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Diabetes mellitus (DM)

Guidelines

Table of content

المظلة هيلثكير مانجمنت
ALMADALLAH
HEALTHCARE MANAGEMENT

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Introduction

Diabetes mellitus (DM) is characterized by the insufficient regulation of blood glucose levels and should not be conflated with hyperglycaemia. DM specifically involves recurring instances of hyperglycaemia, emphasizing that not all cases of elevated blood sugar are indicative of diabetes.

Prioritizing screening and monitoring are paramount in the management of DM, underscoring the adage that prevention is preferable to cure. The classification of Type 2 Diabetes Mellitus (T2DM) is stratified based on risk factors into low risk, high risk, and very high-risk categories. The management approach varies for each classification, recognizing the nuanced considerations associated with different risk levels.

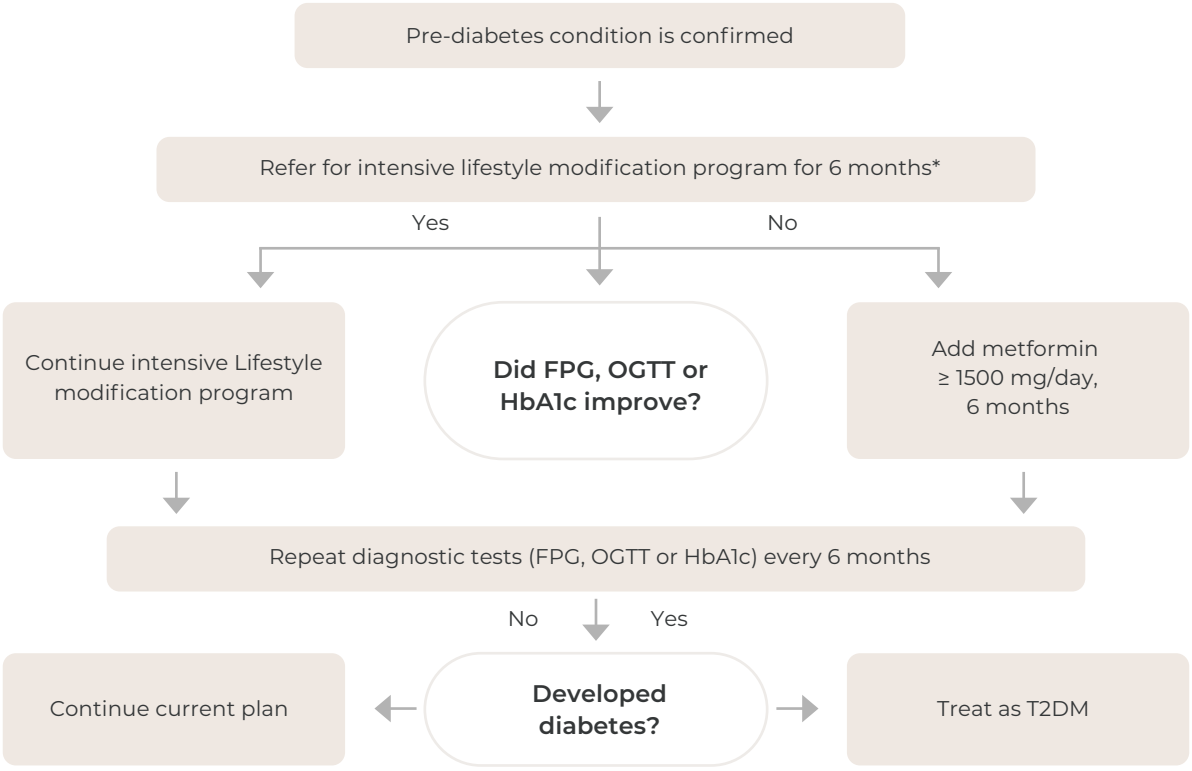
DM

Medication & Treatment:

