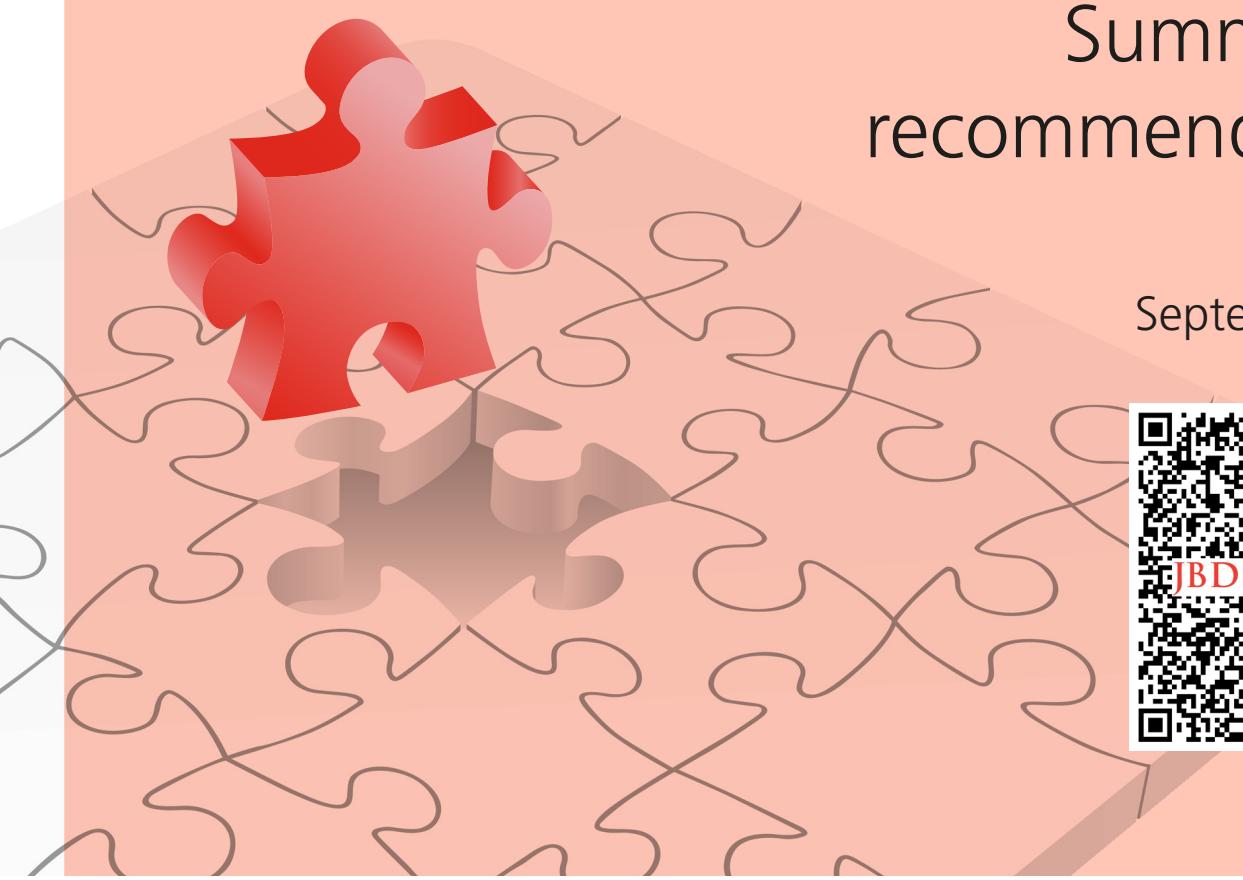
JBDS-IP Joint British Diabetes Societies for inpatient care

Management of adults with diabetes on dialysis

Summary of recommendations



September 2022

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This document is coded JBDS 11 in the series of JBDS documents:

Other JBDS documents:

The hospital management of hypoglycaemia in adults with diabetes mellitus	*JBDS 01*
The management of diabetic ketoacidosis in adults	*JBDS 02*
Management of adults with diabetes undergoing surgery and elective procedures: improving standards	*JBDS 03*
Self-management of diabetes in hospital	*JBDS 04*
Glycaemic management during the inpatient enteral feeding of stroke patients with diabetes	*JBDS 05*
The management of the hyperosmolar hyperglycaemic state (HHS) in adults with diabetes	*JBDS 06*
Admissions avoidance and diabetes: guidance for clinical commissioning groups and clinical teams	*JBDS 07*
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These guidelines can also be accessed via the Diabetologists (ABCD) app (need ABCD membership to access the app)

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Statement for JBDS guidelines

JBDS guidelines have been developed to advise on the care process for people with diabetes currently under hospital care.

