

Managing Adults with Diabetes on the Haemodialysis and Renal Unit: Summary Guidance

This summary relates to the management of glucose control in patients with diabetes on the haemodialysis unit and renal ward. These are adapted for local use from the Joint British Diabetes Societies for Inpatient Care guidance for the 'Management of adults with diabetes on the hemodialysis unit' accessible [here](#).

This document summarises the national guidelines relating to the management of adults with diabetes in relation to: -

1. Organisation of care.
2. Assessment of glycaemic control.
3. Glycaemic control and outcomes on maintenance haemodialysis.
4. Diabetes glucose lowering therapies.
5. Dietary management and nutrition-diabetes specific.
6. Foot risk in haemodialysis patients.
7. End of life care.

1. Organisation of care

- All people with diabetes undergoing maintenance haemodialysis should have a documented annual review of their diabetes which includes foot and eye screening, in addition to access to a diabetes care provider (GP, Diabetes Specialist Nurse-DSN, Diabetes Consultant)
- This necessitates the need for close working between the teams involved. There are Quarterly MDTs meetings between the lead Diabetes Renal Physician and the Diabetes team (Consultant)
- Urgent referral from the Renal Unit for Diabetes input can be made to the DSNs and Diabetes team via the e-referral form on COIN ([CID1694](#))

2. Assessment of glycaemic control

- Glucose control is measured using HbA1c, self-monitoring of blood glucose (SMBG) or using newer technologies such as Libre and continuous glucose monitoring systems (CGMS)
- There are renal-associated factors that may render HbA1c less reliable including:
 - Under dialysis or poor diet resulting in persistent metabolic acidosis
 - Recent transfusions
 - Haemoglobinopathy
 - Rapid rise of Hemoglobin in the preceding 2 months in response to erythropoietin.
- Patients on haemodialysis should be aware that it is more likely that the HbA1c will underestimate average blood glucose particularly in patients with good to moderate glycaemic control

- SMBG remains the cornerstone of assessing glycaemic control in patients with diabetes on haemodialysis who are being treated with agents that increase the risk of hypoglycaemia
- Libre and CGM may provide valuable information on the glycaemic control of patients with diabetes on haemodialysis

3. Glycaemic control and outcomes on maintenance haemodialysis

- The target HbA1c for patients with diabetes on haemodialysis should be 'individualised' but if the patient is on a treatment which increase the risk of hypoglycaemia (e.g. insulin, sulphonulurea) the HbA1c target should be between 58-68 mmol/mol. But there may be an argument for 'less stringent' control in a frail patient with multiple complexities and at high risk of hypoglycaemia.
- A HbA1c of >80mmol/mol represents inadequate glycaemic management unless there is severe iron deficiency
- A reduction in treatment should be considered for patients with HbA1c <58 mmol/mol on potentially hypoglycaemia inducing agents

4. Diabetes glucose lowering therapies

As renal function declines, peripheral insulin resistance increases alongside a decline in renal gluconeogenesis, hypoglycaemic counter-regulation, and the clearance of insulin (endogenous or injected) and other antihyperglycaemic agents. Some patients on maintenance haemodialysis may stop taking antidiabetic therapies transiently or permanently.

4.1 Non-insulin based therapies

- Sulphonylureas are not licensed for use in patients on haemodialysis and should be avoided because of the increased incidence of hypoglycaemia in this setting. Gliclazide poses a lower risk for severe hypoglycaemia than glibenclamide and glimepiride, but should be used with caution when GFR is <40mL/min
- Metformin is not licensed to be used in patients on haemodialysis and should be avoided because of the increased risk of lactic acidosis in this setting
- No dose adjustment is needed for pioglitazone for impaired renal function. Whilst pioglitazone is not licensed for use in patients on haemodialysis there has been some experience of this agent used in this context
- There is insufficient experience of the use of any of the current GLP-1 receptor analogues in patients on haemodialysis and as such that their use cannot be recommended
- Of the DPP4 inhibitors licensed in the UK, linagliptin, sitagliptin, vildagliptin and alogliptin can be used in patients on maintenance haemodialysis; however, dose reductions for sitagliptin, vildagliptin and alogliptin are required (labelled maintenance doses in this setting are sitagliptin (25 mg OD), vildagliptin (50 mg OD), alogliptin (6.25 mg OD). Linagliptin does not require dosage adjustment. Saxagliptin is not recommended for end stage renal disease (ESRD)