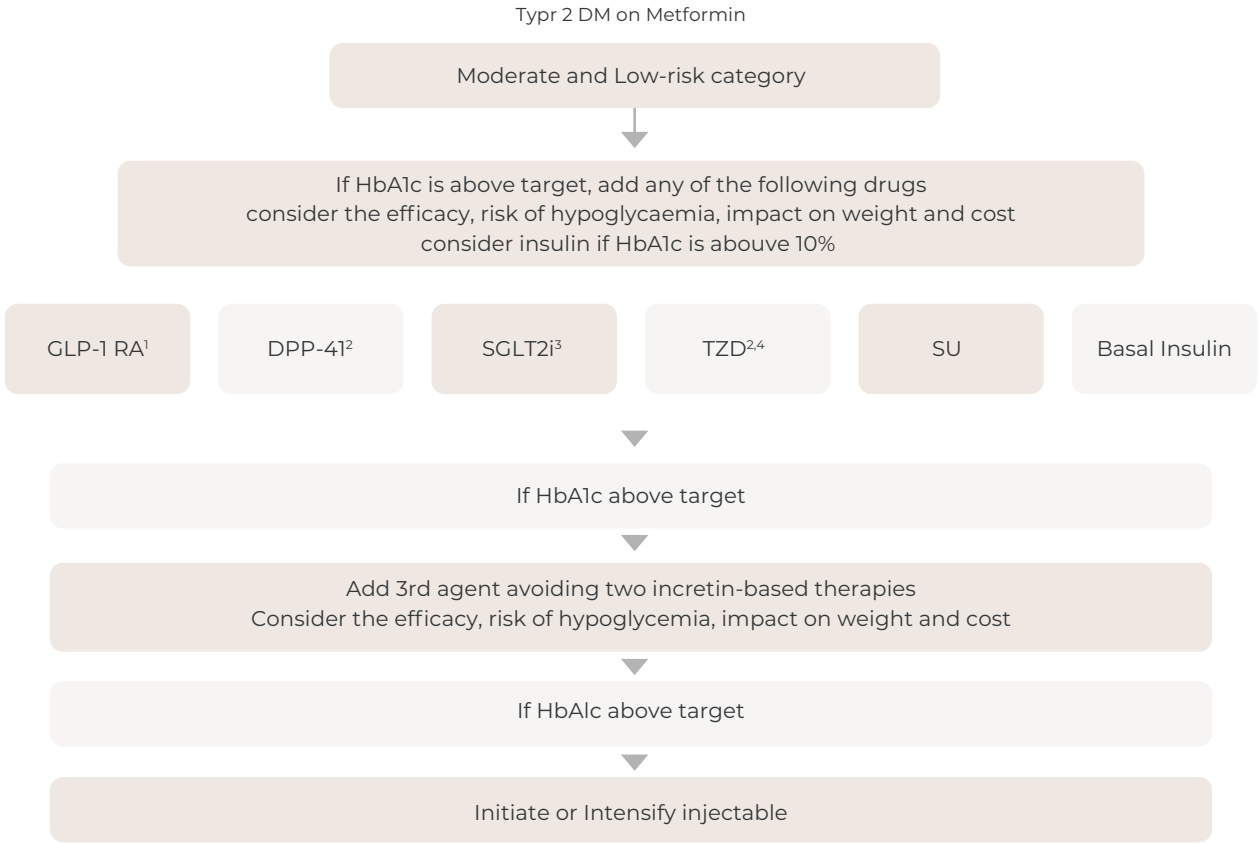
Step	Stage	Action	Outcome
1	Prediabetic confirmed	Intensive lifestyle program	Monitor the condition if not improved go for stage 2
2	Intensive lifestyle program didn't work	Metformin up to 1500 mg/d	Monitor the condition if not improved go for stage 3 or 6 or 9 based on the condition
3	T2DM low risk	Metformin + one of (GLP-1RA/DPP-4i/S-GLT2i/TZD/SU/Basal insulin only for HbA1C above 10)	Monitor the condition if not improved go for stage 4
4	T2DM low risk not controlled with 2 medications	Add a 3rd agent avoiding 2 incretins	Monitor the condition if not improved go for stage 5
5	T2DM low risk not controlled with 3 medications	Initiate or intensify injectable	
6	T2DM High risk	Metformin + one of (GLP-1RA/DPP-4i/SGLT2i/TZD/-SU/Basal insulin only for HbA1C above 10)	Monitor the condition if not improved go for stage 7
7	T2DM low risk not controlled with 2 medications	Add a 3rd agent avoiding 2 incretins	Monitor the condition if not improved go for stage 8
8	T2DM high risk not controlled with 3 medications	Initiate or intensify injectable	
9	T2DM very High risk	Add (GLP-1RA or SGLT2i) with proven CVD benefit regardless of HbA1c	Monitor the condition if not improved go for stage 10
10	T2DM very high risk not controlled with 2 medications	Add the other class (GLP-1 RA or SGLT2i*) with proven CVD benefit if resources permit	Monitor the condition if not improved go for stage 11
11	T2DM very high risk not controlled with 3 medications	Add basal insulin	Monitor the condition if not improved go for stage 12
12	T2DM very high risk not controlled with 3 medications + insulin	Intensify injectable	

