DHA TELEHEALTH CLINICAL GUIDELINES

FOR VIRTUAL MANAGEMENT OF

TYPE 2 DIABETES MELLITUS – 30

Version 2

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Health Policies and Standards Department

Health Regulation Sector (2024)

INTRODUCTION

Health Regulation Sector (HRS) forms an integral part of Dubai Health Authority (DHA) and is mandated by DHA Law No. (14) of the year (2021) amending some clauses of law No. (6) of 2018 pertaining to the Dubai Health Authority (DHA), to undertake several functions including but not limited to:

- Developing regulation, policy, standards, guidelines to improve quality and patient safety and promote the growth and development of the health sector;
- Licensure and inspection of health facilities as well as healthcare professionals and ensuring compliance to best practice;
- Managing patient complaints and assuring patient and physician rights are upheld;
- Governing the use of narcotics, controlled and semi-controlled medications;
- Strengthening health tourism and assuring ongoing growth; and
- Assuring management of health informatics, e-health and promoting innovation.

The DHA Telehealth Clinical Guidelines aim to fulfil the following overarching DHA Strategic Priorities (2026):

- Pioneering Human-centered health system to promote trust, safety, quality and care for patients and their families.
- Make Dubai a lighthouse for healthcare governance, integration and regulation.
- Leading global efforts to combat epidemics and infectious diseases and prepare for disasters.

- Pioneering prevention efforts against non-communicable diseases.
- Become a global digital health hub.
- Foster healthcare education, research and innovation.

ACKNOWLEDGMENT

The Health Policy and Standards Department (HPSD) developed this Guideline in collaboration with Subject Matter Experts and would like to acknowledge and thank these health professionals for their dedication toward improving quality and safety of healthcare services in the Emirate of Dubai.

Health Regulation Sector

Dubai Health Authority

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EXECUTIVE SUMMARY

Telehealth is based on Evidence Based Practice (EBP) which is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of the individual patient. It means integrating individual clinical expertise with the best available external clinical evidence and guidelines from systematic research.

EBP is important because it aims to provide the most effective care virtually, with the aim of improving patient outcomes. As health professionals, part of providing a professional service is ensuring that practice is informed by the best available evidence.

This guideline is presented in the format comprising of clinical history/symptoms, differential diagnosis, investigations and management. Identification of 'Red Flags' or serious conditions associated with the disease is an essential part of this telehealth guideline as it aids the physician to manage patients safely and appropriately by referrals, if indicated during virtual telehealth assessment, to ER, family physicians or specialists for a face to face management.

Type 2 diabetes mellitus is characterized by hyperglycemia, insulin resistance, and relative impairment in insulin secretion. It is a common disorder with a prevalence that rises markedly with increasing degrees of obesity. The prevalence of type 2 diabetes has risen alarmingly in the past decade, in large part linked to the trends in obesity and sedentary lifestyle

The primary purpose of this Telehealth Guideline is to prove the health physicians, who will be managing patients virtually, with a summary of the best available evidence for the virtual management of this very common chronic condition among adults.

This guideline also identifies key “Red Flags” or serious symptoms associated with Type 2 diabetes which warrant a referral to ER or specialist for further face-to-face management

DEFINITIONS/ABBREVIATIONS

Virtual Clinical Assessment: Is the evaluation of the patient's medical condition virtually via telephone or video call consultations, which may include one or more of the following: patient medical history, physical examination and diagnostic investigations.

Patient: The person who receives the healthcare services or the medical investigation or treatment provided by a DHA licensed healthcare professional.

ABBREVIATIONS

ACE	:	Angiotensin-Converting Enzyme
ACR	:	Albumin Creatinine Ratio
ARB	:	Angiotensin-II Receptor Blocker
BMI	:	Body Mass Index
BP	:	Blood Pressure
CCB	:	Calcium-Channel Blocker
CKD	:	Chronic Kidney Disease
CVD	:	Cardiovascular Disease
DCCT	:	Diabetes Control and Complications Trial
DPP-4	:	Dipeptidyl Peptidase-4
DHA	:	Dubai Health Authority
ER	:	Emergency Room
GLP1	:	Glucagon-Like Peptide

HbA1C	:	Haemoglobin A1c
HBGM	:	Home Blood Glucose Monitoring
IFCC	:	International Federation of Clinical Chemistry
KPI	:	Key Performance Indicator
MR	:	Modified Release
NICE	:	National Institute for Health and Care Excellence
RTA	:	Roads and Transport Authority
U&Es	:	Urea and Electrolytes
WHO	:	World Health Organisation

1. BACKGROUND

1.1. Type 2 diabetes mellitus is characterized by hyperglycemia, insulin resistance, and relative impairment in insulin secretion.

1.2. Initially, patients present with a combination of varying degrees of insulin resistance and relative insulin deficiency, and it is likely that both contribute to type 2 diabetes. Furthermore, each of the clinical features can arise through genetic or environmental influences, making it difficult to determine the exact cause in an individual patient. Moreover, hyperglycemia itself can impair pancreatic beta-cell function and exacerbate insulin resistance, leading to a vicious cycle of hyperglycemia causing a worsening metabolic state.

1.3. Type 2 diabetes is often accompanied by other conditions, including hypertension, high serum low-density lipoprotein (LDL) cholesterol concentrations, and low serum high-density lipoprotein (HDL) cholesterol concentrations that, like type 2 diabetes, increase cardiovascular risk. This constellation of clinical conditions is referred to as the metabolic syndrome

1.4. This guideline will discuss the recommendations related to screening asymptomatic patients for type 2 diabetes mellitus and treatment of patients with Type 2 diabetes mellitus.

1.5. Treatment of patients with type 2 diabetes mellitus includes education, evaluation for micro- and macrovascular complications, attempts to achieve near

normoglycemia, minimization of cardiovascular and other long-term risk factors, and avoidance of drugs that can exacerbate abnormalities of insulin or lipid metabolism. All of these treatments need to be tempered based on individual factors, such as age, life expectancy, and comorbidities.