The guideline recommendations have been developed and reviewed by a multidisciplinary team led by the Joint British Diabetes Society (JBDS) and including representation from Primary Care Diabetes Society and Diabetes UK. People with diabetes have been involved in the development of the guidelines via stakeholder events organised by Diabetes UK.

It is intended that the guideline will be useful to clinicians and service commissioners in planning, organising and delivering high quality diabetes care. There remains, however, an individual responsibility of healthcare professionals to make decisions appropriate to the circumstance of the individual, informed by them and/or their guardian or carer and taking full account of their medical condition and treatment.

When implementing this guideline full account should be taken of the local context and in line with statutory obligations required of the organisation and individual. No part of the guideline should be interpreted in a way that would knowingly put staff, those with diabetes or anyone else at risk

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The information contained in this guidance is a consensus of the development and consultation groups' views on current treatment. It should be used in conjunction with any local policies/procedures/guidelines and should be approved for use according to the trust clinical governance process. Care has been taken in the preparation of the information contained in the guidance. Nevertheless, any person seeking to consult the guidance, apply its recommendations or use its content is expected to use independent, personal medical and/or clinical judgement in the context of the individual clinical circumstances, or to seek out the supervision of a qualified clinician. The group makes no representation or guarantee of any kind whatsoever regarding the guidance content or its use or application and disclaim any responsibility for its use or application in any way.

To enable the guideline to stay relevant, it is envisaged that all of the JBDS guidelines will be updated or reviewed each year. As such these are 'living' documents – designed to be updated based on recently published evidence or experience. Thus, feedback on any of the guidelines is welcomed. Please email christine.jones@nnuh.nhs.uk with any comments, suggestions or queries.

Conflict of interest statement

The authors declare no conflicts of interest

Contents

Introduction

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This is an update of the guideline commissioned by the Joint British Diabetes Societies in conjunction with the UK Kidney Association previously published in 2016. The updated guideline has been informed by experts in diabetes and nephrology; including senior clinicians, specialty nurses, dietitians, pharmacists and people with diabetes who have experienced end stage kidney disease (ESKD) treatment.

The main document can be found at https://abcd.care/resource/jbds-11-management-adults-diabetes-dialysis" Management of adults with diabetes on the haemodialysis unit
The aim of this updated guideline is to improve the standards of care for people with diabetes (including both people with type 1 and type 2 diabetes) who are treated with dialysis.

The number of people with diabetes and kidney disease is increasing in the UK and this is reflected by the increasing number of people on ESKD treatment. In some units in the UK, over 40% of the people on dialysis have diabetes.

The guideline highlights the organisational difficulties that people with diabetes on dialysis experience and suggests the need for organisation of their care to be centred around the individual. We hope that this guideline will be of use to all healthcare professionals whose work brings them in contact with this very vulnerable group of individuals.

The target audience specifically includes:

- Clinical staff working on dialysis units (nephrologists, haemodialysis specialist nurses and healthcare assistants)
- Clinicians working in diabetes networks (diabetologists, diabetes specialist nurses and pharmacists)
- General practitioners, practice nurses and district nurses
- Podiatrists
- Dietitians involved in the care of patients on dialysis

The original 2016 guidelines were the first national guidelines covering issues relating to diabetes management for this complex group. In updating this guideline, we have expanded the remit to include people with diabetes on peritoneal dialysis, and we have also updated other sections. This includes a major revision on the section on glycaemic monitoring and glycaemic targeting which takes into account the significant technological advances that have been made in relation to glucose monitoring. The section on complications now includes subsections relating to diabetic ketoacidosis and eye complications.

The writing committee recognise that encouraging change in care for people with diabetes on dialysis requires more than a guideline document. It needs to be accompanied by practical advice on how best to implement guideline recommendations. In order to facilitate this, we have aligned this guideline to work that is being undertaken as part of the national kidney quality improvement programme (KQuIP) in this area and the Diabetes Care in Haemodialysis (DiH) programme.

Diabetes Care In Haemodialysis Programme

The DiH group has been established as a multi-professional, multidisciplinary working group to support the implementation of the 2016 JBDS guidelines and most importantly to facilitate improvements in the care for people with diabetes on haemodialysis.

The strategy has been built around:

1) Agreement of standards to define care of people with diabetes on maintenance haemodialysis (mHDx).
2) Agreement on an audit tool to support implementation of the guidelines for staff.
3) Engagement with haemodialysis staff and people with diabetes – learning about and disseminating good practice.
4) Development of an educational programme for staff.

1) Standards For Care Of People With Diabetes On Maintenance Haemodialysis (Mhdx)

It is recognised how difficult it has been for each haemodialysis unit to meet all the recommendations within 2016 guidelines and much easier for them work towards achieving a set of standards that encompass the most important elements.