DM

1. Prediabetic:

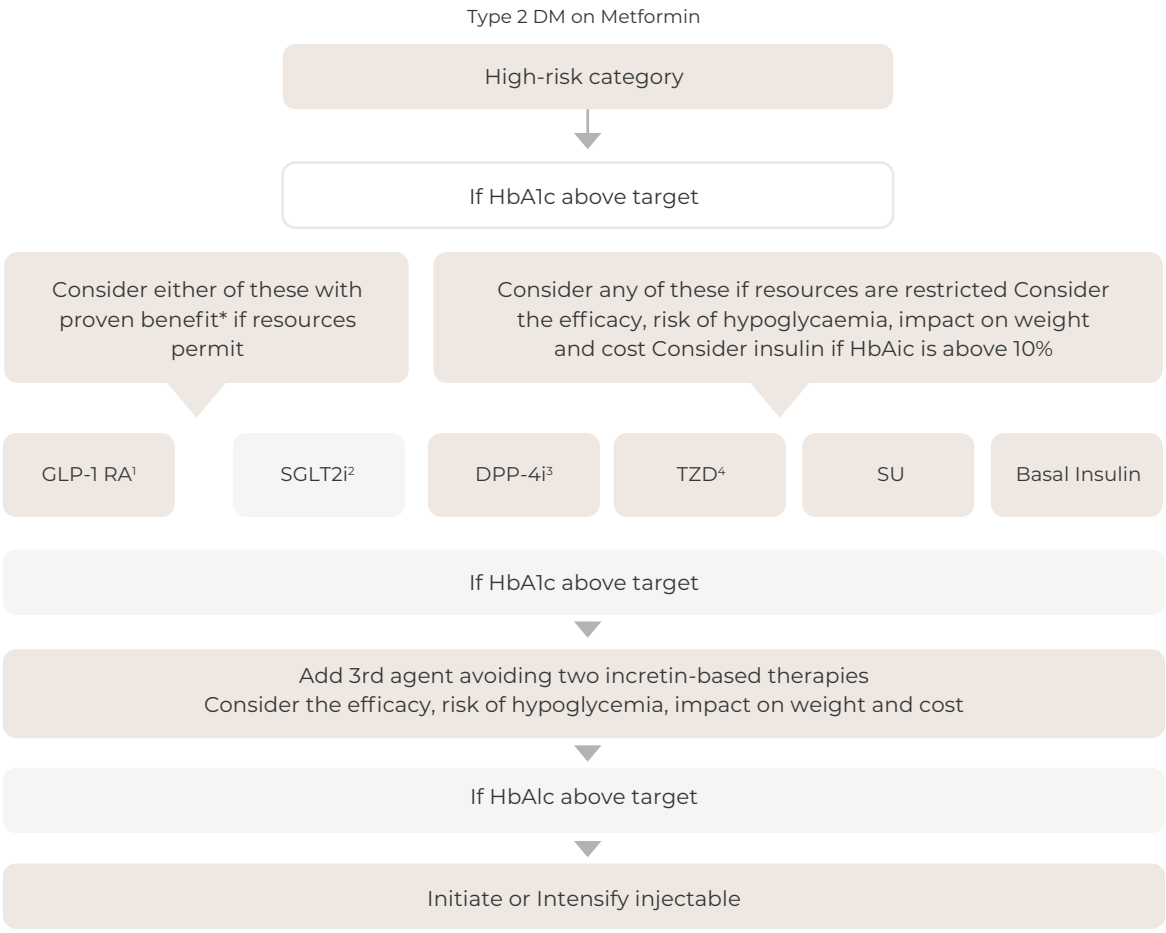


2. T2DM low risk:

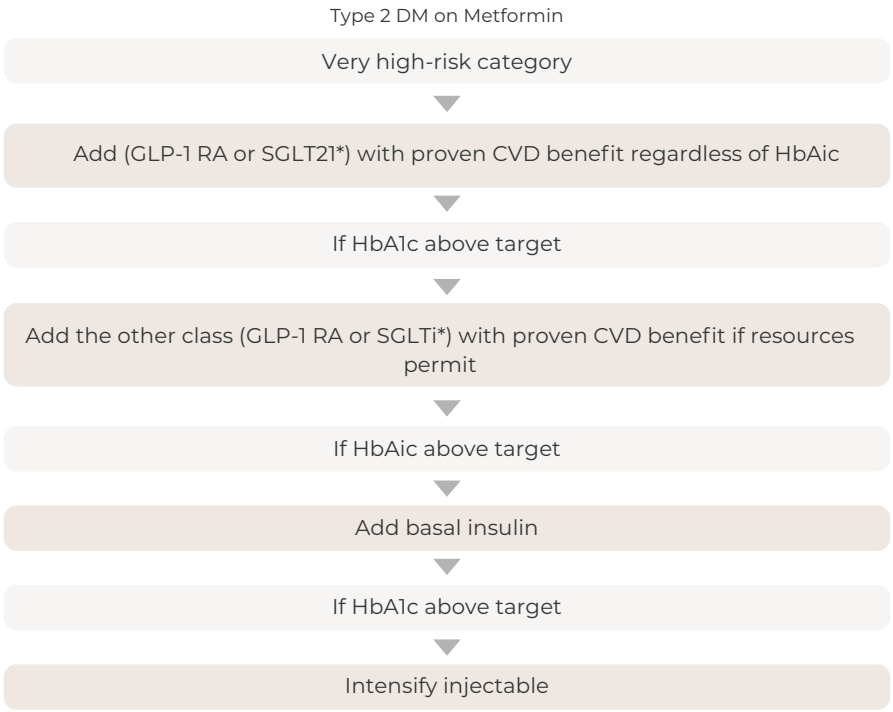


DM

T2DM high risk:



T2DM very high risk:



DM

A.Oral antidiabetic:

I.GLP-1 Receptor Agonists (GLP-1RA):

A. Exenatide (Byetta).
B. Liraglutide (Victoza).
C. Dulaglutide (Trulicity).
D. Semaglutide (Ozempic).

Mechanism: Mimics the action of glucagon-like peptide-1, which enhances insulin secretion, suppresses glucagon secretion and slows gastric emptying.

II.DPP-4 Inhibitors (DPP-4i):

A. Sitagliptin (Januvia).
B. Saxagliptin (Onglyza).
C. Linagliptin (Tradjenta).
D. Alogliptin (Nesina).

Mechanism: Inhibits dipeptidyl peptidase-4, an enzyme that breaks down incretin hormones. This leads to increased insulin secretion and reduced glucagon levels.

III. SGLT2 Inhibitors (SGLT2i):

A. Canagliflozin (Invokana).
B. Dapagliflozin (Farxiga).
C. Empagliflozin (Jardiance).

Mechanism: Blocks the reabsorption of glucose by the kidneys, leading to increased glucose excretion in urine.

