

ICU Management Protocol No. 6

INTENSIVE INSULIN INFUSION

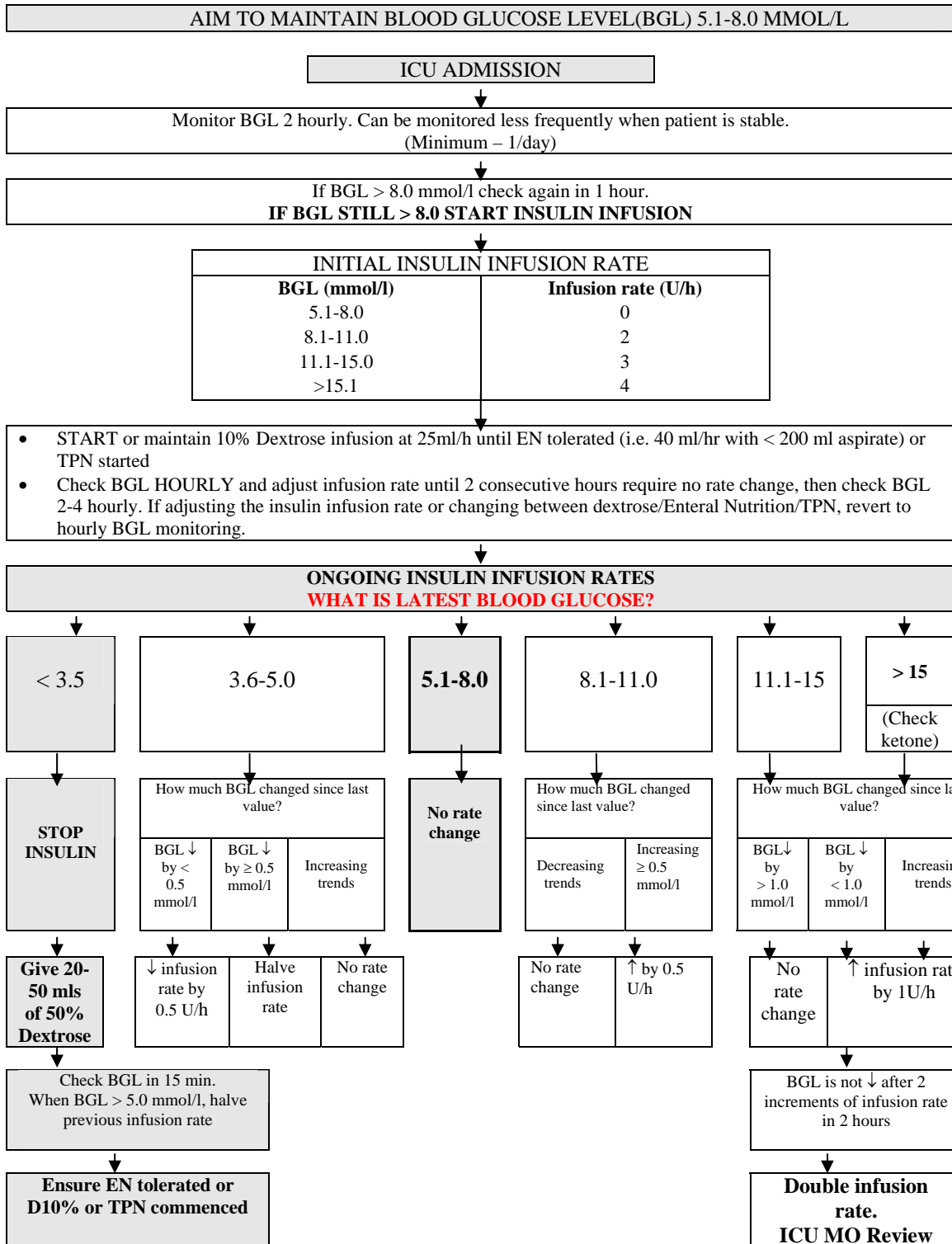
Introduction

- The role of intensive insulin treatment is to maintain tight control of blood glucose in critically ill patients.
- In a prospective, randomised, controlled study of mechanically ventilated adults, intensive insulin therapy reduced mortality to 4.6% compared with a conventional treatment group which had a mortality rate of 8%. The greatest reduction in mortality involved deaths due to multi-organ failure with a proven septic focus.
- You may choose to use either Protocol A or Protocol B