Originally five standards were agreed through a consultative process and thereafter these were to be used to support commissioning arrangements for dialysis units and encourage improvements in care.

Following the update of this guideline the current standards will be reviewed and updated. The process for the delivery of any agreed standards will vary from site to site depending on service configurations. However, responsibility for meeting these standards will ultimately lie with the service commissioners whilst the responsibility for recording achievement of standards rests with the dialysis unit service leads.

2) Development Of An Audit Tool To Support Staff Achieve Standards

To support the implementation of the standards, an appropriate audit tool was developed). This defines measures that allow units to demonstrate that they meet the standards and incorporated within the audit tool are examples of good practice in relation to that particular area and advice on collection of data. Following this updated guideline, the audit tool will be refreshed to bring it in line with the current recommendations and standards.

3) Engagement With Staff And People With Diabetes To Support The Dissemination Of Good Practice

There is a wealth of good practice being undertaken across the country and a programme of work will be undertaken to collate these examples. It is proposed that these examples will be linked to both the audit tool used by dialysis units to demonstrate good practice and will also be held on the KQuIP website.

In conjunction with this element of the programme, a guide for people with diabetes who are on dialysis has been developed to help them appreciate the care that they should expect to receive. This will be aimed at empowering people with diabetes in relation to their understanding of their diabetes and its implications for their management whilst receiving dialysis. It is proposed that the guide will be piloted and assessed using patient activation measures to demonstrate effectiveness.

4) Educational Programme

There is unlikely to be any change in the care delivered to people with diabetes on dialysis unless staff who work with these individuals attain some degree of knowledge and understanding of the key issues that are relevant to such people. To support this, an educational program has been developed which consists of a blended educational strategy. This includes face-to-face teaching which could be delivered on a single day or through a series of sessions. In addition to this, an e-learning programme has been developed that could be undertaken on an individual basis to augment learning from a face-to-face event or indeed undertaken as a stand-alone resource.

The face-to-face educational programme has been designed to encompass the main elements of this guideline. The educational programme will then be made available for use more widely with appropriate resources workbooks and materials available to be delivered. Alternatively, members of the faculty developing this program could be asked to influence local delivery on a regional basis.

People With Diabetes On Peritoneal Dialysis

It is recognised that up until the production of this 2022 revision to the 2016 guidelines, much of the work of the DiH programme has been focused on people with diabetes on haemodialysis and that there now needs to be some focus also in relation to people who undertake peritoneal dialysis to ensure that they to achieve appropriate care. It is envisaged with production of this guideline the DiH working group will work with KQuIP to facilitate this.

Methodology

Search strategies

Authors of each section were asked to undertake a literature search using standard databases including PubMed, MEDLINE, Google Scholar, CINAHL and ClinicalTrials.gov, particularly focussing on newer articles from 2016 onwards. Searches were limited to publications in English.

Evidence grading

In general, we followed the principles set out in the UK Kidney Association's "Clinical Practice Guideline Development Manual" and grade "Recommendations for Use" and "Recommendations for Implementation" according to its two-tier grading system (Table 1.2). We use the term "recommend" within the guideline text where recommendations are based on Grade 1 evidence and prefer the term "suggest" for those based on Grade 2 evidence.

As described in the document there is very little data to support any recommendations in relation to the management of diabetes in people on peritoneal dialysis, and we have defined these recommendations as "practice points".

Table 1.2: UK Kidney Association's grading system for recommendations' strength and evidence quality

Level of evidence	Evidence quality
• Grade 1 recommendation is a strong recommendation to do (or not do) something, where the benefits clearly outweigh the risks (or vice versa) for most, if not all patients (i.e. recommendations) • Grade 2 recommendation is a weaker recommendation, where the risks and benefits are more closely balanced or are more uncertain (i.e. suggestions)	• Grade A evidence means high-quality evidence that comes from consistent results from well-performed randomised controlled trials, or overwhelming evidence of some other sort. • Grade B evidence means moderate-quality evidence from randomised trials that suffer from serious flaws in conduct, inconsistency, indirectness, imprecise estimates, reporting bias, or some combination of these limitations, or from other study designs with special strength. • Grade C evidence means low-quality evidence from observational studies, or from controlled trials with several very serious limitations. • Grade D evidence is based only on case studies or expert opinion.

