GUIDELINES FOR MANAGEMENT OF DIABETES IN PALLIATIVE CARE PATIENTS

Background

The aim of diabetes management in palliative care is to preserve quality of life; prevention of long term complications is usually unnecessary. Minimising adverse effects of diabetic treatment and avoiding metabolic decompensation, including symptomatic dehydration are key to ensuring good symptom control. Symptoms of hyperglycaemia may develop with glucose levels > 15mmol/l and of hypoglycaemia at < 4mmol/l.

Glucose control targets

- No pre-meal glucose level < 7mmol/l

- No pre-meal glucose level > 15mmol/l

Tailoring medication at different stages of illness

- In patients with several months' expected prognosis, consider whether cardio-protective drugs, such as ACE inhibitors, angiotensin-receptor blockers, aspirin and statins could be stopped.

- In patients with 1-2 months' estimated prognosis and on combinations of diabetic medications, consider converting to insulin alone, OD or BD regime. If the patient is already on BD insulin, consider changing to OD Isophane insulin at 75% of the total previous BD dose.

- In patients with an expected prognosis of weeks only, relax blood glucose control targets, but continue to assess for symptoms of hypo- and hyperglycaemia.

- If the prognosis is days, for Type 2 diabetic patients, stop all oral hypoglycaemic agents and consider whether insulin should be continued; for Type 1 diabetic patients, aim to continue long acting insulin. When continuing insulin, change to OD (morning) long-acting insulin, giving dose 25% less than previous total daily insulin dose. Check blood glucose at teatime, and if < 8 mmol/l, reduce insulin by 10-20%, but if >20mmol/l, increase insulin by 10-20% to reduce risk of ketosis.

- For both Type 1 and Type 2 diabetics, once a patient is unconscious (not induced by hyper or hypoglycaemia), and prognosis <48hrs, consider discontinuing insulin entirely.

Management of hypoglycaemia

- The risk of hypoglycaemia is increased in patients with poor appetite, renal or liver impairment, and in patients on insulin and sulphonylureas.

- If the patient is awake and can swallow, give 150ml of Coke, 200ml of orange juice, 100ml of Lucozade or 60ml of glucojuice (in hypo box in drug cupboard), 3-5 glucotabs (4g glucose per tablet) or glucogel (25g). If after 10 minutes blood glucose is still < 4mmol/l, repeat above. Once blood glucose > 4mmol/l, give the patient a banana or glass of milk or 2 digestive biscuits or a slice of bread or something similar.

- If the patient is on PEG feeds, stop their feed and insert 30ml of undiluted original Ribena, 150ml of Coke, 100ml of Lucozade or 60ml glucojuice into their PEG tube and repeat every 10 minutes until blood glucose > 4mmol/l. Once blood glucose above 4mmols, restart the feed.
- If the patient is unconscious due to hypoglycaemia, put them into the recovery position and administer 1mg glucagon IM or 40ml of 20% glucose IV over 10-15 minutes. Once the patient is conscious, give drinks and snacks as above. Note that glucagon may be less effective in cachectic patients.

General rules for oral diabetes medications

- **Metformin** is usually inappropriate in patients with an advanced malignancy due to its effect on appetite, weight and gastrointestinal side effects. It should be discontinued if creatinine is >150mmol/l or eGFR <30.

- **Sulphonylureas** (e.g. gliclazide) should be reviewed in patients experiencing weight loss, anorexia or dysphagia. Guidelines state to review dose of sulphonylureas if renal function 'deteriorates' but no cut-off level of function is described. Sulphonylureas can also cause hypoglycaemia in patients with reduced liver function.

- **Pioglitazone** is rarely appropriate in terminally ill patients and should not be used in patients with bladder tumours or heart failure.

- **Gliptins**, e.g. sitagliptin, should be reviewed in deteriorating renal function as doses may need to be reduced. The BNF states recommended dose reductions according to eGFR.

- **GLP-1 analogues**, e.g. exenatide, are not recommended for patients with significant weight loss and should be withdrawn if the patient develops abdominal pain, pancreatitis or any other GI related symptoms.

Preventing acute metabolic complications in diabetic patients who are acutely unwell

- Offer the patient frequent sips of sugar-free fluids.

- If patients are suffering with vomiting or diarrhoea, metformin should be stopped.

- If the patient is a type II diabetic and is not eating and blood glucose is <15mmol/l, all diabetic medications should be stopped, but if blood glucose continually >15mmol, consider increasing diabetic medications or administering PRN short-acting insulin.

- In type I diabetics on insulin, maintain hydration and monitor blood sugars closely. Take advice from Diabetic Team at Torbay Hospital and consider whether admission to the acute sector may be required.

