

# MANAGEMENT OF HYPERGLYCAEMIA DURING ENTERAL FEEDING OF STROKE PATIENTS WITH DIABETES

## Diagnosis of stroke

- ❶ Target blood glucose: 4-7.8 mmol/L pre and post-meal.
- ❶ Check CBG every hour whilst on Variable Rate Intravenous Insulin Infusion (VRIII/Sliding scale)
- ❶ If CBG persistently elevated (>7 mmol/l) does patient already have diagnosis of diabetes?
  - If so – type 2 or type 1 diabetes?
  - If unsure refer to diabetes specialist team for clarification
- ❶ Measure CBG 4-6 hourly (hourly if VRIII in use)  
Target CBG levels:
  - Fasting/Pre-feed 5-8 mmol/l
  - Feeding 6-12 mmol/l
- ❶ Review insulin and medication on admission.
  - MDT decision to feed via NGT- Dietitian to prescribe appropriate feed regimen for patient
  - Refer to diabetes specialist team at earliest opportunity

### Patient with type 1 diabetes

- Continue long acting analogue insulin in regimen (eg, Lantus, Levemir, Toujeo, Degludec).
- Consider bolus doses of soluble or rapid acting insulin at start, 6 and 12 hours into feed as required.
- Involve specialist diabetes team at earliest opportunity
- Avoid unnecessary use of VRIII
- If patient on continuous subcutaneous insulin pump this should be stopped and subcutaneous insulin commenced.

### Patient with well-controlled type 2 diabetes (CBG 6 – 12 mmol/l)

- Consider metformin powder resuspended and administered via NGT if CBG rising >12 mmol/l during feeding
- Continue feed regimen
- Review every 48 hours by specialist diabetes team or if feed regimen altered, hypoglycaemia or recurrent hyperglycaemia

### Patient with poorly controlled type 2 diabetes (CBG persistently >12)

- Continue metformin if indicated using resuspended metformin powder via NGT
- If CBG >12 mmol/l assess feed regimen and commence an insulin regimen from choices below-
  1. Pre-mixed (30/70) human insulin at start and midpoint of feed.
  2. Isophane insulin at start and midpoint of feed.
  3. Continuation of basal insulin if already prescribed with bolus doses soluble insulin at start, 6 and 12 hours into feed as required (Table below for more info)

- Treatment of hyperglycaemia - if CBG persistently >12 mmol/l - increase insulin doses by 2 - 4 units or (10-20%) per dosage adjustment.
- Liaise with specialist diabetes team for advice.

- If feed stopped for longer than 2 hours and insulin has been administered, risk of hypoglycaemia is high. Consider commencing IV 10% glucose to avoid hypoglycaemia.
- In people with type 1 diabetes not receiving basal insulin a VRIII should be commenced if feed turned off for greater than 2 hours to avoid patient developing DKA due to omission of insulin
- If ketonaemia (>3 mmol/l) or ketonuria (>2+) refer patient urgently to doctor or out-of hours medical team for review and FRIII/VRIII and DKA management if required.

- Continue feed regimen. Review every 48 hours by specialist diabetes team or if feed regimen altered, hypoglycaemia or recurrent hyperglycaemia.

## AVAILABLE INSULINS AND GUIDELINES FOR APPROPRIATE USE

Type of insulin regimen	Name of insulin available	✔ Advantages	✘ Disadvantages	When to use
Pre-mixed human/ analogue insulin at start and mid point of feed	<ul style="list-style-type: none"> <li>Humulin M3®, Insuman Combo</li> <li>NovoMix30, HumalogMix25 and HumalogMix50</li> </ul>	<ul style="list-style-type: none"> <li>Required bd.</li> <li>Moderately long-acting profile – 8-12 hours.</li> <li>Fewer injections</li> </ul>	<ul style="list-style-type: none"> <li>If feed stops insulin continues to work – risk of hypoglycaemia.</li> </ul>	<ul style="list-style-type: none"> <li>For use in feeds that are 12 – 24 hours long.</li> <li>Use 1 – 2 doses during feed, as required.</li> </ul>
Intermediate- acting human insulin (Isophane) at start and mid-point of feed	<ul style="list-style-type: none"> <li>Insulatard, Humulin I or Insuman Basal</li> </ul>	<ul style="list-style-type: none"> <li>Isophane has moderately long-acting profile – 8-12 hours. Cost effective insulin.</li> <li>May only require one injection daily – but will require 2 in most cases.</li> </ul>	<ul style="list-style-type: none"> <li>If feed stops insulin continues to work – risk of hypoglycaemia.</li> <li>Peak of action at 8 hours – may cause hypoglycaemia.</li> <li>May need extra soluble human insulin added earlier or later in feed.</li> </ul>	<ul style="list-style-type: none"> <li>Use in feeds that are 12 – 24 hours long.</li> <li>Use 1 – 2 doses during feed, as required.</li> </ul>
Short-acting human insulin	<ul style="list-style-type: none"> <li>Soluble human - Actrapid, Humulin S, Insuman rapid</li> </ul>	<ul style="list-style-type: none"> <li>Short-acting insulin added in is a flexible and cost-effective option</li> </ul>	<ul style="list-style-type: none"> <li>Glucose-lowering effects of short-acting insulin alongside premixed or moderately long-acting insulin may be unpredictable.</li> </ul>	<ul style="list-style-type: none"> <li>Single doses of short-acting insulin may be best used in the context of repeated bolus feeding. Give insulin dose 20 minutes before feed starts.</li> </ul>
Rapid-acting insulin analogue	<ul style="list-style-type: none"> <li>Novorapid, Apidra® or Humalog</li> </ul>	<ul style="list-style-type: none"> <li>Rapid onset of action.</li> <li>3 – 4 hour period of action - flexible.</li> </ul>	<ul style="list-style-type: none"> <li>Unlikely to be effective unless used alongside intermediate-acting or basal insulin. Rapid-acting analogues are costly.</li> </ul>	<ul style="list-style-type: none"> <li>May be useful for patients with type 1 diabetes receiving bolus feeds.</li> </ul>
Long-acting analogue Insulin od or bd	<ul style="list-style-type: none"> <li>Lantus® od or Levemir® od or bd</li> </ul>	<ul style="list-style-type: none"> <li>Long-acting insulin works well to cover 20 – 24 hour feeds.</li> <li>Useful for type 1 patients.</li> </ul>	<ul style="list-style-type: none"> <li>Long-acting insulin more expensive.</li> <li>Not appropriate for shorter bolus feeds as may cause hypoglycaemia. Also risk of hypoglycaemia in rest period or if feed interrupted for long periods.</li> </ul>	<ul style="list-style-type: none"> <li>For use with patients requiring 16 – 24 hr feeds with hyperglycaemia not controlled with isophane or pre- mixed insulin, or in patients with type 1 diabetes.</li> </ul>