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List of Abbreviations

ACEI	Angiotensin convertase inhibitor
ARB	Angiotensin 2 receptor blockade
AGP	Ambulatory Glucose Profile
APD	Automated peritoneal dialysis
BCVA	Best central visual acuity
BMI	Body mass index
CAPD	Continuous ambulatory peritoneal dialysis
CBG	Capillary blood glucose
CGM	Continuous glucose monitoring
CKD	Chronic kidney disease
CRT	Central retinal thickness
CSII	Continuous subcutaneous insulin infusion
CV	Coefficient of variation
CVD	Cardiovascular disease
DiH	Diabetes Care in Haemodialysis programme.
DKA	Diabetic ketoacidosis
DME	Diabetic macular oedema
DPP-4	Dipeptidyl-peptidase-4
DR	Diabetic retinopathy
DSN	Diabetes specialist nurse
EPO	Erythropoietin
ESKD	End stage kidney disease
Flash GM	Flash glucose monitoring
FPG	Fasting plasma glucose
FRII	Fixed rate insulin infusion
GA	Glycated Albumin
GDH-PQQ	Glucose dehydrogenase pyrroloquinoline quinone
GI	Glycaemic index
GO	Glucose oxidase
GV	Glycaemic variability
Hb	Haemoglobin
HbA1c	Glycated haemoglobin
HCPs	Health care professionals

IBW	Ideal body weight
IDFG	Inter dialysis fluid gains
IDWG	Inter dialysis weight gain
IM	Intramuscular
IQR	Interquartile range
isCGM	Intermittently scanned continuous glucose monitoring
KQuIP	Kidney quality improvement programme
MAGE	Mean amplitude of glucose excursion
MDI	Multiple daily injections
mHDx	Maintenance haemodialysis
MODD	Mean of daily differences
NPH	Neutral protamine Hagedorn
OAD	Oral antidiabetic drugs
OCT	Optical Coherence Tomography
OGTT	Oral glucose tolerance test
PAD	Peripheral arterial disease
PD	Peritoneal dialysis
PDR	Proliferative diabetic retinopathy
PEW	Protein energy wasting
RAS	Renin–angiotensin system
RBC	Red blood cell
RCT	Randomised controlled trials
SGLT2I	Sodium -glucose cotransporter 2 inhibitor
SMBG	Self-monitoring of blood glucose
SU	Sulfonylureas
TIR	Time in range
T1D	Type 1 diabetes
T2D	Type 2 diabetes
TZD	Thiazolidinedione
UF	Ultrafiltration
VEGF	Vascular endothelial growth factor
VH	Vitreous haemorrhage

Summary of all recommendations

Recommendations For Organisation Of Care (Section 1)

1.1. It is recommended that all people with diabetes undergoing either mHDx or PD should have a documented annual review of their diabetes which includes foot and eye screening through the primary care diabetes register. The responsibility for coordinating this rests with the primary care, diabetes or nephrological service caring for the person. In order to ensure that this is effectively undertaken:

a) The assessment should be coordinated in a manner that recognises that the person on mHDx is usually attending the dialysis unit three times per week.

b) The information pertaining to the review should be available to all healthcare staff involved in the care of the individual.

c) Each person undertaking in-centre mHDx should have a named link worker on the dialysis unit who can ensure that the assessments have been undertaken and have been acted upon. (Grade 1B)

1.2. It is recommended that all people with diabetes undergoing mHDx or on a PD programme should have access to a named DSN responsible for providing support in relation to ongoing care of diabetes and its complications. Where commissioned, the DSN would be able to provide rounds on the haemodialysis unit and outpatient clinics for those on PD, offering patient education and clinical advice where necessary. A link nurse on the haemodialysis unit will be expected to coordinate regular foot checks, blood glucose monitoring training and injection technique. This could be a healthcare assistant or a registered nurse following appropriate training and competency assessment. The link nurse would be expected to escalate foot problems for specialist foot assessment and on-going referral to the specialist foot team. (Grade 1D)

1.3. It is recommended that a process to coordinate the management of acute metabolic, eye, cardiovascular and/or foot emergencies should be established with effective communication between the dialysis (haemodialysis or peritoneal) unit, the specialist diabetes team and primary care. (Grade 1C)

1.4 It is recommended that all people with diabetes on dialysis with acute and/or chronic glycaemic instability, or on insulin therapy should have specialist diabetes input. (Grade 1C).

Summary

Local integrated care systems and acute trust hospitals should take into consideration that in-reach visits during dialysis unit attendance by diabetes service teams might be the most viable option to carry out regular diabetes review (annual review). To support this healthcare resources should be ringfenced and allocated accordingly.