Insulin usually kept at Rowcroft:-

Actrapid	Short-acting	Quick onset of action within 30-60 minutes, peak action between 2-4 hours, duration of action up to 8 hours
Novorapid	Rapid-acting	Rapid onset of action within 15 minutes, peaks at 2 hours, duration of action 3-4 hours
Humulin I	Intermediate-acting	Isophane insulin – Of particular value for initiation of BD regimes. Onset of action 1-2 hours, peak action 6 hrs, duration of action up to 18 hrs
Insulatard	Intermediate-acting	As Humulin I
Levemir	Long-acting	Like Glargine (Lantus) in that it is given once or twice daily. Onset of action of 1-2 hours, maximum effect at 4-12 hours, duration of action 16 – 35 hours

Patients on steroids

Patients on short courses of steroids (< 3 days) merely require closer monitoring of their blood glucose, but patients on longer steroid courses may need conversion of oral diabetic medications to insulin – see flow chart. The greatest rise in blood sugar is likely to occur 2-3 hrs after taking a corticosteroid, returning to normal by 12hrs later. Therefore longer acting oral hypoglycaemics or insulin may cause nocturnal hypoglycaemia.

MANAGING GLUCOSE CONTROL ON ONCE DAILY STEROIDS

No diabetes:-
- Check CBG before starting steroids
- Random CBG > 8mmol/l needs further checking with venous blood
- Random venous glucose > 7.8 means at risk of developing diabetes with steroids
- Random venous glucose > 11 needs second check to confirm pre-existing unknown diabetes

Known Diabetes – Steroids added

Diet - controlled or Metformin or Gliptin & Metformin

- Test before evening mealtime

- If repeatedly high (urine glucose > 2+ or CBG > 15mmol/l), consider, if symptomatic, adding Gliclazide 40mg with breakfast

- Increase morning Gliclazide by 40mg increments

- Aim CBG 7-15mmol/l or <1+ glycosuria before evening meal

If no hypo symptoms, taking 180mg gliclazide & BM still > 15mmol/l

- Add evening meal Gliclazide at 40mg or change to morning insulin

Sulphonylurea-treated (Gliclazide)

If no hypo symptoms & on < 320mg gliclazide daily

- Adjust gliclazide doses to give up to 160mg am and 160mg pm

- Aim for CBG 7-15mmol/l or < 1+ glycosuria before evening meal

If no hypos & on full 320mg/day:-
- Switch to morning Insulatard or Humulin I 10 units on day 1 of steroids
- Aim for CBG 7-15mmol/l before evening meal

If CBG > 15mmol/l before evening meal:-

- Increase dose by 4 units & review daily until stable

If CBG 10-15mmol/l before evening meal:-

- Consider increasing dose

Insulin controlled

Twice daily insulin:-

- Morning dose to increase according to CBG pre-evening meal

- Aim CBG 7-15 mmol/l pre-evening meal unless pt has a hypo before meals

If glucose > 15mmol/l before evening meal:-

- Increase morning insulin dose & r/v daily until stable

If glucose 10-15mmol/l pre-evening meal:-

- Consider increasing morning dose depending on hypo risk & r/v daily

Basal bolus insulin:-
- Breakfast & lunchtime rapid acting insulin may need to increase to avoid high readings before lunch / evening meal

- Aim CBG 7-15mmol/l before lunch & evening meal unless patient has a hypo before meals or has long gaps between meals

If CBG > 15mmol/l before lunch or evening meal:-
- Increase breakfast or lunchtime dose & r/v daily until stable
If CBG 10-15mmol/l before lunch or evening meal:-
- Consider increasing breakfast or lunchtime dose depending on hypo risk & r/v daily

Assuming no hypos, pre-meal time glucose is >10mmol/l and increase in dose is needed:-