2. SCOPE

2.1. Telehealth services in DHA licensed Health Facilities.

3. PURPOSE

3.1. To support the implementation of Telehealth services for patients with complaints of Type 2 Diabetes in Dubai Health Authority (DHA) licensed Health Facilities

4. APPLICABILITY

4.1. DHA licensed physicians and health facilities providing Telehealth services.

4.2. Exclusion for Telehealth services are as follows

4.2.1. Emergency cases where immediate intervention or referral is required.

4.2.2. Prescribe Narcotics, Controlled or Semi-Controlled medications.

5. RECOMMENDATION

5.1. Screening for diabetes: Consider screening for diabetes for the following groups:

5.1.1. Age < 40 years and >25 who have Chinese, Afro Caribbean or S Asian ethnicity should have a DM risk assessment, as should patients with Poly Cystic Ovary Syndrome (use the assessment algorithm found in http://www.diabetes.org/are-you-at-risk/diabetes-risk-test/). In

patients, who are found to be at high risk, provide appropriate interventions and screen annually with a fasting blood sugar or HbA1c. Those found to have low to moderate risk should be screened every five years.

5.1.2. > 40 years of age all patients should have DM risk assessment (use the assessment algorithm found in http://www.diabetes.org/are-you-at-risk/diabetes-risk-test/) and in patients who are found to be at high risk, provide appropriate interventions and screen annually with a fasting blood sugar or HbA1c. Those found to have low to moderate risk should be screened every five years.

5.1.3. Consider screening in other conditions which increase risk that are not included in the above algorithm e.g. patients on drugs such as long term or frequent steroid use, antiretrovirals and some antipsychotics.

5.2. Annual blood tests in specific conditions:

5.2.1. Women who had Gestational Diabetics need a fasting Blood Sugar test at 6 weeks post-delivery and annual HbA1c thereafter for life.

5.2.2. Hypertensives – should have a diabetes risk assessment (by using the assessment algorithm found in http://www.diabetes.org/are-you-at-risk/diabetes-risk-test/) and those found to be at low to moderate risk

only need screening fasting blood sugar or HbA1c every five years. Those at high risk need annual screening.

5.2.3. Patients with CKD or CVD: ischemic heart disease, peripheral vascular disease and stroke – HbA1c forms part of their annual review.

5.3. Diabetes Mellitus Diagnosis:

5.3.1. Diagnosis using HbA1c (WHO 2011)

a. The WHO in January 2011 added HbA1c as a diagnostic test for Type 2 diabetes in adults if the HbA1c level is 48 mmol/mol or above (6.5% or above). The WHO state that diagnosis should be confirmed with a repeat HbA1c test, unless clinical symptoms and plasma glucose levels >200mg/dL are present in which case further testing is not required.

b. Note: HbA1C test does not apply to children, pregnant women, patients with haemoglobinopathy or haemolytic anemia, patients with acute onset osmotic symptoms, History of DM < 2 months or suspected Type 1 DM.

c. Refer to APPENDIX 1 for Use of Glycated Haemoglobin (HbA1c) in the Diagnosis of Prediabetes and Diabetes Mellitus

5.3.2. WHO 2006 (Using blood glucose)

a. Diabetes symptoms (i.e. polyuria, polydipsia and unexplained weight loss) plus
   - a random venous plasma glucose concentration › 200 mg/dL or
   - a fasting plasma glucose concentration › 126 mg/Dl

b. With no symptoms, diagnosis should not be based on a single glucose determination but requires confirmatory plasma venous determination. At least one additional glucose test (or HbA1c) result on another day with a value in the diabetic range is essential, either fasting, from a random sample or from the two-hour post glucose load. If the fasting values are borderline, then the two-hour value should be used.

c. Refer to APPENDIX 2 for Use of Fasting and Post-prandial Blood Sugar in the Diagnosis of Prediabetes and Diabetes Mellitus

d. A diagnosis of diabetes has important legal and medical implications for the patient, and it is therefore essential to be secure in the diagnosis.

5.4. The changing of HbA1c reporting

5.4.1. The old, percentage way of reporting HbA1c values is known as the DCCT (Diabetes Control and Complications Trial) units.

5.4.2. The new mmols/mol values are known as the IFCC (International Federation of Clinical Chemistry) units.

5.4.3. DCCT aligned measurement of HbA1c is likely to be gradually be phased out and replaced with the new IFCC method which has completely different units! Instead of being reported as a percentage it will be expressed in mmol/l.

5.4.4. Refer to APPENDIX 3 for HbA1c Converstion Table from percentage (DCCT unit) to IFCC (in mmol/l)

5.5. The New Patient with Diabetes Assessment:

5.5.1. Make sure the diagnosis is correct!

5.5.2. Provide information e.g. Type 2 diabetes Leaflet from www.patient.co.uk

5.5.3. Arrange base line review bloods.

5.5.4. (CBC and Hb. electrophoresis to exclude haemoglobinopathy, HbA1c, TSH, Electrolytes and Creatinine, non-fasting lipid profile, micro-proteinuria (urine ACR), BMI and BP and smoking status/cessation advice).

5.5.5. Refer to ophthalmology for retinal screening and then ensure patient had retinal screening annually.

5.5.6. If overweight / BMI of 25 or higher (or >23 if Asians) refer to the Wellness Team.

5.5.7. Most patients should start Metformin around the time of diagnosis (Metformin 500mg bd taken with or after food) – if not then try diet for 12 weeks with HbA1c at that time – if not at target then start treatment with Metformin. Please remember Metformin is very effective, reduces cardiovascular risk, retards weight gain and is not usually associated with hypoglycemia – but is contra-indicated if Creatinine > 150micromol/L (or eGFR < 45) in Congestive Cardiac Failure or significant hepatic dysfunction. If Metformin is contraindicated, then refer to diabetic specialist / Endocrinologist. Remember Metformin has to be stopped if eGFR fall below 30! Metformin MR can be used if they run into problems with GI side effects.