IV. Thiazolidinediones (TZD):

A. Pioglitazone (Actos).
B. Rosiglitazone (Avandia).

Mechanism: Improves insulin sensitivity by activating peroxisome proliferator-activated receptors (PPARs) which regulate genes involved in glucose and lipid metabolism.

V. Sulfonylureas (SU):

A. Glyburide (Diabeta).
B. Glipizide (Glucotrol).
C. Glimepiride (Amaryl).

Mechanism: Stimulates insulin release from the pancreas by closing potassium channels in the beta cells.

B.Injectable antidiabetic:

I.Insulin:

1.Rapid-acting:

- Insulin lispro (Humalog),
- Insulin aspart (NovoLog),
- Insulin glulisine (Apidra)

2.Short-acting: Regular insulin (Humulin R, Novolin R)

3.Intermediate-acting: NPH insulin (Humulin N, Novolin N)

4.Long acting:

- Insulin glargine (Lantus),
- Insulin detemir (Levemir),
- Insulin degludec (Tresiba)

Mechanism: Insulin is a hormone that helps regulate blood sugar. It can be used in various forms depending on the need, such as rapid-acting for mealtime coverage or long-acting for basal insulin needs.

II.GLP-1 Receptor Agonists (GLP-1RA):

A. Exenatide (Byetta, Bydureon),
B. Liraglutide (Victoza, Saxenda),
C. Dulaglutide (Trulicity),
D. Semaglutide (Ozempic)

Mechanism: Mimics the action of the incretin hormone GLP-1, promoting insulin secretion and suppressing glucagon release. It also slows gastric emptying.

III.Amylin Analogs:

1.Pramlintide (Symlin)

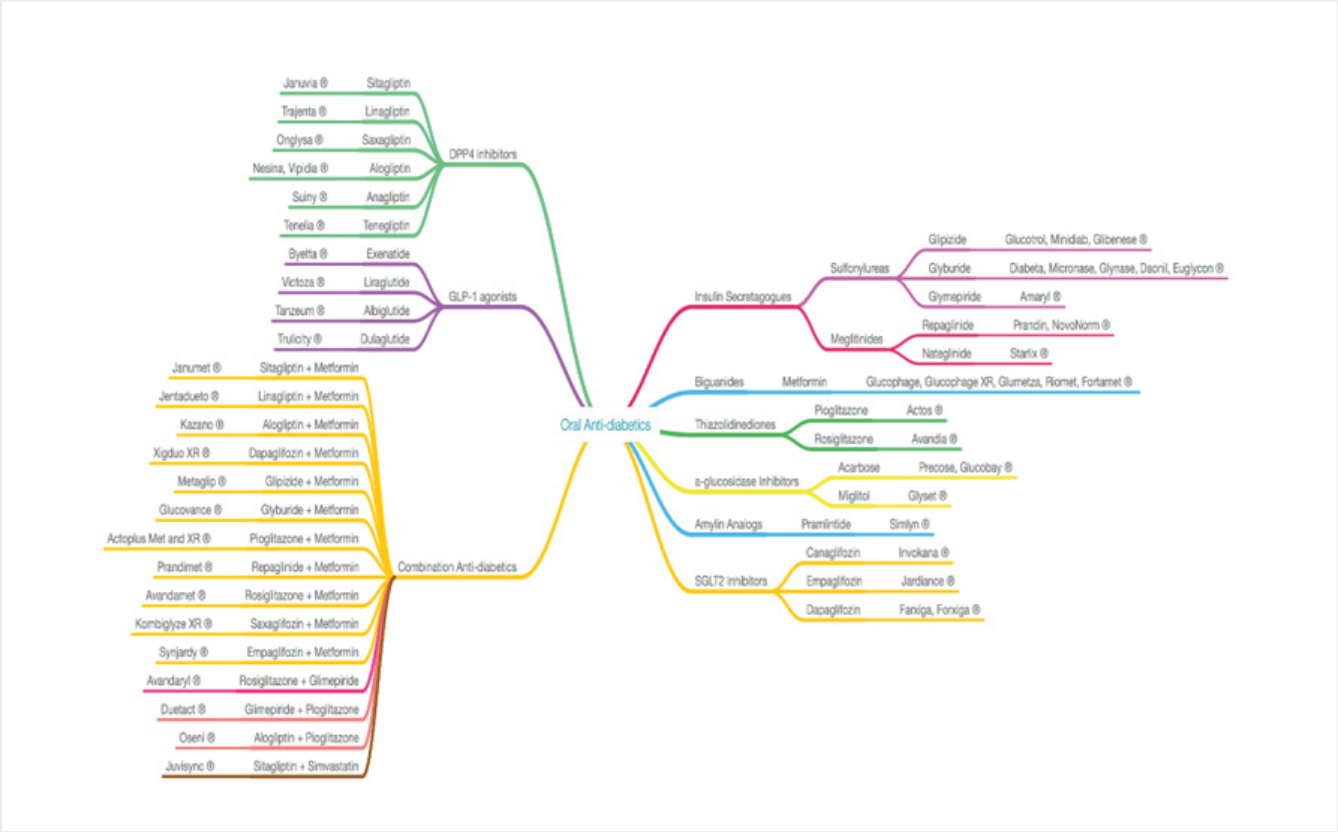
Mechanism: Mimics the effects of amylin, a hormone that works with insulin to regulate blood sugar levels, slowing the rate at which glucose is released into the bloodstream.