Recommendations For Glycaemic Assessment In People With Diabetes On Dialysis (Section 2)

2.1 We suggest that HbA1c should be used with caution in people with diabetes on dialysis, as it may not provide a true reflection of prevailing glucose control, and clinicians should be aware of its deficiencies. In particular, HbA1c does not give a good reflection of GV and may not adequately identify people who are at high risk of hypoglycaemia. (Grade 2C)

2.2 We suggest that HbA1c > 80 mmol/mol (9.5%) is likely to reflect poor glycaemic control, unless there is severe iron deficiency. (Grade 2C)

2.3 We suggest that there is inadequate data on the use of alternative glycated proteins such as GA or fructosamine for monitoring glucose control in people with diabetes on dialysis, although use of GA should be explored in further research. (Grade 2C)

2.4 We suggest that for people with diabetes on dialysis, direct glucose estimations (SMBG) should routinely be offered. isCGM should also be considered for the assessment of glucose control. (Grade 2C)

2.5 We recommend that all people with diabetes on dialysis treated with insulin and/or sulfonylureas must have access to SMBG. (Grade 1C)

2.6 We suggest that HCPs involved in adjusting diabetes therapy should review meter downloads and any point of care SMBG data at every diabetes related visit to optimise treatment, assess variability and hypoglycaemia risk. (Grade 2C)

2.7 We recommend that glucose meters using GO or GDH-PQQ enzymatic methods for glucose assessment should not be used in people with diabetes on dialysis. (Grade 1B)

2.8 We recommend that people with diabetes on dialysis meeting national criteria for isCGM should be offered this option and receive training and support for its optimal use. (Grade 1C)

2.9 We suggest that all people with diabetes on dialysis using insulin who have recurrent hypoglycaemia or loss of hypoglycaemia awareness should be offered real-time CGM. (Grade 2C)

2.10 We suggest that long term CGM should be considered in people with diabetes on dialysis who are treated with insulin and/or sulfonylurea, unless practical issues make long-term use difficult, in which case 6 to 12 monthly diagnostic CGM can be used to aid dose adjustments and adequacy of treatment. (Grade 2C)

2.11 We suggest that people with diabetes on dialysis not eligible for isCGM should be considered for regular diagnostic (6-12 monthly) CGM if their SMBG results show frequent (>5%) glucose readings below 4 mmol/L, frequent (>20%) glucose readings above 14 mmol/L, if they are unable to undertake SMBG twice a daily for 1-2 weeks periods, or if they have HbA1c < 42 mmol/mol (6.0%) or > 80 mmol/mol (9.5%). (Grade 2C)

Summary
HbA1c does not adequately describe glucose control in people with diabetes on dialysis. Frequent SMBG is burdensome. Therefore, use of isCGM or CGM in such patients should be considered, especially in those on therapies that may cause hypoglycaemia.

Recommendations For Non-Insulin Glucose Lowering Therapies (Section 3a)

3A.1 Sulfonylureas, Glinides, Acarbose, Metformin and SGLT-2Is are not licensed for use in patients on dialysis. We therefore do not recommend their use in people with diabetes on dialysis. (Grade 1B)

3A.2 Pioglitazone is not licensed for use in patients on dialysis although it is licenced for use in patients with eGFR down to 4 mL/min and has been used safely in patients on mHDx. We therefore suggest its use with caution in people with diabetes on mHDx. (Grade 1C)

3A.3 The DPP-4 inhibitors linagliptin, sitagliptin, vildagliptin and alogliptin are all licenced for use in patients on dialysis. We therefore recommend their use in people with diabetes on dialysis. Dose reductions for sitagliptin, vildagliptin and alogliptin are required. (Grade 1B)

3A.4 GLP1-receptor agonists are not licenced for use in patients with eGFR of <15 mL/min but have been used safely in patients on mHDx. We therefore suggest their use with caution in people with diabetes on mHDx. (Grade 2D)

Recommendations For Insulin Therapy In People With Diabetes On Dialysis (Section 3b)

3B.1 The aim of insulin therapy in people with diabetes on dialysis is to improve quality of life and avoid extremes of hypo- and hyperglycaemia. (Grade 2C)

3B.2 We suggest that HCPs involved in adjusting diabetes therapy review meter downloads and any point of care SMBG data at every diabetes related visit to optimise insulin treatment, assess variability and hypoglycaemia risk. (Grade 2C)

3B.3 We suggest that HCPs should consider periodic (1-2x per year) "diagnostic" CGM analysis for all people with diabetes on dialysis on insulin treatment in order to guide future treatment planning unless they are already using Flash GM or real-time CGM systems. (Grade 2C)

3B.4 We suggest that basal bolus regimes may be most flexible and best suited to the GV seen in people with diabetes on dialysis. (Grade 2C)

3B.5 We suggest that a reduction in insulin doses by 25% on haemodialysis days may reduce risk of hypoglycaemia, but assessment with CGM may offer a better guide to insulin dosing on dialysis and non-dialysis days. (Grade 2C)

3B.6 We suggest that in people with diabetes on dialysis who are unable to manage a basal bolus regimen, consideration should be given to once daily regimes with longer acting insulin. (Grade 2C)

3B.7 We suggest that if patients have troublesome hypoglycaemia on NPH insulin, conversion to analogue insulin may be considered. (Grade 2C)

Summary
Pioglitazone, gliptins, GLP-1 analogues and insulin are the only recommended therapies available for use on people with diabetes on dialysis.