5.5.8. If they have osmotic symptoms OR if HbA1c > 86 mmol/l , then refer to diabetic specialist/ Endocrinologist.

5.5.9. Don't forget if using sulphonylureas counsel the patient about the symptoms of hypoglycemia, hypoglycemia management, driving and remind them about informing their car and travel insurer and document this in their records.

5.6. Annual/6 monthly Review:

5.6.1. Review smoking status and alcohol intake and give cessation advice.

5.6.2. Review exercise status and advise about exercise as per NICE recommendation regarding physical activities as mentioned below

a. All adults aged 19 years and over should aim to be active daily.

b. Over a week, this should add up to at least 150 minutes (2.5 hours) of moderate intensity[1] physical activity in bouts of 10 minutes or more.

c. Alternatively, comparable benefits can be achieved through 75 minutes of vigorous intensity[2] activity spread across the week or combinations of moderate and vigorous intensity activity.

d. All adults should also undertake physical activity to improve muscle strength on at least 2 days a week.

e. They should minimise the amount of time spent being sedentary (sitting) for extended periods.

f. Older adults (65 years and over) who are at risk of falls should incorporate physical activity to improve balance and coordination on at least 2 days a week.

5.6.3. Ask about hypoglycaemia awareness.

5.6.4. Advice regarding Home Blood Glucose Monitoring (HBGM) - How often? What to do with the results. Ask also about appropriate use of their glucometer

5.6.5. Measure BP and BMI

5.6.6. Request the following investigation:

a. Creatinine and Electrolytes

b. Urinary ACR and Egfr

c. HbA1c and non-fasting cholesterol.

5.6.7. Refer for Podiatry and retinal review.

5.7. Targets at a glance

5.7.1. BP <140/80 (However aim <130/80 if end organ damage)

5.7.2. Non-smoker

5.7.3. BMI < 25 (Target weight loss is 5 to 10% per year) (According to NICE, overweight patient should be encouraged to lose weight and agree on a target weight loss. The starting weight-loss target should be to lose 5% to 10% of original weight. Any weight loss will help, although the nearer the patient gets to a healthy body weight, the better it will be for his/long long-term health.

5.7.4. Cholesterol aim < 4.0 mmol/l (200 mg/dL) and LDL <2.6mmol/L (100 mg/dL)

5.7.5. HbA1c

a. Target should reflect the risk and benefits to the individual patient and an individualised HbA1c target should be agreed with the patient

b. NICE's 'Rule of thumb'

- If Patient on diet alone, HbA1c < 48mmol/l (6.5%)
- If Patient on diet and Metformin, HbA1c < 48mmol/l
- If Patient on diet, Metformin and 1 hypoglycaemic therapy, HbA1c < 53 mmol/l (7.0%)
- In patients in whom hypoglycaemia represent a real risk, HbA1c < 58 mmol/l (7.5%)

c. NB: consider relaxing the target for those patients where risk may outweigh benefits

6. REFERRAL CRITERIA AND RED FLAGS

If a patient meets any of the below referral criteria, then he or she should be referred to specialists or ER as appropriate.

6.1. Red Flags and Referral to ER

If serious metabolic derangement or diabetes complication that is left untreated would lead to need for hospitalisation, or which requires immediate hospitalisation.

Examples:

6.1.1. Acutely decompensated Type 1 or Type 2 diabetes (i.e. suspected Diabetic Ketoacidosis (DKA)/Hyperosmolar Hyperglycaemic state) with /without dehydration or vomiting

6.1.2. Foot ulcer with infection

6.1.3. Patients who are thought to need IV Sliding Scale Infusion

6.1.4. Patients requiring emergency Insulin Start

6.1.5. Profound/prolonged Hypoglycaemia

6.2. Referral to Specialist as Outpatient

6.2.1. Metabolic deterioration or complication that can be expected to deteriorate rapidly if not attended to or reviewed by specialist.

Examples:

a. Acutely decompensated Type 2 diabetes without clear need for hospitalisation

b. Recently diagnosed Type 2 diabetes with blood glucose levels consistently >270mmol/l

c. Acute foot ulceration without active infection

d. Other acute Diabetes Foot problems requiring improved glycaemic control.

6.2.2. Diabetes symptoms or complications severely impairing daily functioning or likely to rapidly lead to irreversible deterioration in health. Examples:

a. Marked or symptomatic hyperglycaemia not responding to current therapy (i.e. BGL consistently >270md/dL)
b. Recurrent hypoglycaemia
c. Painful neuropathy
d. Nephropathy with deteriorating renal function
e. Poorly controlled hypertension
f. Deteriorating vision
g. Patient is pregnant or planning to be pregnant
h. New/Existing Type 2 Diabetes Mellitus commencing Insulin/Sulphonylureas/Glucagon-Like Peptide (GLP1)
i. Multiple complications of Diabetes

6.2.3. At higher risk of diabetes complications or suffering from a relatively stable chronic complication. Examples:

a. Worsening Diabetic nephropathy or microalbuminuria
b. Peripheral neuropathy or peripheral vascular disease

c. If patient has not had diabetic eye screening within one year, then he/she should be referred for dilated fundoscopic eye exams (to be done either by an ophthalmologist or therapeutic optometrist).

d. Other conditions based on justifiable clinical decision.

7. MANAGEMENT

7.1. Refer to APPENDIX 4 for the Virtual Management of Type 2 Diabetes Algorithm

7.2. Refilling/Prescribing Diabetic Medication

If a patient calls for refill, then check the minimum data are available which include BP, creatinine and electrolytes, HbA1c, cholesterol and urinary ACR. If these are not available or the patient could not provide this, then arrange the lab test before prescribing the diabetic medications. Regarding glycemic control and HbA1c, the following should be taken into consideration

7.2.1. HbA1c should just be checked every 6 months as per NICE recommendation if at target (but every three months if treatment is being up-titrated to achieve target).