- Increase dose by 2-5 units if dose < 20 units
- Increase dose by 5-10 units if dose 20-50 units
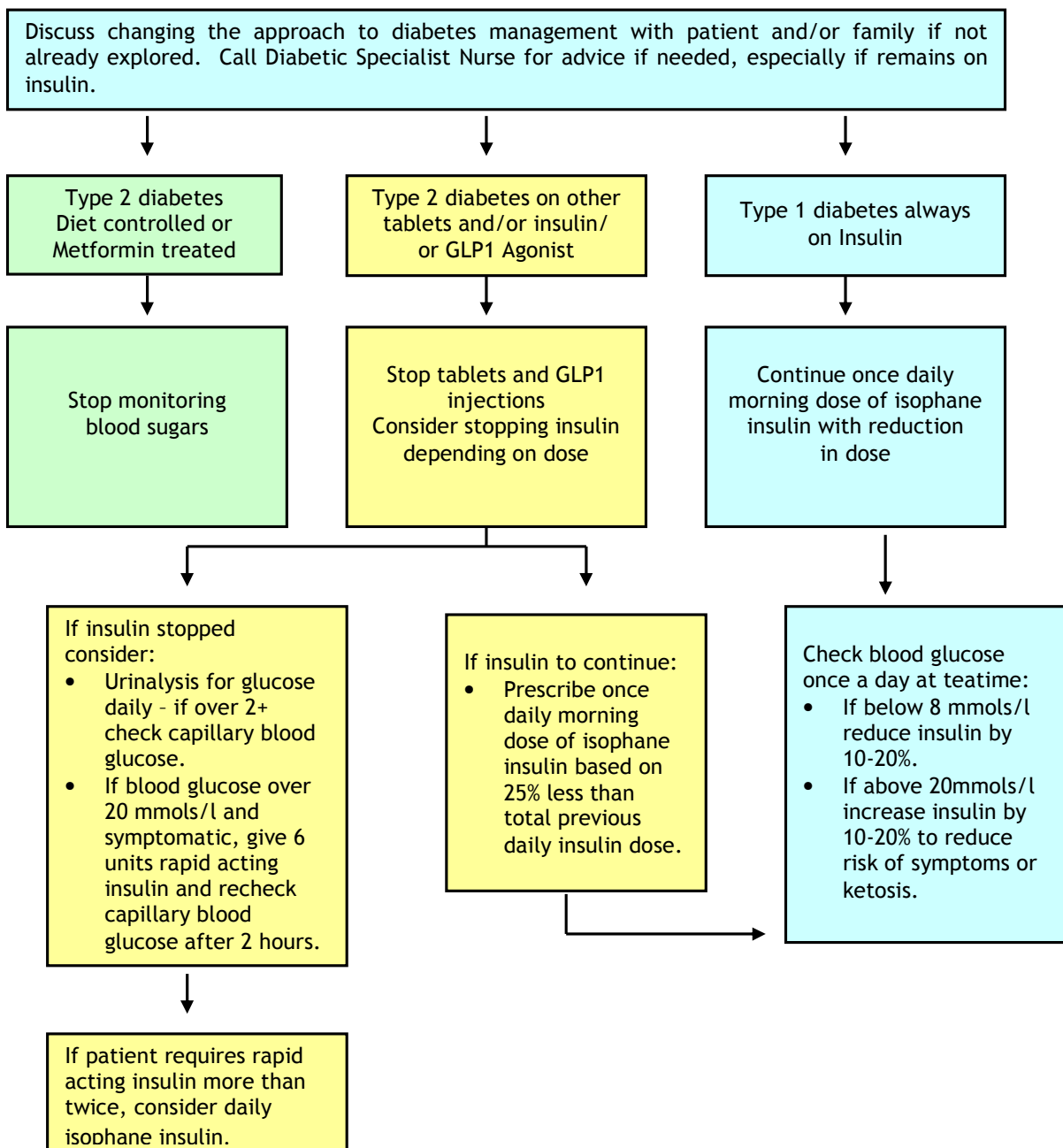- Increase dose by 10-20 units if dose 50-100 units

If steroids are reduced or discontinued consider reverting to previous doses.
All of above are for guidance only and in some situations alteration of doses may not be necessary or appropriate.

END OF LIFE DIABETES MANAGEMENT
FOR USE IN LAST DAYS OF LIFE

Principles

- Keep tests to a minimum. It may be necessary to perform some tests to ensure unpleasant symptoms do not occur due to low or high blood glucose.
- It is difficult to identify symptoms due to "hypo" or hyperglycaemia in a dying patient.
- If symptoms are observed it could be due to abnormal blood glucose levels.
- Test urine or blood for glucose if the patient is symptomatic.
- Observe for symptoms in previously insulin treated patient where insulin has been discontinued.
- Once patient is unconscious (not induced by hyper or hypoglycaemia or other reversible cause) and prognosis <48 hours, consider discontinuing insulin entirely.

Flowchart

Discuss changing the approach to diabetes management with patient and/or family if not already explored. Call Diabetic Specialist Nurse for advice if needed, especially if remains on insulin.

Type 2 diabetes Diet controlled or Metformin treated	Type 2 diabetes on other tablets and/or insulin/ or GLP1 Agonist	Type 1 diabetes always on Insulin
Stop monitoring blood sugars	Stop tablets and GLP1 injections Consider stopping insulin depending on dose	Continue once daily morning dose of isophane insulin with reduction in dose

If insulin stopped consider:
- Urinalysis for glucose daily – if over 2+ check capillary blood glucose.
- If blood glucose over 20 mmols/l and symptomatic, give 6 units rapid acting insulin and recheck capillary blood glucose after 2 hours.

If patient requires rapid acting insulin more than twice, consider daily isophane insulin.

If insulin to continue:
- Prescribe once daily morning dose of isophane insulin based on 25% less than total previous daily insulin dose.

Check blood glucose once a day at teatime:
- If below 8 mmols/l reduce insulin by 10-20%.
- If above 20mmols/l increase insulin by 10-20% to reduce risk of symptoms or ketosis.

Contact the Diabetes Specialist Nurses if advice required