Recommendations For Dietary Interventions For People With Diabetes On Dialysis (Section 4)

4.1 We recommend that the type of diabetes should be identified, and personalised dietary goals should be agreed that supports both the diabetes and renal aspects of the diet. (Grade 1C)

4.2 We recommend that each haemodialysis unit should have access to appropriate dietary expertise able to provide a holistic approach to the individual with diabetes. (Grade 1D)

4.3 We suggest that total energy should come from 50–60% carbohydrate, <30% fat and at least 15% from protein. (Grade 2D)

4.4 We recommend that individuals on mHDx achieve an energy intake of 30–40 kcal/kg ideal body weight (IBW). (Grade 1D)

4.5 We recommend that individuals on mHDx achieve a protein intake of >1.0 g/kg IBW. (Grade 1C)

4.6 We recommend that for people on mHDx with diabetes, dietary advice should be given for both dialysis and non-dialysis days to minimise significant glycaemic and caloric excursions. (Grade 1D)

4.7 We recommend that low potassium dietary restrictions are not required unless serum potassium is persistently ≥6.0mmol/L predialysis. (Grade 1D)

4.8 We recommend that foods containing phosphate additives which have low nutrient value should be targeted prior to other high phosphate foods e.g. wholegrain products and foods with high biological value protein. (Grade 1D)

4.9 We recommend that clinicians should ensure that individuals on maintenance haemodialysis with diabetes are aware that they are more likely to be able to maintain inter-dialytic fluid gain (IDFG) at <4.5% of dry weight or <2 kg if they optimise their glucose control. (Grade 1D)

4.10 We recommend a salt intake of <5 g/day for people with diabetes on dialysis. (Grade 1C)

4.11 We recommend that all individuals with diabetes on dialysis should be screened for PEW using a valid nutritional screening tool. (Grade 1C)

4.12 We recommend that initiation of nutrition support should be considered in those at risk of PEW; the indicators are the same in those with and without diabetes. (Grade 1C)

4.13 We recommend that individuals should receive dietary counselling and oral nutrition support as their first-line treatment if unable to meet their nutritional needs orally. Enteral or parenteral nutrition may need consideration if these interventions are insufficient. (Grade 1D)

4.14 We recommend that individuals with gastroparesis should be encouraged to have frequent small meals that are low in fat and fibre to help manage the condition. (Grade 1C)

4.15 We recommend that individuals who are being considered for a kidney transplant who are overweight/obese should be encouraged to lose weight through dietary counselling on a calorie restrictive diet, making sure protein requirements are met (1.0 g/kg IBW). (Grade 1B)

4.16 We recommend that dietary counselling should also ideally include behavioural change strategies and increased physical activity. (Grade 1B)

4.17 We recommend that all individuals with an elevated body mass index (BMI) who may not be considered for transplantation if unable to lose weight through diet, exercise and behavioural change should be considered for weight-reducing strategies including bariatric surgery. (Grade 1C)

4.18 We recommend that individuals on peritoneal dialysis (PD) achieve an energy intake of 30-35kcal/kg IBW. (Grade 1D)

4.19 We recommend that individuals on PD achieve a minimum protein intake of 1.0-1.2g/kg IBW. (Grade 1C)

4.20 We recommend that calories provided through PD solutions should be estimated with caution. (Grade 1D)

Summary
All people with diabetes on dialysis should have the opportunity to discuss dietary issues with a dietitian with expertise in dialysis and diabetes.

Recommendations For Management Of Hypoglycaemia In People With Diabetes On Dialysis (Section 5a)

For people on active treatment of diabetes with insulin:

5A.1 We recommend that where there is a pre-dialysis glucose of <7 mmol/L, 20–30 g low glycaemic index carbohydrate is provided at the beginning of the haemodialysis session to prevent further decline of blood glucose level. (Grade 1D)

5A.2 We recommend that capillary glucose should be assessed pre- and post-haemodialysis. (Grade 1D)

5A.3 We suggest that the dialysis unit should ensure a hypoglycaemia treatment is always accessible to patients, including during travelling to and from the dialysis unit. (Grade 2D)

In cases of hypoglycaemia

5A.4 We recommend that an appropriate rapid-acting carbohydrate treatment should be provided to take into account fluid, potassium and phosphate restrictions. (Grade 1D)

5A.5 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 glucose followed by 10–20 g complex or low glycaemic index carbohydrate is recommended. (Grade 1C)

5A.6 We recommend that patients and staff should be educated in regard to the appropriate treatment of mild to moderate hypoglycaemia and hypoglycaemia unawareness. (Grade 1D)

Summary
All dialysis units should have rapid access to treatments for hypoglycaemia, and staff should be fully trained in the recognition and management of hypoglycaemia.