- SGLT2 inhibitors may be used in patients with early stage chronic kidney disease (CKD; stages 1–2) with no dose adjustment, but as CKD progresses to moderate and severe disease (stages 3–5) they are to be avoided as **‘glucose lowering therapies’** as they will not be efficacious for glucose control. For renal protection, dapagliflozin (10mg OD) and canagliflozin (100mg OD) can be used to an eGFR of 15 ml/min) but are not recommended at dialysis or ESRD

4.2 Insulin based therapy

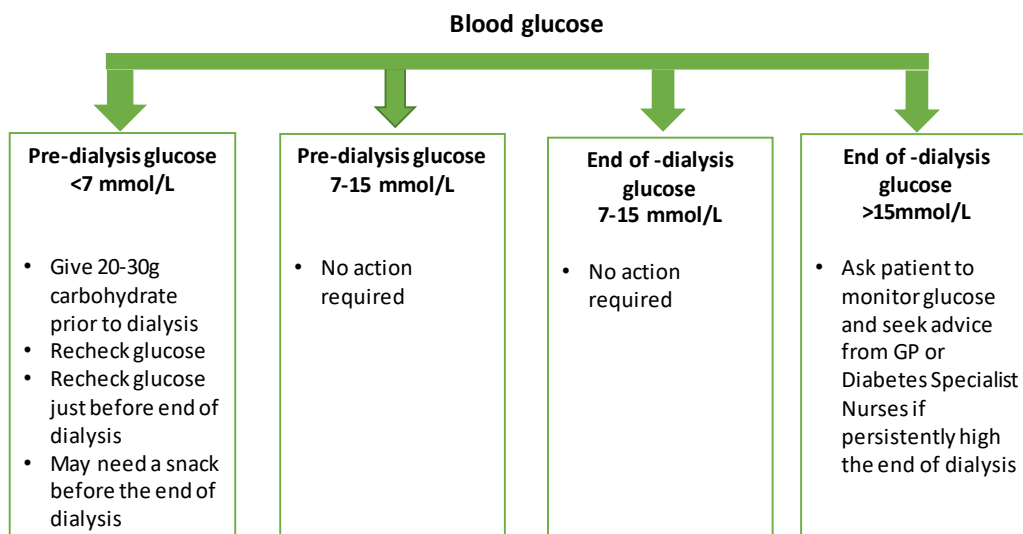
Insulin requirements fall with a reduction in eGFR. The process of haemodialysis has a number of effects on glycaemic control. These include removal of glucose (the dialysate should contain glucose for a patient with diabetes and ESRD), removal of glucoregulatory hormones (insulin, C-peptide, glucagon) and some diabetes therapies (insulin, sulphonulreas), and modulation of insulin action secondary to improved uraemia, acidosis, and phosphate metabolism. Therefore, glucose control on dialysis days may be very different to that on non-dialysis days, leading to unpredictable glucose levels, and glycaemic variability.

- All people with diabetes on insulin should be dialysed against a dialysate containing glucose. The aim of insulin therapy in diabetes patients on haemodialysis is to improve quality of life and avoid extremes of hypo- and hyperglycaemia
- Most patients on dialysis would benefit from a reduction of insulin dose during and immediately following dialysis (i.e. on the dialysis day); although advice should be individualised on the basis of glucose monitoring data
- Basal-bolus regimes (fast-acting insulin with meals and long-acting once a day insulin e.g. Novorapid and Tresiba) may be most flexible and best suited to the glycaemic variability seen in patients with diabetes on maintenance haemodialysis. In patients who are less likely to be able to comply with the requirements of a basal-bolus regime consideration should be given to once daily regimes with basal (long acting insulin), e.g. Lantus, Humulin I.
- Biphasic insulin regimens (also known as premixed insulins e.g. Novomix 30, Humalog Mix 25) may be more difficult to manage on haemodialysis due to the irregularity of diet, glucose levels and activity imposed by haemodialysis sessions; but patients stabilised on a biphasic insulin regimen may be reluctant to change. Advice on a 10–15% reduction in doses of insulin on dialysis days may be required to avoid hypoglycaemia. Some patients on biphasic insulin may need a bedtime carbohydrate snack (<2g) to avoid the risk of nocturnal hypoglycaemia. **See Figure 1**
- Libre monitoring and CGM may allow clinicians to advise on variation of insulin regimen according to day of dialysis

