.2 General Management

On admission to ICU, start intravenous dextrose infusion. Use either 20% dextrose run at 40ml/hr via central venous catheter-CVC (for those who need to be volume restricted), or 10% at 80ml/hr (can be given via peripheral cannula). This will provide around 200cal in the first 24 hours. Other maintenance fluids for volume replacement given prescribed.

Start enteral feed as soon as possible, according to current unit policies.

Consider early post pyloric tube placement in any patient expected to spend more than 3 days in ICU. Consider TPN for patients with pre-existing malnutrition who are expected to spend more than 5 days in ITU.

As enteral feed is introduced wean back 10% dextrose accordingly by 2ml/hr for each ml/hr of enteral feed. (20% by 1ml per ml). NB when feed is first started (25ml / hr) assume that it will be absorbed and reduce the dextrose infusion. (ie feed at 25ml = reduce 10% dextrose to 30ml/hr). If large aspirates occur and feed is reduced to 10ml/hr then discount it from calorie intake and give full volume dextrose infusions.

If a rest period is being used with enteral feed give 10% (or 20%) dextrose at full rate for the duration of this period, then cease as feed restarts.

* This does NOT include other interruptions ie trips to theatre etc. where both feed and insulin should be ceased.

3.3 Insulin Infusion

50 units of Insulin (Actrapid) is mixed with 50mls 0.9% (Normal) Saline. It is stable for up to 24 hours.

Give this by continuous infusion via a central line (if possible). The rate of infusion is altered according to the attached algorithm.

3.4 Blood glucose control

Measure blood sugar with the "Roche" blood glucose machine. Lab glucose should be sent with morning bloods and repeated at 4pm every day. Use lab result to compare with Roche result at 7am and 4pm. Note the "Roche" readings may over-read especially in patients with a low heamatocrit. If "Roche" reading is <4 then send an urgent lab sample too. Initially, measure BM every hour and adjust as per protocol.

As normoglycaemia is **reached and if insulin rate has been steady for at least 3 hours** this can be reduced to every two, then four hours. If rapid changes (more than 50% of preceding BM) or hypoglycaemia occur, more frequent monitoring is required, ie every 15 minutes. Target blood glucose is 6.0 to 10.0 mmol/l.

"Wild swings" in blood glucose or BMs >18.0mmol/l: consult medical staff

3.5 Events that may alter Insulin requirement

- During short interruptions to enteral feeding and cessation of dextrose infusions: (CT scan, theatre, extubation, etc) stop insulin infusion and check BM hourly.
- Insulin sensitivity improves with time, so requirements may fall after a few days in ICU.
- When patients first start enteral (NG/NJ or oral) feeding, absorption may be erratic: monitor blood glucose more frequently.
- Pyrexia increases insulin requirements.
- Patients receiving steroids may have increased insulin requirements.
- **Patients with acute renal failure**

If there are concerns about fluid overload: Use 20% dextrose at 42ml/hr on admission (and wean to feed as protocol). Other fluid replacement (e.g. when replacing previous hours urine output etc) use Normal saline unless significant hypernatraemia. If dextrose-containing fluids are used for volume replacement consult medical staff re insulin dosing.

- Changing inotrope requirements are likely to lead to changing insulin dose.

3.6 Discharge to ward care

As soon as the decision to discharge a patient from the ITU (including to HDU) is made the standard Trust guidelines for glucose control on the wards will apply. If the patient remains on an insulin infusion at this time consider starting a GKI and refer to the diabetic team for ongoing management. The wards should be notified of a need for more regular BM checks following the immediate discharge period.

Aim for BM control below 11mmol/l for ward care.

4 Training/ Implementation

Via nursing and medical educators as part of basic competencies

5 Monitoring/ Audit

A yearly monitoring of glucose levels within ICCU should be carried out. Audit tool is with the ICCU medical audit lead.

6 References:

Van de Berge G, Wouters P, Weekers F, et al. Intensive Insulin therapy in critically ill patients. **NEJM**. 2001. **345** (19). 1359-67.

NICE SUGAR