7.2.2. If HbA1c is not at target, consider potential life style changes, compliance issues and/or increase treatment assuming this has not been done in the last 4 weeks – consider discussion with the diabetes lead clinician.

7.2.3. Please note that HbA1c < 42 mmol/l in diabetics on oral hypoglycaemic medications is associated with increased morbidity and mortality.

7.2.4. Consider HBGM in the short term for patients starting sulphonylureas, patients with suspected hypoglycaemic or those planning pregnancy.

7.2.5. Consider HBGM in the long term for patients on insulin, drivers or machine operators on drugs which may induce hypoglycaemic or patient at risk for hypoglycaemia due to co-morbidity.

7.3. Initiating drug Treatment/Re-Prescribing – Mono therapy

7.3.1. At the time of diagnosis if they have mild or no symptoms of diabetes try dietary control and lifestyle over 3 months, usually starting Metformin around the time of diagnosis unless contraindicated.

7.3.2. Offer standard-release metformin as the initial drug treatment for adults with type 2 diabetes.

7.3.3. Gradually increase the dose of standard-release metformin over several weeks to minimise the risk of gastrointestinal side effects in adults with type 2 diabetes

7.3.4. If an adult with type 2 diabetes experiences gastrointestinal side effects with standard-release metformin, consider a trial of modified-release metformin.

7.3.5. If metformin is contraindicated, not tolerated or patients have osmotic symptoms, consider initial drug treatment with:

a. a dipeptidyl peptidase-4 (DPP-4) inhibitor or

b. pioglitazone or

c. a sulfonylurea.

7.4. First intensification with metformin combination therapy

7.4.1. According to NICE recommendations, first intensification of drug treatment means treatment with 2 non-insulin blood glucose lowering therapies in combination (dual therapy).

7.4.2. In adults with type 2 diabetes, if initial drug treatment with metformin has not continued to control HbA1c to below the person's individually agreed threshold for intensification, consider dual therapy with:

a. metformin and a DPP-4 inhibitor or

b. metformin and pioglitazone or

c. metformin and a sulfonylurea.

7.5. First intensification if metformin is contraindicated or not tolerated

7.5.1. First intensification of drug treatment means treatment with 2 non-insulin blood glucose lowering therapies in combination (dual therapy).

7.5.2. As per NICE guideline, in adults with type 2 diabetes, if metformin is contraindicated or not tolerated and initial drug treatment has not continued to control HbA1c to below the person's individually agreed threshold for intensification, consider dual therapy[1] with:

a. a DPP-4 inhibitor and pioglitazone or

b. a DPP-4 inhibitor and a sulfonylurea or

c. pioglitazone[2] and a sulfonylurea.

7.6. Second intensification with metformin combination therapy

7.6.1. Second intensification of drug treatment means treatment with either 3 non-insulin blood glucose lowering therapies in combination (triple therapy) or any treatment combination containing insulin.

7.6.2. As per NICE guideline, in adults with type 2 diabetes, if dual therapy with metformin and another oral drug has not continued to control HbA1c to below the person's individually agreed threshold for intensification, consider either:

a. triple therapy with:

- metformin, a DPP-4 inhibitor and a sulfonylurea or
- metformin, pioglitazone and a sulfonylurea or

b. starting insulin-based treatment (or refer patient to specialist for this).

7.7. Second intensification if metformin is contraindicated or not tolerated

7.7.1. Second intensification of drug treatment means treatment with either 3 non-insulin blood glucose lowering therapies in combination (triple therapy) or any treatment combination containing insulin.

7.7.2. As per NICE guideline, In adults with type 2 diabetes, if metformin is contraindicated or not tolerated, and if dual therapy with 2 oral drugs has not continued to control HbA1c to below the person's individually agreed threshold for intensification, consider insulin-based treatment (or refer patient to specialist to be started on insulin).

7.8. Refer to APPENDIX 5 for NICE Algorithm for blood glucose lowering therapy in adults with Type 2 Diabetes

7.9. Special Considerations that need to be taken when prescribing Diabetic Medications

Be aware of the following medications before continuing/re-prescribing them or adding combination therapy:

7.9.1. Metformin

There has been a shift to early Metformin use, as mentioned above, due to it reducing CVD mortality. Start with 500mg with main meal and up-titrate each week over three weeks to a TDS dose with breakfast, lunch and tea. Max dose is usually 2g a day.

Take it with or just after food

Metallic taste and diarrhea are common initially but often settle. If not consider the once daily MR version with the main meal of the day.

Metformin to be considered in specific circumstances:

a. Metformin and eGFR:

- Must monitor renal function
- Review need for continued Metformin if eGFR < 45
- Withdraw Metformin if eGFR < 30.
- If Metformin is stopped, then patient must be referred to specialist.

b. It also needs to be stopped 48 hours prior to contrast radiological studies and not re-started until check U&Es confirm it is safe to do so, no early than 72 hours post procedure.

c. Also stop it during intercurrent disease associated with dehydration.