Figure 1: Insulin adjustment in diabetes patients receiving dialysis

- Patients should be encouraged to monitor and manage their own diabetes
- Patients should bring their own insulin/tablets with them to the Dialysis Unit
- For patients on agents that could cause hypoglycaemia, blood glucose should be checked **pre dialysis and just before the end of dialysis**
- Blood glucose can fluctuate during dialysis and drops mostly **in the last hour of dialysis**
- **Reduce total daily insulin by 10-15% during and immediately following dialysis**
- **Reduce insulin dose** (or oral therapies) in those with a HBA1c <58mmol/mol to avoid hypos

| On rapid-acting insulin | On premixed/biphasic insulin | On long-acting insulin |
|---|--|---|
| <p>Patients should reduce their usual breakfast (if morning dialysis), lunchtime (if afternoon dialysis) or evening insulin (if evening dialysis) by 10-15% at the start of each shift</p> | <p>Patients should reduce dose by 10-15% with breakfast (morning and afternoon dialysis) and with their evening meal (if starting evening dialysis)</p> | <p>Patients should reduce dose by 25% in the morning or in the evening of dialysis</p> |



5. Dietary management and nutrition-diabetes specific

The renal team has a specialist dietetic service which provides advice to renal and dialysis patients. The dietary advice and nutritional products prescribed should minimise any deleterious effects on blood sugar or lipid levels. For patients on active treatment of diabetes with insulin: -

- Where there is a pre-dialysis glucose of <7 mmol/L, 20-30 g of a low glycaemic index carbohydrate is recommended at the beginning of the haemodialysis session to prevent further decline of blood glucose level
- Capillary glucose should be assessed pre- and post-dialysis
- The unit should ensure that hypoglycaemia treatment is accessible to patient at all times, including during travelling to and from the dialysis unit
- In case of hypoglycaemia:
 - Appropriate rapid-acting carbohydrate treatment should be provided to take into account fluid, potassium and phosphate restrictions (see also COIN for hypoglycaemia guidance)
 - After treatment initiation, glucose level should be checked 15 minutes after the treatment is given. If not above 4 mmol/L, a repeat dose of the 15 g rapid acting glucose followed by 10–20 g complex or low glycaemic index carbohydrate is recommended
 - Patients and staff should be educated in regard to the appropriate treatment of mild to moderate hypoglycaemia and hypoglycaemia unawareness. See COIN guidance ([CID208](#))

6. Foot risk in haemodialysis patients

- All patients with diabetes on dialysis should have their feet inspected at least weekly and be considered high risk and should have regular review by the podiatry team
- The heels of all patients with diabetes on haemodialysis should be protected with a suitable pressure relieving device during haemodialysis
- If the patient has an ulcer or there is any other concern the patient should be referred to the diabetic foot multidisciplinary team within one working day
- Any patient presenting with a hot swollen foot should be referred to the diabetes foot team within 24 hours (to exclude Charcot foot)

7. End of life care

- Patients with diabetes on haemodialysis approaching end of life or where a palliative care pathway has been agreed should be managed in accordance with the Diabetes and End of Life Guidance available on COIN ([CID4120a](#) and [CID1420b](#)).


This guideline was developed by Dr A. Williams (Renal) and Prof J. Stephens (Diabetes). It has been reviewed by the ThinkGlucose lead, the Diabetes consultants and nursing staff across the health board, along with the Renal consultants.



Swansea Bay University Health Board

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