IV.SGLT2 Inhibitors (SGLT2i):

1.Empagliflozin (Jardiance)

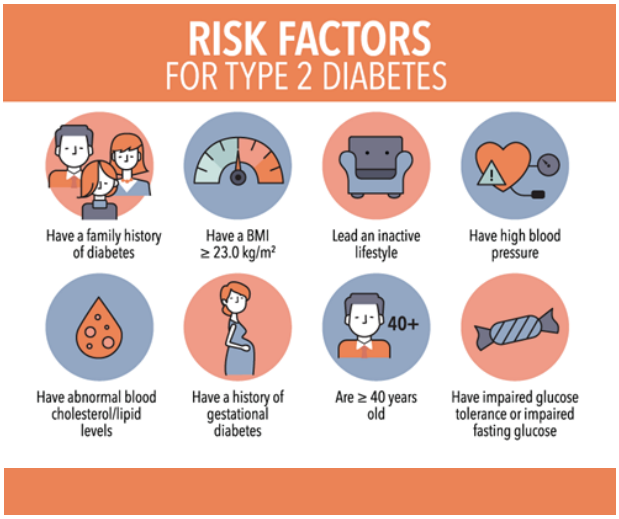
Mechanism: While most SGLT2 inhibitors are oral medications, empagliflozin is available in an injectable form. It works by inhibiting the reabsorption of glucose by the kidneys.

DM



Risk factors for T2DM:

1. Family History: Individuals with a family history of diabetes are at a higher risk.
2. Age: The risk of diabetes increases with age, particularly after 45 years.
3. Ethnicity: Certain ethnic groups, such as African Americans, Hispanic/Latino Americans, Native Americans, and Asian Americans, are at higher risk.
4. Obesity: Excess body weight, especially abdominal fat, is a significant risk factor.
5. Physical Inactivity: Lack of regular physical activity can contribute to the development of diabetes.
6. Poor Diet: Diets high in processed foods, sugars, and unhealthy fats can contribute to diabetes risk.
7. Gestational Diabetes: Women who had gestational diabetes during pregnancy have a higher risk of developing type 2 diabetes later in life.
8. Polycystic Ovary Syndrome (PCOS): Women with PCOS have an increased risk of diabetes.
9. Hypertension (High Blood Pressure): Elevated blood pressure is a risk factor for type 2 diabetes.
10. High Cholesterol Levels: Abnormal levels of cholesterol and triglycerides can increase the risk.
11. Sleep Apnea: Untreated sleep apnea may increase the risk of type 2 diabetes.
12. Smoking: Smokers have a higher risk of developing diabetes than non-smokers



