

Guidelines for the management of patients with hyperglycaemia or diabetes and acute myocardial infarction

ELIGIBLE PATIENTS

All patients admitted with acute myocardial infarction requiring thrombolysis with an admission laboratory blood glucose of >11.0mmol/l, and all patients with diabetes (regardless of blood glucose on admission) should be managed with an insulin / glucose infusion for at least 24 hours. The patient will then be converted to subcutaneous insulin for 3 months after discharge.

On Admission

- Laboratory investigations to include:
 - Blood Glucose
 - HbA1c
 - U&E's
 - FBC
 - Lipids

Guidelines for the use of sliding scale insulin

- All patients admitted with a blood sugar of >11.0mmol/l and acute myocardial infarction requiring thrombolysis require i.v. insulin on admission. The sliding scales below should be used.
- **All** oral hypoglycaemic agents should be discontinued when commencing an insulin sliding scale.

Use soluble insulin (Actrapid or Humulin-S) in a dilution of 50 units in 50ml of normal saline.

BLOOD GLUCOSE	INSULIN RATE / HR	INSULIN RATE / HR	INSULIN RATE / HR	INSULIN RATE / HR
	A	B	C	D
0 - 4	0.5*	0.5*	0.5*	0.5*
4.1 - 7	1	2	3	4
7.1 - 9	2	4	6	8
9.1 - 11	3	6	9	12
11.1 - 13	4	8	12	16
13.1 +	6	12	18	24

***Stop infusion for 15mins and treat hypo**

How to start sliding scale of insulin

- Start with scale A unless the patient is usually on a total daily dose of insulin of more than 100u of insulin, in which case start with scale B.
- If blood glucose > 7.0mmol/l for 3 consecutive hourly tests AND blood glucose is either rising, or has fallen by less than 25% in the last hour, step up to the next scale (e.g. if on scale A, increase to scale B; if on scale B, increase to scale C etc).
- If blood glucose < 3.5 mmol/l, step down to the next scale (e.g. if on scale D, decrease to scale C; if on scale C, decrease to scale B etc).
- Before adjusting sliding scale check venflon site, if tissue resite venflon. Do not adjust sliding scale.

Accompanying intravenous fluids

- When blood glucose is <15 mmol/l, intravenous dextrose should also be given, usually in the form of Dextrose 4% / Saline 0.18% (1 litre every 8 hours, with 20mmol potassium per litre) - this may need to be adjusted according to individual circumstances.
- If you do not wish to give sodium because of heart failure or renal disease, 5% dextrose may be substituted and infused at a lower rate (with potassium). If fluid overload is a real worry, 10% dextrose may be substituted and given at 1 – 1.5 litres per day with appropriate potassium supplement. There is an increased risk of local phlebitis, and therefore this is best given via a central line and an IVAC or similar drip regulator.
- When blood glucose is > 15 mmol/l, N/Saline 0.18% should also be given, (1 litre every 8 hours) – this may need to be adjusted according to individual circumstances and depending on blood glucose levels.

Blood Glucose monitoring

Aim for blood glucose of 4 – 9 mmols. Check capillary blood glucose at least hourly to start with, and at any time when the blood glucose goes outside the target range, or the patient is 'ill'.

If the blood glucose is stable within the target range, then 2 - 4 hourly tests will suffice.

Converting onto subcutaneous Insulin

Patients should remain on sliding scale insulin for at least 24 hours.

If patient is eating & drinking they should then be converted onto either

1. **QDS insulin regime** (4 injections per day-given prior to breakfast, lunch, evening meal and supper)

OR

2. **BD insulin regime** (2 injections per day-given prior to breakfast and evening meal).

How to convert to subcutaneous insulin dose

- Work out total amount of insulin required in previous 24 hrs on sliding scale
- If patient is going onto **QDS** insulin regime, give a third of total dose pre – supper and divide remaining dose evenly between breakfast, lunch and evening meal.

For Example.

If total amount of insulin required in 24 hrs on insulin sliding scale = 36units convert to:

	Pre-Breakfast	Pre-Lunch	Pre - Evening meal	Pre-Supper
Soluble insulin Actrapid or Humulin S or Humalog or Novo Rapid	8units	8units	8units	
Isophane insulin Insulatard or Humulin I				12 units

If patient going onto **BD** insulin regime, give 50% of total daily dose pre-breakfast and remaining 50% insulin pre- evening meal

For Example

If total dose of insulin required in 24 hours on insulin sliding scale was 36 units convert to:

	Pre-Breakfast	Pre-Lunch	Pre - Evening meal	Pre-Supper
Pre-mixed insulin Human Mixitard 30/70 or Humulin M3	18units	-	18units	-

- Administer 1st dose of s/c insulin prior to next main meal and continue insulin sliding scale infusion for half an hour, then discontinue sliding scale

- If converting patient to Humalog or Humalog Mix 25 insulins, overlap insulin sliding scale by 10 minutes only.
- Insulin doses will need to be altered daily to achieve target blood glucose levels of 4 - 9 mmols.

Dietetics

NB All patients transferred onto subcutaneous insulin **must** be referred to, and should be seen by a dietitian before discharge. Please refer patient as soon as possible and inform the dietitian that the patient is a transfer onto insulin as a result of acute myocardial infarction.

Please refer all patients to Dr Manns' or Dr Rowe's team and hospital diabetes nurse (5089) as soon as possible following admission. They will arrange education / support and a subsequent **3-month** follow up appointment and aim to ensure optimum glycaemic control during this period. Treatment will then be individualized to the patient's circumstances.

Discharge Follow up

On discharge the hospital diabetes nurse will refer the patient appropriately and organize appropriate follow-up appointments as necessary.

All patients will need a 3 month follow up appointment with a diabetologist.

Guidelines for the care of patients receiving insulin treatment following a myocardial infarction after discharge from hospital.

1. Patients and their carers referred to the Diabetes Specialist Nursing service will receive specialist diabetes nursing care, education and support to optimize their diabetes control and quality of life.
2. The aim of care is to establish and / or maintain good glycaemic control (blood glucose levels 4-9mmol/L) using appropriate dietary and insulin treatments. This will be done by maintaining regular contact with the diabetes specialist nurses (DSN) and dietitian via drop-in-clinic or the telephone. Home visits can also be provided for the house bound patient.
3. Patient's treatment and plan of care should be reviewed after 3 months by a diabetologist
4. **Patients known to have Type 2 Diabetes Mellitus treated with oral hypoglycaemic agents at the time of myocardial infarction** requiring 8 units or

less in 24 hours to maintain good glycaemic control may stop insulin treatment 3 months after their myocardial infarction. This should be done at the start of the week and under close supervision of the DSN.

5. **Patients who were not known to have diabetes mellitus at the time of myocardial infarction** and are requiring 8 units of insulin or less in 24 hours can stop insulin treatment 3 months after their myocardial infarction. This should be done at the start of the week and under close supervision from the DSN. A glucose tolerance test should be performed 1 week after the withdrawal of insulin treatment and a normal diet to establish a diagnosis of diabetes according to the WHO criteria.
6. All patients will receive education and follow-up appropriate to their diagnosis.

Useful Telephone numbers

Dr Manns (Registrar) – bleep through switch board

Dr Rowe (Registrar) – bleep through switch board

Hospital Diabetes Specialist Nurse ext. 5089 (answer phone) or Air Call through switch

Community Diabetes Specialist Nurses (South Manchester) 945-8203

Hospital Dietician ext, 2701