Advantages: Cheap, reduces CVD risk and is weight neutral

Disadvantages: Side Effect Include lactic acidosis, diarrhea, nausea, vomiting, and flatulence. Other side effects include: asthenia, and decreased vitamin b12 serum concentrate. Other disadvantages include multiple dosing if not using MR form

7.9.2. Repaglinide (A mitiglinide)

a. Very similar to sulphonylureas, rapid acting and short duration, so used pre-prandially.

b. Adult 18–74 years: Initially 500 micrograms (max. per dose 4 mg), adjusted according to response. usually 0.5 to 4mg TDS.

c. Hypoglycemia a risk but less than classical sulphonylureas.

d. Dose to be taken within 30 minutes before main meals and adjusted at intervals of 1–2 weeks; maximum 16 mg per day.

e. Adult 75 years and over: Not recommended.

f. Licensed as monotherapy or in combination with Metformin, has to be stopped if other agents added. Caution in CKD and in the elderly.

g. Advantages: Cheap, risk of hypoglycemia lower than sulphonylureas, flexible use in patients with erratic eating habits

h. Disadvantages: hypoglycemia, multiple dosing, limited licensing

7.9.3. Gliclazide (A sulphonyl urea 'SU')

a. For Type 2 diabetes mellitus: by mouth using immediate-release medicines Adult: Initially 40–80 mg daily, adjusted according to response, increased if necessary up to 160 mg once daily.

b. Dose to be taken with breakfast, doses higher than 160mg to be given in divided doses; maximum 320 mg per day.

c. by mouth using modified-release medicines Adult: Initially 30 mg daily, dose to be taken with breakfast, adjust dose according to response every 4 weeks (after 2 weeks if no decrease in blood glucose); maximum 120 mg per day.

d. Dose equivalence and conversion: Gliclazide modified release 30mg may be considered to be approximately equivalent in therapeutic effect to standard formulation gliclazide 80 mg.

e. As with all long acting sulphonylureas hypos are more likely.

f. If a driver, consider HBGM and counsel for hypoglycaemia symptoms, management and RTA guidance.

g. It's metabolised by the liver and so can be used in renal impairment.

h. Consider stopping/avoiding if there is a significant risk of and/or implication regards hypoglycaemia (e.g. patients with impaired cognition, patients > 60 years, patients with CKD3b or worse or someone who drives long distance). Avoid in severe hepatic impairment.

i. Advantages: It is very effective

j. Disadvantages: Risks of hypoglycemia and weight gain

7.9.4. Linagliptin (a DPP-4 inhibitor)

a. Once daily dose 5mg, no dose adjustment for renal impairment. Can be used with Metformin, SU and insulin but not Pioglitazone (can use Sitagliptin with Pioglitazone).

b. Should not be used if there is a past medical history of pancreatitis. Warn patient risk small but if gets severe abdominal pain, stop medication and see doctor same day. Document your warning in records.

c. Stop if Hba1c does not improve after 3 months (> 0.6 mmol/l)

d. Note – Alogliptin is a bit cheaper than Linagliptin but dose adjustment needed in renal impairment

e. Advantages: Once daily and weight neutral

f. Disadvantages: Small risk of pancreatitis

7.9.5. Pioglitazone (a 'glitazone')

a. Adult: Initially 15–30 mg once daily, adjusted according to response to 45 mg once daily, in elderly patients, initiate with lowest possible dose and increase gradually; review treatment after 3–6 months and regularly thereafter.

b. Avoid if patient has history of heart failure, IHD, bladder cancer or undiagnosed hematuria.

c. Advantages = cheap and once daily

d. Disadvantages = weight gain, fluid retention, heart failure and small risk of bladder cancer and osteoporosis.

7.9.6. Canagliflozin (a 'Flozin')

a. By mouth Adult: 100 mg once daily; increased if tolerated to 300 mg once daily if required, dose to be taken preferably before breakfats. Licensed for use with Metformin, Sulphonylureasa and Insulin

b. In combination with SUs or insulin can cause hypoglycemic, so step down insulin or SU dose temporarily when initiating Rx. Stop if Hba1c does not improve after 3 months (> 0.6mmol/l)

c. Relation with eGFR:

   – Don't start it if eGFR < 60,

   – Start with100mg if e GFR falls to 45 to 60,

   – Stop if eGFR < 45.

d. Advantages = weight loss and BP reduction. It seems to reduce heart failure admission rates, and decrease CVD mortality and all-cause mortality.

e. Disadvantages = hypotension and increased genital infection due to glycosuria, possible increased risk of masking DKA as blood glucose rise is not as high as you would normally expect.

7.9.7. Liraglutide and other GLP agonists.

a. If the patient won't accept insulin, especially if their BMI is raised (BMI > 35) consider referring to Diabetic Specialist for a trial of an injectable GLP agonist e.g. twice daily Exenatide or once daily Liraglutide or once weekly Bydureon. They are now also licensed to be used with insulin.

b. They cause reduced appetite and cause mild nausea (usually settles) and often result in mild weight loss.

c. *Exenatide* is injected within 1 hour before 2 main meals (at least 6 hours apart).

d. *Bydurion* is a slower release variant of Exenatide and is injected weekly.

e. *Liraglutide* can be given at any time of day (but best given around the same time each day) and no requirement for relationship to meals.

f. The main side effects include nausea and vomiting, but most side effects settle within 8 weeks. Exenatide and Liraglutide can delay gastric emptying. Don't use in gastric paresis.

g. They are contraindicated if there is past medical history of pancreatitis or severe inflammatory bowel disease. Always counsel patients (and document in record) to see their Family Physician promptly if they develop vomiting or severe abdominal pain.

h. Relation with eGFR:

   - Liraglutide – avoid if eGFR < 60
   - Exenatide - use with caution if eGFR 30-50, avoid if eGFR < 30

i. Continue Exenatide or Liraglutide only if the person has a reduction in HbA1c of ≥ 11mmol/l and ≥ 3% of initial body weight in 6 months.

7.10. BP Control– Active management is essential

7.10.1. Over half of all diabetics are hypertensive. Studies have shown that excellent BP control reduces retinopathy, nephropathy, strokes, heart failure and MI. BP control is as important as glycemic control. Note recent trials have shown driving systolic BP <130 does not decrease CVD events and that if you drive systolic BP <110 it is associated with increased CVD risk.

7.10.2. If BP> above 140/90 you must act. Most antihypertensive treatments will have their full effect after 2 to 4 weeks, so up-titrate within that time frame.