Recommendations For Footcare (Section 5b)

5B.1 We recommend that all people with diabetes on dialysis should be considered high risk of developing foot ulcers and are at high risk of amputation. (Grade 1B)

5B.2 We recommend that all people with diabetes on dialysis should inspect their feet daily and if they are unable to do this because of poor eyesight or frailty their carers should be advised to undertake this for them. (Grade 1C)

5B.3 We recommend that the heels of all people with diabetes on mHDx should be protected with a suitable pressure relieving device during haemodialysis. (Grade 1C)

5B.4 We recommend that all people with diabetes on dialysis should have regular podiatry review. (Grade 1C)

5B.5 We recommend that all people with diabetes on dialysis should have their feet screened monthly using a locally agreed tool and by competent staff on the dialysis unit. (Grade 1C)

5B.6 We recommend that if the individual has an ulcer or there is any other concern the patient should be referred to the diabetic foot team within one working day and each dialysis unit should ensure that there is a clearly defined escalation pathway for these individuals. (Grade 1B)

5B.7 If the individual is on home dialysis, we suggest it is the responsibility of the clinician in charge of their care to ensure that they have an annual foot review and are attending review by the foot protection team. (Grade 2B)

5B.8 We recommend that any individual presenting with a hot swollen foot should be referred to the diabetic foot team within 24 hours. (Grade 1B)

Summary
All people with diabetes on dialysis should have regular review of their feet and rapid access to podiatry services if an acute foot problem develops.

Recommendations For Retinopathy In People With Diabetes On Dialysis (Section 5c)

5C.1 We recommend that all people with diabetes on dialysis should be asked about when they last had retinal screening as part of their annual review. Ideally, this should have occurred within six months prior to starting dialysis in order to ensure that those who have severe non proliferative retinopathy, proliferative retinopathy or macular oedema have been referred for treatment ideally before initiating dialysis. (Grade 1C)

5C.2 We recommend the implementation of the UK Kidney Association guidelines on management of glycaemia, hypertension, lipids and anaemia in people with diabetes on dialysis in order to reduce the risk of progression of retinopathy after starting dialysis. (Grade 1C)

5C.3 We suggest that in those individuals identified as having severe macular or retinal disease extra care is taken to minimise intradialytic hypotension and rapid change in BP or fluid status during haemodialysis. (Grade 2D)

5C.4 We recommend continuing with anti-coagulation and anti-platelets therapies when indicated in patients with diabetic retinopathy on dialysis. (Grade 1C)

5C.5 We recommend prompt control of hypertension in patients with diabetic retinopathy on dialysis following initiation or maximisation of erythropoietin therapy. (Grade 1C)

5C.6 We suggest the use of ACEIs and ARBs to treat hypertension in patients with diabetic retinopathy on dialysis. (Grade 2B)

5C.7 We recommend that if people with diabetes on dialysis experience acute changes to their vision, they should be referred urgently to a hospital eye service for an urgent assessment and that each dialysis unit should have an escalation pathway for such individuals. (Grade 1B)

Summary

All people with diabetes on dialysis should have regular retinal screening and rapid access to specialist eye services if acute eye problems develop.

Recommendations For Diabetic Ketoacidosis In People On Dialysis (Section 5d)

Recognising Diabetic Ketoacidosis on the haemodialysis unit

5D.1 We suggest that every haemodialysis unit should have point of care blood ketone testing available and staff should be trained in its use. (Grade 2D)

5D.2 People with diabetes on mHDx should have their blood ketones checked using point of care testing kits if they have:

- Type 2 diabetes (T2D) and their pre-dialysis or post-dialysis capillary blood glucose (CBG) is persistently raised above 15.0 mmol/L (2 consecutive readings taken an hour apart) and they have symptoms suggestive of DKA OR
- Type 1 diabetes (T1D) and have CBG above 15.0 mmol/L. (Grade 2D)

5D.3 If blood ketones are above 3.0mmol/L, the person should have access to personnel and facilities to enable rapid and appropriate assessment and management of Diabetic Ketoacidosis (DKA). (Grade 2D)

5D.4 We suggest there should be a pathway in place at each haemodialysis unit for the rapid and safe prescription and administration of a bolus dose of insulin for use in an emergency. (Grade 2D)

5D.5 If there is a delay in transfer to a facility for intravenous insulin infusion, we suggest the following. (Grade 2C):

a) Administration of subcutaneous bolus dose of short acting insulin at a dose of 0.05units/kg

b) Hourly monitoring of CBG and blood ketones

c) Clear documentation of the administered dose and timing of insulin bolus and handing this information over to the receiving team when the patient is transferred

Diagnosing Diabetic Ketoacidosis

5D.6 We suggest that the diagnostic criteria for DKA in people with ESKD are the same as for adults with preserved renal function. (Grade 2C)

Managing Diabetic Ketoacidosis

5D.7 After DKA has been diagnosed, treatment should follow the JBDS DKA Guidelines update June 2022, paying particular attention to the fluid replacement regimen recommended for those on dialysis. (Grade 2D)

Summary
All dialysis units should be able to recognise and provide initial management of hyperglycaemic emergencies in people with diabetes on dialysis. They should have rapid access to specialist diabetes care once a hyperglycaemic emergency is diagnosed.

