Prediabetes

Impaired pasting glucose or impaired glucose tolerance. High risk of developing T2DM. Aggressive lifestyle change.

Insulin resistance

↑ insulin production to try and keep up (chronic hyperinsulinemia) = body becomes less sensitive to it = exhaust the beta cells "burn out" = decline in function = ↓ insulin (alongside resistance)

Progression: beta cells fail to compensate, leading to insulin deficiency alongside resistance

Treatment = Lifestyle. ↓ weight, ↑ exercise. *Education on progression*.

Metabolic syndrome

Central adiposity (measured by waist circumference) PLUS AT LEAST ONE OF:

↑ triglycerides (>1.7mmol/L)

↓ HDL (males <1.03, females <1.29)

↑ BP (S >130, D >85)

Fasting BGL >5.6mmol/L

Diagnosed T2DM

T2DM

Defective insulin receptors → Cells cannot efficiently take up glucose = ↑ blood glucose levels. Compensatory hepatic response → The liver ↑s gluconeogenesis

Insulin resistance AND relative insulin deficiency

Risk factors: age, family hx, obesity, sedentary lifestyle, HT, dyslipidaemia, impaired glucose tolerance, ethnicity, insulin resistance

Consider

prev education/age on diagnosis	how they take their medication
insulin?	

Diagnosis

FBG: >7 mmol/L (confirmed with repeat)

FBG: >7 mmol/L AND 2h glucose >11.1 mmol/L

Hb1c >6.5% (confirmed with repeat)

S/S

Hypo	Hyper
Trembling	3 Ps
Trouble concentration	blurred vision
Sweating	weight loss
↑ HR	fatigue
Dizzy	low energy
Weakness	delayed healing
	irritability

Consequences

retinopathy (vision loss or blindness)	nephropathy (leading cause of CKD)
neuropathy – numbness/feet - amputations	stroke
delayed wound healing - infections	

Biochem

BGL	
Glucose, random	3.0-7.7 mmol/L
Glucose, fasting	3-6 mmol/L
Impaired, fasting glucose	6.1-6.9 mmol/L
Diabetic, fasting glucose	> 7 mmol/L
Insulin	5-25 mmol/L
OGTT	

Biochem (cont)

OGTT (normal)	3-7.7 mmol/L
OGTT (impaired)	7.8-11 mmol/L
OGTT (probable diabetic)	>11.1 mmol/L
HbA1c	*long-term indicator of blood glucose control*
Normal range	3.5-6%
Prediabetes	6-6.4%
Diabetes	>6.5%
Good control	<7%
Poor Control	>8.1%

MNT Objectives

Fasting blood glucose 6–8 mmol/L

HbA1c <7%

Moderate weight loss if overweight (5–10% of body weight)

CHO consistency across meals

Contact: 3-6 encounters in first 6 months. Min 1 annual review.

Nut Reqs

Na <2 300 mg/day

Fibre intake ≥38g/day

Strategies

Weight Management	↑ exercise, portion control, ↑ lean P/Fibre, meal plans, swaps
Carb counting	1 carb choice/exchange = 15g CHO. 2-4 exchanges per meal (30-60g CHO). 1–2 carb exchanges per snack. Label reading, sugar-free substitutes
CHO consis-tency	↑ complex carbs, even spacing throughout the day

Strategies (cont)

GI	Lower GI foods and “dressing up” CHO
Group counselling	

Carb Counting

1 exchange (15g CHO)
1 sl bread
1/2 bread roll
1/2 english muffin
2-4 multigrain crackers (eg vitaweat)
1 crumpet
1/3 cup raw oats
1/2 cup muesli
1 1/2 weetbix
½ cup cooked pasta
¼ cup cooked rice
1/3 cup cooked noodles
1 small potato
1 medium cob corn

Example PESS

Inappropriate intake of types of carbohydrates (intake), related to food/nutrition knowledge deficit, as evidenced by CHO intake/CHO distribution ratio/FBG

Medications

Metformin	↑ insulin sensitivity. ↓ liver glucose. S/E: metallic taste, N/D. Tablet taken w/ food.
Alogliptin, Linagliptin, Saxagliptin, Sitagliptin, Vildagliptin	↑ insulin production. ↓ liver glucose. S/E: GI upset. Tablet.

Medications (cont)

GLP-1 (*e.g. Ozempic/Semaglutide*)	↑ insulin production. ↓ stomach emptying. N/V/D, weight loss, appetite suppression. Injection twice a day, or once a week
SGLT2 inhibitor. *Dapagliflozin, Empagliflozin, Ertugliflozin*	↑ glucose loss in urine. Tablet taken w/ water. S/E: dehydration (↑ urination), ↓ BP, weight loss, ketoacidosis. Avoid if eating a very low CHO diet.
Sulfonylurea *Glibenclamide, Gliclazide, Glipizide, Glimepiride*	↑ insulin production. S/E: N/D, hypoglycaemia, weight gain.

INSULIN Injections

Background: control fasting blood glucose levels. 1-2/day regardless of mealtimes.

> **Long-acting** (onset 2.4h, duration ~24): *TOUJEO*, *OPTISULIN*. **Intermediate-acting** (onset 0.5-1h, duration 10-16h): *PROTAPHANE, HUMULIN NPH*

Bolus: Quickly reduce high blood glucose levels

> **Rapid acting** (onset 5 mins, duration 4.5 hours). *NOVORAPID, HUMALOG, APIDRA, FIASP.* Taken immediately after a meal. **Short acting**. (onset 30 mins, duration 6 hours). *ACTRAPID, HUMULIN R.* Taken 15-30 mins before meal.

INSULIN Injections (cont)

Premix: Mix of background & bolus. Best taken at regular times of the day with a meal

> **Analogue** (onset 5-15min, duration 10-16h). *NOVOMIX30, HUMALOG MIX 25, HUMALOG MIX 50, RYZODEG 70*
> **Human** (onset 30min, duration 10-16h). *MIXTARD 30, MIXTARD 50.*

Important to have carbs at every meal and avoid skipping meals.

Guidelines & References

Muscogiuri et al. Nutritional guidelines for the management of insulin resistance. Critical reviews in food science and nutrition, 2022

A Position Statement on Screening and Management of Prediabetes in Adults 2020

Lifestyle management. (2017). Diabetes Care

Management of type 2 diabete mellitus: A handbook for general practice. RACGP, 2021

Papamichou et al. Dietary patterns and management of type 2 diabetes: a systematic review of randomised clinic trials. (2019)

Nutrition therapy recommendations for the management of adults with diabetes. Diabetes Care (2013)

Handbook p131