7.10.3. According to NICE Recommendations,

a. Offer people aged under 55 years step 1 antihypertensive treatment with an angiotensin-converting enzyme (ACE) inhibitor or a low-cost angiotensin-II receptor blocker (ARB). If an ACE inhibitor is prescribed and is not tolerated (for example, because of cough), offer a low-cost ARB.

b. Do not combine an ACE inhibitor with an ARB to treat hypertension.

c. Offer step 1 antihypertensive treatment with a calcium-channel blocker (CCB) to people aged over 55 years and to black people of African or Caribbean family origin of any age. If a CCB is not suitable,

for example because of oedema or intolerance, or if there is evidence of heart failure or a high risk of heart failure, offer a thiazide-like diuretic.

d. If diuretic treatment is to be initiated or changed, offer a thiazide-like diuretic, such as chlortalidone (12.5–25.0 mg once daily) or indapamide (1.5 mg modified-release once daily or 2.5 mg once daily) in preference to a conventional thiazide diuretic such as bendroflumethiazide or hydrochlorothiazide.

7.10.4. Once stable, NICE recommend a BP check every six months. Refer to the Hypertension Clinical Guidance prepared by Trudoc 24x7 for more details about the management of hypertension.

7.10.5. Ramipril starting regime derived from the HOPE study regime and BNF guidelines

a. If U&Es pre -treatment reveal a creatinine < 150 micromol/l and a sodium >130 mmol/l then 2.5 mg Ramipril daily (1.25mg if on lower dose concomitant diuretics) for one week with check U&Es and an increase to 5.0 mg Ramipril for a further three weeks.

b. Re-check U&Es and if indicated increase to 10mg Ramipril and repeat U&Es on an annual basis. If eGFR falls > 25% or creatinine rises by > 30% stop or back titrate treatment – see NICE guidelines and BNF

cautions and contraindications. You must refer to specialist if you have any concern or eGFR is falling.

7.11. Micro-proteinuria Management

7.11.1. ACR (Albumin Creatinine Ratio) is a screening test for diabetic microalbuminuria performed on a random sample of urine. The ACR for men should be less than 2.5 mg/mmol and for women less than 3.5 mg/mmol. Remember false +ve results may occur after strenuous exercise, UTIs or glomerulonephritis.

7.11.2. NICE guidelines for micro-proteinuria

a. Measure serum Creatinine and urinary Albumin Creatinine Ratio (ACR) concentration at least annually (unless consistently ACR > 6 in which case request urinary Protein Creatinine Index (PCI).

b. If new onset microalbuminuria or proteinuria is present (ACR > 2.5 men and > 3.5 women) exclude UTI and repeat twice more (within 3 to 4 months) as it may become an irreversible nephropathy within 6 to12 months.

c. If micro-proteinuria is still present, check their records (or refer to ophthalmology for examination of their retina) to check for retinopathy. If retinopathy is not present, if they have resistant

hypertension or if they have microscopic haematuria then look for a non-diabetes cause of renal disease/ must consider renal referral.

- Ensure good glycemic control
- Measure, assess and manage cardiovascular risk factors aggressively.
- Initiate ACE inhibitor therapy for cardiovascular/renal protection.
- Target blood pressure <130/80 mmHg.
- ACE inhibitors are the drug of first choice. To achieve target blood pressure then use combination therapy if ACE inhibition alone is not fully effective.
- Measure ACR at each visit.
- See CKD Telemedicine Clinical Guidance for referral criteria to nephrology.

7.12. Use of Statin in Diabetic Patient

According to the American Diabetes Association (ADA), the recommendations are as follow for statin use in diabetic individuals:

7.12.1. Statin therapy should be added to lifestyle therapy, regardless of baseline lipid levels, for diabetic patients *a*) with overt cardiovascular disease (CVD); the primary goal is an LDL cholesterol <100 mg/dl (<2.6 mmol/l); a lower LDL cholesterol goal of 70 mg/dl (1.8 mmol/l), using a high dose

of a statin, is an option; and *b*) without CVD who are over the age of 40 years and have one or more other CVD risk factor. The primary goal is an LDL cholesterol <100 mg/dl (<2.6 mmol/l).

7.12.2. For lower-risk patients than those specified above (e.g., without overt CVD and under the age of 40 years), statin therapy should be considered in addition to lifestyle therapy if LDL cholesterol remains >100 mg/dl or in individuals with multiple CVD risk factors.

7.12.3. If drug-treated patients do not reach the above targets on maximal tolerated statin therapy, a reduction in LDL cholesterol of >40% from baseline is an alternative therapeutic goal.

7.12.4. Combination therapy using statins and other lipid-lowering agents may be considered to achieve lipid targets but has not been evaluated in outcome studies for either CVD outcomes or safety.

7.12.5. Statin therapy is contraindicated in pregnancy.

8. KEY PERFORMANCE INDICATORS

8.1. Refer to APPENDIX 6 for Key Performance Indicators

REFERENCES

1. NHS. [Internet]. Type 2 diabetes. [updated 2020; cited 2022 May 23]. Available from: https://www.nhs.uk/conditions/type-2-diabetes/

2. Maclsaac, R., Jerums, G., and Watts, G., Diabetic Chronic Kidney Disease. Diabetes: Chronic Compilations Edition 3. 2010.