Protocol A

1. This protocol is not suitable for patients with diabetic ketoacidosis or children under the age of 16 years old.
2. The aim of blood glucose level (BGL) is between **5.1 – 8.0** mmol/l.
3. Start protocol when BGL exceeds 8.0 mmol/l after 2 consecutive readings in 2 hours.
4. Insulin Infusion: Use Soluble Insulin 50 units in 50 ml 0.9%NaCl infused through a dedicated cannula or central line lumen.
5. Blood glucose monitoring: Initially hourly monitoring, then 2-4 hourly when there is no rate change in 2 consecutive hours.
6. Patients who develop symptoms of severe hypoglycaemia should be treated as if BGL < 3.5 mmol/l. Symptoms include tremors, tachycardia, sweating, confusion and agitation leading to fitting and coma.
7. Feeding: Continuous feeding is recommended. Give IV dextrose 10% at 25ml/h until EN is tolerated or TPN is started. If EN is discontinued for any reason, recommence IV Dextrose 10% infusion at 25ml/h and continue insulin infusion.
8. Stop protocol when patient is taking food orally.
9. Other infusions (especially antibiotics) should be made up with water or saline if possible.
10. Patients should be converted to a standard hospital intermittent regimen (if required), before ICU discharge.

INTENSIVE INSULIN INFUSION IN THE ICU



Protocol B

1. Intensive insulin therapy is recommended to maintain serum glucose levels between **5 to 8 mmol/l** in all ICU patients.
2. Continuous intravenous insulin infusion (CIVII) through a pump is preferred as it offers smooth control.
3. Dilute 50 units of soluble insulin in 50 ml of normal saline in a syringe and deliver it by an infusion pump.
4. Start CIVII with scale 1 or 2 initially.
5. Blood glucose level (BGL) should be monitored at 2 h intervals. Depending on whether the blood glucose improves 4 h later, the sliding scale may be switched to one with a higher initial CIVII rates. (e.g. from scale 1 to scale 3)
6. BGL may be monitored less regularly (i.e. 4 h intervals) once stable.

Continuous intravenous insulin infusion

Blood glucose (mmol/l)	Scale 1 (U/h)	Scale 2	Scale 3	Scale 4	Scale 5	Scale 6	Scale 7	Scale 8
≥ 22	3.0	4.0	5.0	6.0	7.0	8.0	10.0	11.0
18-	2.5	3.5	4.0	5.0	6.0	6.0	8.0	9.0
14-	2.0	3.0	3.0	4.0	5.0	5.0	6.0	7.0
12-	1.5	2.5	2.5	3.0	4.0	4.0	4.0	5.0
10-	1.0	2.0	2.0	2.0	3.0	3.0	3.0	4.0
8-	1.0	1.5	1.5	1.5	2.0	2.0	2.5	3.0
6-	0.5	1.0	1.0	1.0	1.5	1.5	2.0	2.0
5-	0.5	0.5	0.5	0.5	1.0	1.0	1.5	1.5
< 5	Stop IV insulin infusion and inform doctor							

References

1. Van den Berghe G, Wouters P, Weekers F et al. Intensive insulin therapy I critically ill patients. N Eng J Med 2001; 345: 1359-1367.
2. Van den Berghe G, Wilmer A, Hermans G, et al. Intensive Insulin Therapy in the Medical ICU. N Engl J Med 2006; 354:449-61.
3. Krinsley J. Effect of an Intensive Glucose Management Protocol on the Mortality of Critically Ill Adult Patients. Mayo Clinic Proceedings 2004; 79(8): 992-1000.