Recommendations For End Of Life Care In People With Diabetes On Dialysis (Section 5e)

5E.1 People with diabetes on dialysis approaching end of life or where a palliative care pathway has been agreed should be managed in accordance with Trend Diabetes End of Life clinical care recommendations for people with diabetes. Treatment and interventions should be focussed on symptoms. (Grade 1D)

Summary
Specialist end of life care should be offered in all people with diabetes on dialysis who are approaching end of life.

Practice Points Management Of Diabetes In People Undergoing Peritoneal Dialysis – Clinical Considerations And Practice Points (Section 6)

56.1 HbA1C, despite its limitations in persons with renal disease, is currently recommended as the preferred marker to assess long term glycaemic control in people with diabetes on PD.

6.2 Other markers such as GA or fructosamine may be less reliable than HbA1c in PD.

6.3 HbA1c treatment goals and targets should be individualised and other clinical parameters such as anaemia, erythropoietin treatment and PD regime must be considered when managing diabetes in people on PD.

6.4 Avoid the use of GDH-PQQ based glucometers or strips as these can give rise to falsely elevated BG readings in people undergoing PD with icodextrin. This can result in the risk of excessive insulin treatment and iatrogenic hypoglycaemia.

6.5 An individualised approach with consideration of risks of hypoglycaemia, type of PD and glucose content of dialysate is required.

6.6 Specialist input of the multidisciplinary diabetes team is required for high-risk people with diabetes on PD such as people with T1D, people on insulin with risk of hypoglycaemia, people with high GV, people with recent hospital admissions with hypo/hyperglycaemic emergencies and people who have not received structured diabetes education within the last one year.

6.7 All people with diabetes on PD should receive education on the risk of hypoglycaemia, advice on mitigating risks and guidance on self-management.

6.8 For people with diabetes on PD requiring insulin treatment we advise the use of insulin subcutaneously only.

6.9 We do not recommend intraperitoneal administration of insulin due to the lack of efficacy data and the known risks.

6.10 If using glucose-based dialysates there may be a need for increased insulin doses to counter the systemic absorption of glucose from the dialysate.

6.11 Exact insulin titrations and regimens should be individualized. A standard MDI or CSII (in T1D) may be preferred as it gives more flexibility towards dose titrations.

Summary
Management of diabetes in people on peritoneal dialysis can be challenging, and specialist input may be required. Use of intermittently scanned or continuous glucose monitoring may assist management decisions.

Figure 1. Holistic management of a person with diabetes on dialysis

PRIOR TO COMMENCING DIALYSIS

Ensure that the person with diabetes:

- is aware that dialysis will impact significantly on glucose control and diabetes management
- is undertaking regular SMBG with an appropriate glucose meter
- is able to access dietary advice on diabetes management on dialysis
- has had a recent eye screen
- has had a recent foot check

SHORTLY AFTER COMMENCING DIALYSIS

Review glucose management on dialysis:

- ensure the person with diabetes on dialysis is not developing frequent hypo- or hyperglycaemia
- consider use of isCGM or CGM in people with diabetes shortly after commencing dialysis and review glycaemic therapy
- reiterate dietary advice if needed
- ensure plans are in place for regular eye and foot reviews

REGULAR REVIEW

Regular review glucose management on dialysis at least six monthly:

- whilst HbA1c should be measured, clinicians should recognise its limitations in people with diabetes on dialysis
- ensure regular SMBG is available for all people with diabetes on dialysis
- consider long term CGM (isCGM or CGM) in people with diabetes on dialysis who are treated with insulin and/or sulfonylurea, unless practical issues make long-term use difficult
- consider 6-12 monthly diagnostic CGM to aid dose adjustments if:
  - SMBG results show frequent (>5%) glucose readings below 4 mmol/L
  - SMBG results show frequent (>20%) glucose readings above 14 mmol/L
  - person with diabetes is unable to undertake SMBG twice a daily for 1-2 week periods
  - HbA1c < 42 mmol/mol (6.0%) or > 80 mmol/mol (9.5%)
- reiterate dietary advice if needed
- ensure plans are in place for regular eye and foot reviews