APPENDICES

APPENDIX 1 - USE OF GLYCATED HAEMOGLOBIN (HBA1C) IN THE DIAGNOSIS OF PREDIABETES AND DIABETES MELLITUS

HbA1c	mmol/mol	%
Normal	Below 39 mmol/mol	Below 5.7%
Prediabetes	39 to 47 mmol/mol	5.7 % to 6.4%
Diabetes	48 mmol/mol or over	6.5% or over

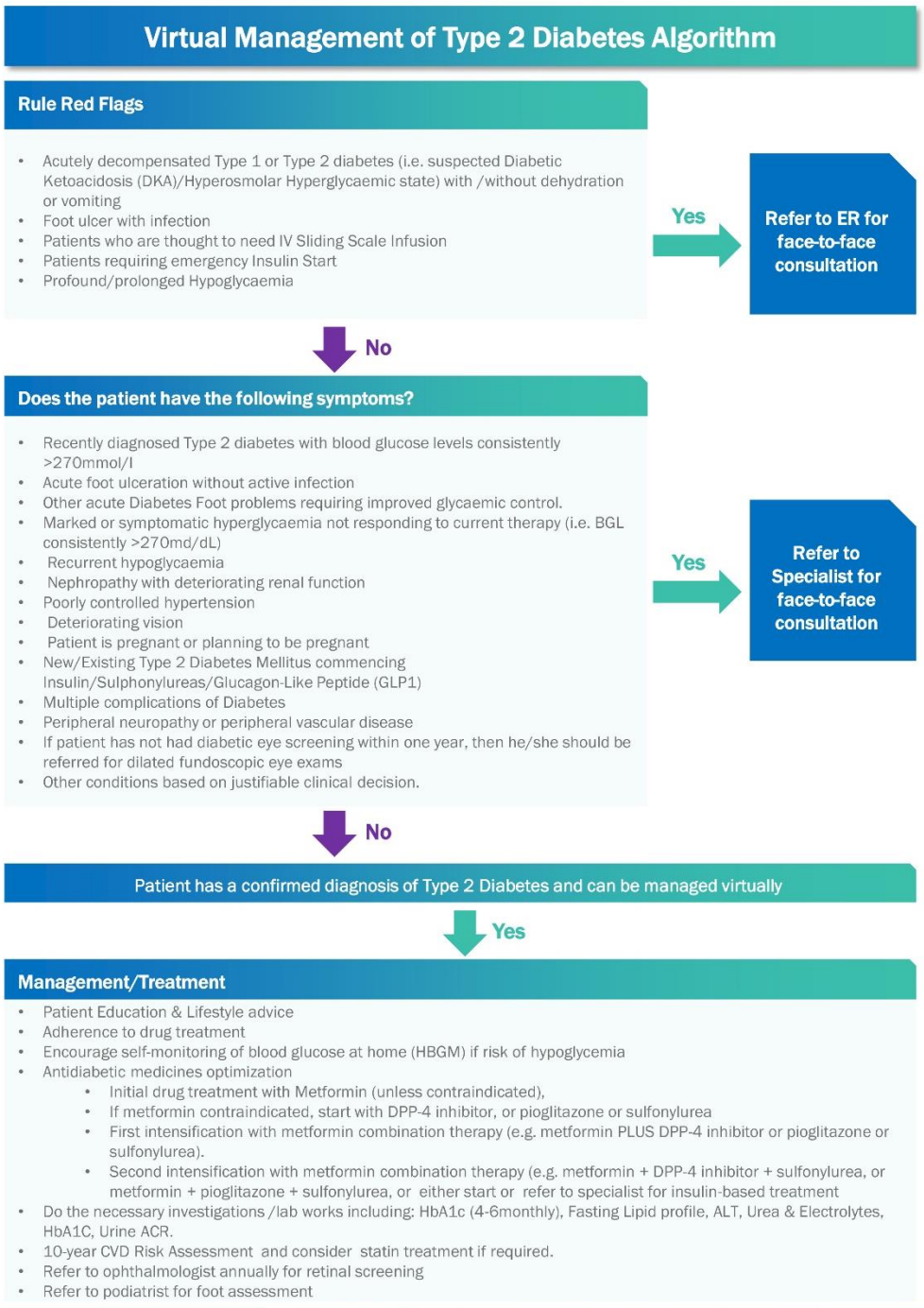
APPENDIX 2 – USE OF FASTING AND POST-PRANDIAL BLOOD SUGAR IN THE DIAGNOSIS OF PREDIABETES AND DIABETES MELLITUS

Plasma glucose test	Normal	Prediabetes	Diabetes
Fasting	Below 100 mg/dl Below 5.5 mmol/l	100 to 125 mg/dl 5.5 to 6.9 mmol/l	126 mg/dl or more 7.0 mmol/l or more
2 hour post-prandial	Below 140 mg/dl Below 7.8 mmol/l	140 to 199 mg/dl 7.8 to 11.0 mmol/l	200 mg/dl or more 11.1 mmol/l or more

APPENDIX 3 – HBA1C CONVERSTION TABLE FROM PERCENTAGE (DCCT UNIT) TO IFCC (IN MMOL/L)

HbA1c (DCCT) %	HbA1c (IFCC) mmol/l
6.0%	42
6.5%	48
7.0 %	53
7.5%	59
8.0%	64
9.0%	75