DM

ICD codes

Category	ICD-10 Code	Description
E08	E08.0	Diabetes mellitus due to underlying condition with hyperosmolarity
	E08.00	Without nonketotic hyperglycaemic-hyperosmolar coma (NKHHC)
	E08.01	With coma
	E08.1	Diabetes mellitus due to underlying condition with ketoacidosis
	E08.10	Without coma
	E08.11	With coma
E09	E09.0	Drug or chemical induced diabetes mellitus with hyperosmolarity
	E09.00	Without NKHHC
	E09.01	With coma
	E09.1	Drug or chemical induced diabetes mellitus with ketoacidosis
	E09.10	Without coma
	E09.11	With coma
E10	E10.0	Type 1 diabetes mellitus with hyperosmolarity
	E10.00	Without coma
	E10.01	With coma
	E10.1	Type 1 diabetes mellitus with ketoacidosis
	E10.10	Without NKHHC
	E10.11	With coma
E11	E11.0	Type 2 diabetes mellitus with ketoacidosis
	E11.00	Without coma
	E11.01	With coma
	E11.1	Type 2 diabetes mellitus with ketoacidosis
	E11.10	Without NKHHC
	E11.11	With coma
E12	E12.0	Malnutrition-related diabetes mellitus with ketoacidosis
	E12.00	Without coma
	E12.01	With coma
	E12.1	Malnutrition-related diabetes mellitus with hyperosmolarity
	E12.10	Without NKHHC
	E12.11	With coma
E13	E13.0	Other specified diabetes mellitus with hyperosmolarity
	E13.00	Without NKHHC
	E13.01	With coma
	E13.1	Other specified diabetes mellitus with ketoacidosis
	E13.10	Without coma
	E13.11	With coma

DM

DM screening Test:

No.	Description	CPT	Frequency
1	HbA1C	**83036**	Every 6 months
2	LDL	**83721**	Every 6 months
3	Renal function panel	**80069**	Every 6 months
4	Glucose; quantitative, blood (except reagent strip)	**82947**	Once every 3 years for prediabetic and once every 6 months for T2DM
5	Glucose; post glucose dose	**82950**	Once every 3 years for prediabetic and once every 6 months for T2DM
6	Glucose Tolerance Test (GTT); three specimens	**82951**	Once every 3 years for prediabetic and once every 6 months for T2DM
7	Corneal topography	**92025**	Once per year
8	Visual acuity	**99173**	Once per year
9	OCT	**92133 or 92134**	Once per year

Hyperglycaemic crisis:

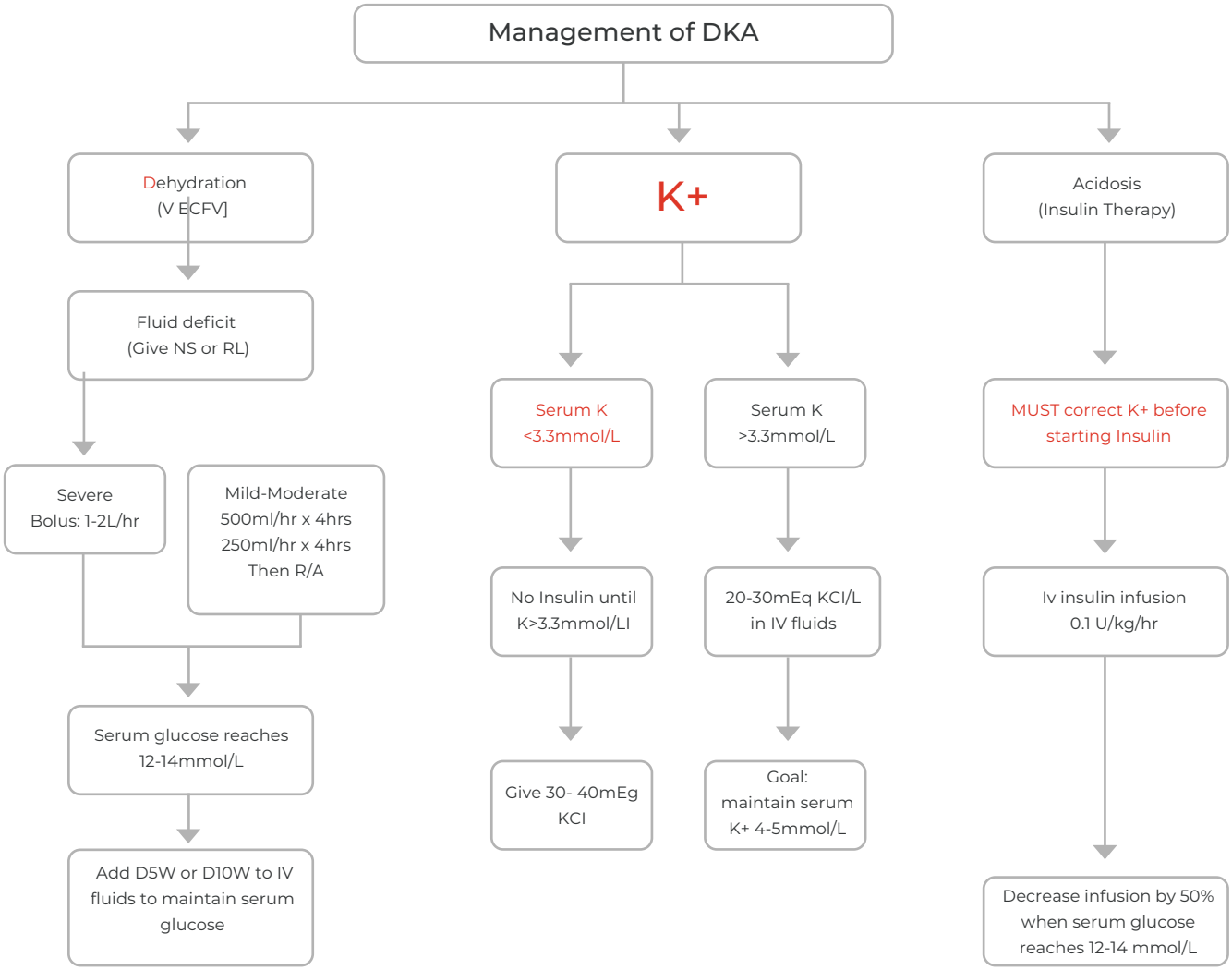
Diabetic ketoacidosis (DKA) and hyperglycaemic hyperosmolar state (HHS) stand out as the gravest and life-threatening hyperglycaemic emergencies in individuals with diabetes. While often discussed as distinct conditions, they represent points along a spectrum of hyperglycaemic emergencies resulting from inadequately controlled diabetes. Both DKA and HHS can manifest in individuals with either type 1 or type 2 diabetes. However, DKA tends to be more prevalent among young individuals with type 1 diabetes (T1DM), while HHS is commonly observed in adults and elderly individuals with type 2 diabetes (T2DM). It's worth noting that in many cases, characteristics of both disorders, including ketoacidosis and hyperosmolality, may coexist.

Can be simply identified by the two main signs which is abdominal pain and fruity breath.

DM

Indicated Lab Test:

No.	Description	CPT	Alerting results for repeating(DKA)	Frequency
1	Gases, blood, any combination of pH, pCO2, pO2, CO2, HCO3 (including calculated O2 saturation)	**83036**	PH <7.00	PH <7.30
1	Serum bicarbonate	**83036**	< 10	>18
1	Acetone or other ketone bodies, serum.	**83036**	+ve	+ve
1	Glucose; quantitative, blood (except reagent strip)	**83036**	>250	>600
1	Serum β-hydroxybutyrate	**83036**	>3.0	<3.0
1	Serum osmolality	**83036**	-	>320 mOsm/kg
1	Electrolyte panel	**83036**	Anion Gap >12	-



DM

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