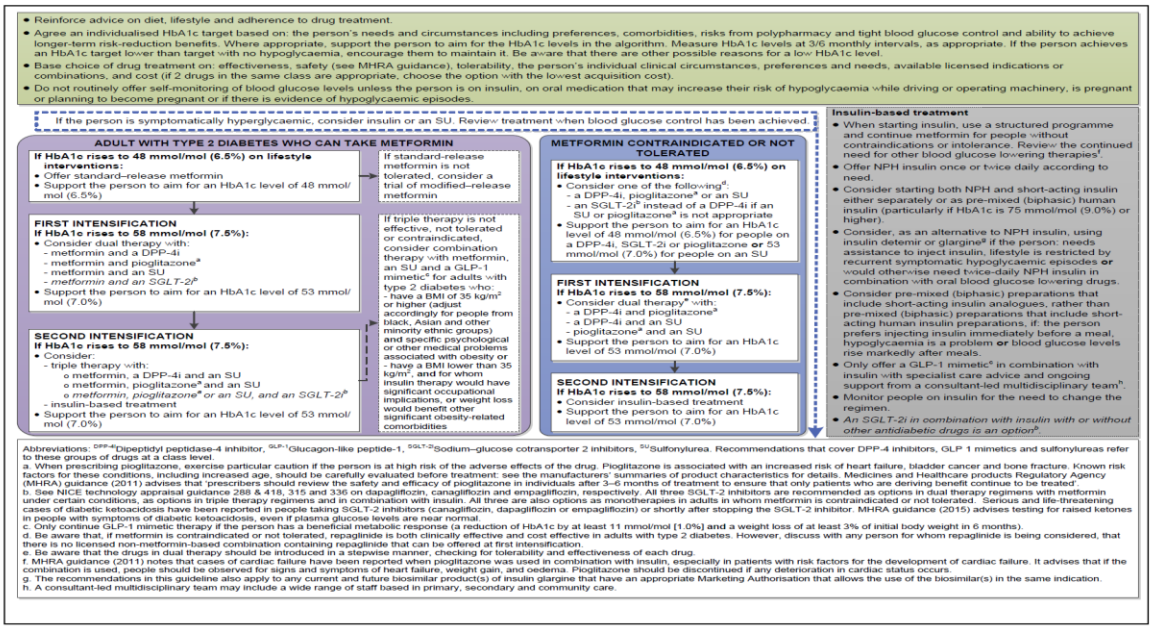
APPENDIX 4 - VIRTUAL MANAGEMENT OF TYPE 2 DIABETES ALGORITHM



APPENDIX 5 – NICE ALGORITHM FOR BLOOD GLUCOSE LOWERING THERAPY IN ADULTS WITH TYPE 2 DIABETES

NICE National Institute for Health and Care Excellence

Algorithm for blood glucose lowering therapy in adults with type 2 diabetes



Abbreviations: DPP-4 Dipeptidyl peptidase-4 inhibitor, GLP-1 Glucagon-like peptide-1, SGLT-2 Sodium–glucose cotransporter 2 inhibitors, SU Sulfonylurea. Recommendations that cover DPP-4 inhibitors, GLP 1 mimetics and sulfonylureas refer to these groups of drugs at a class level.

a. When prescribing pioglitazone, exercise particular caution if the person is at high risk of the adverse effects of the drug. Pioglitazone is associated with an increased risk of heart failure, bladder cancer and bone fracture. Known risk factors for these conditions, including increased age, should be carefully evaluated before treatment: see the manufacturers' summaries of product characteristics for details. Medicines and Healthcare products Regulatory Agency (MHRA) guidance (2011) advises that 'prescribers should review the safety and efficacy of pioglitazone in individuals after 3–6 months of treatment to ensure that only patients who are deriving benefit continue to be treated'.

b. See NICE technology appraisal guidance 288 & 418, 315 and 336 on dapagliflozin, canagliflozin and empagliflozin, respectively. All three SGLT-2 inhibitors are recommended as options in dual therapy regimens with metformin under certain conditions, as options in triple therapy regimens and in combination with insulin. All three are also options as monotherapies in adults in whom metformin is contraindicated or not tolerated. Serious and life-threatening cases of diabetic ketoacidosis have been reported in people taking SGLT-2 inhibitors (canagliflozin, dapagliflozin or empagliflozin) or shortly after stopping the SGLT-2 inhibitor. MHRA guidance (2015) advises testing for raised ketones in people with symptoms of diabetic ketoacidosis, even if plasma glucose levels are near normal.

c. Only continue GLP-1 mimetic therapy if the person has a beneficial metabolic response (a reduction of HbA1c by at least 11 mmol/mol [1.0%] and a weight loss of at least 3% of initial body weight in 6 months).

d. Be aware that, if metformin is contraindicated or not tolerated, repaglinide is both clinically effective and cost effective in adults with type 2 diabetes. However, discuss with any person for whom repaglinide is being considered, that there is no licensed non-metformin-based combination containing repaglinide that can be offered at first intensification.

e. Be aware that the drugs in dual therapy should be introduced in a stepwise manner, checking for tolerability and effectiveness of each drug.

f. MHRA guidance (2011) notes that cases of cardiac failure have been reported when pioglitazone was used in combination with insulin, especially in patients with risk factors for the development of cardiac failure. It advises that if the combination is used, people should be observed for signs and symptoms of heart failure, weight gain, and oedema. Pioglitazone should be discontinued if any deterioration in cardiac status occurs.

g. The recommendations in this guideline also apply to any current and future biosimilar product(s) of insulin glargine that have an appropriate Marketing Authorisation that allows the use of the biosimilar(s) in the same indication.

h. A consultant-led multidisciplinary team may include a wide range of staff based in primary, secondary and community care.

'Type 2 diabetes in adults: management', NICE guideline NG28. Published December 2015, last updated April 2017.

APPENDIX 6 - KEY PERFORMANCE INDICATORS IN DIABETES MANAGEMENT

KPIs	Frequency
% of Diabetic patient with HbA1c done every 3 months	3 months
% of Diabetic patient with HbA1c ≤ 7	3 months
Mean HbA1c	3 months

APPENDIX 7 - SUMMARY OF THE REQUIRED LABORATORY TESTS

Chronic Condition	**Blood tests to be done at the time of the diagnosis** (or if the baseline results are unknown (if patient's previous lab reports are unavailable and chronic medications need to be prescribed)	**3 monthly Review**	**6 Monthly and Annually**
Diabetes	HbA1C, U/E*, Fasting lipids, ALT, Urine ACR.	HbA1C, Urine ACR (if baseline was abnormal),	HbA1C, U/E*, Cholesterol, Urine ACR
Impaired Fasting Glucose, Impaired Glucose Tolerance , Gestational Diabetes	HbA1C, U/E*, Fasting glucose and total cholesterol. If urine dip + protein then send for ACR	N/A (Provided the baseline lab results were satisfactory/normal)	HbA1C, U/E, Fasting glucose and total cholesterol. Urine ACR,

U/E* = Urea and Electrolyte