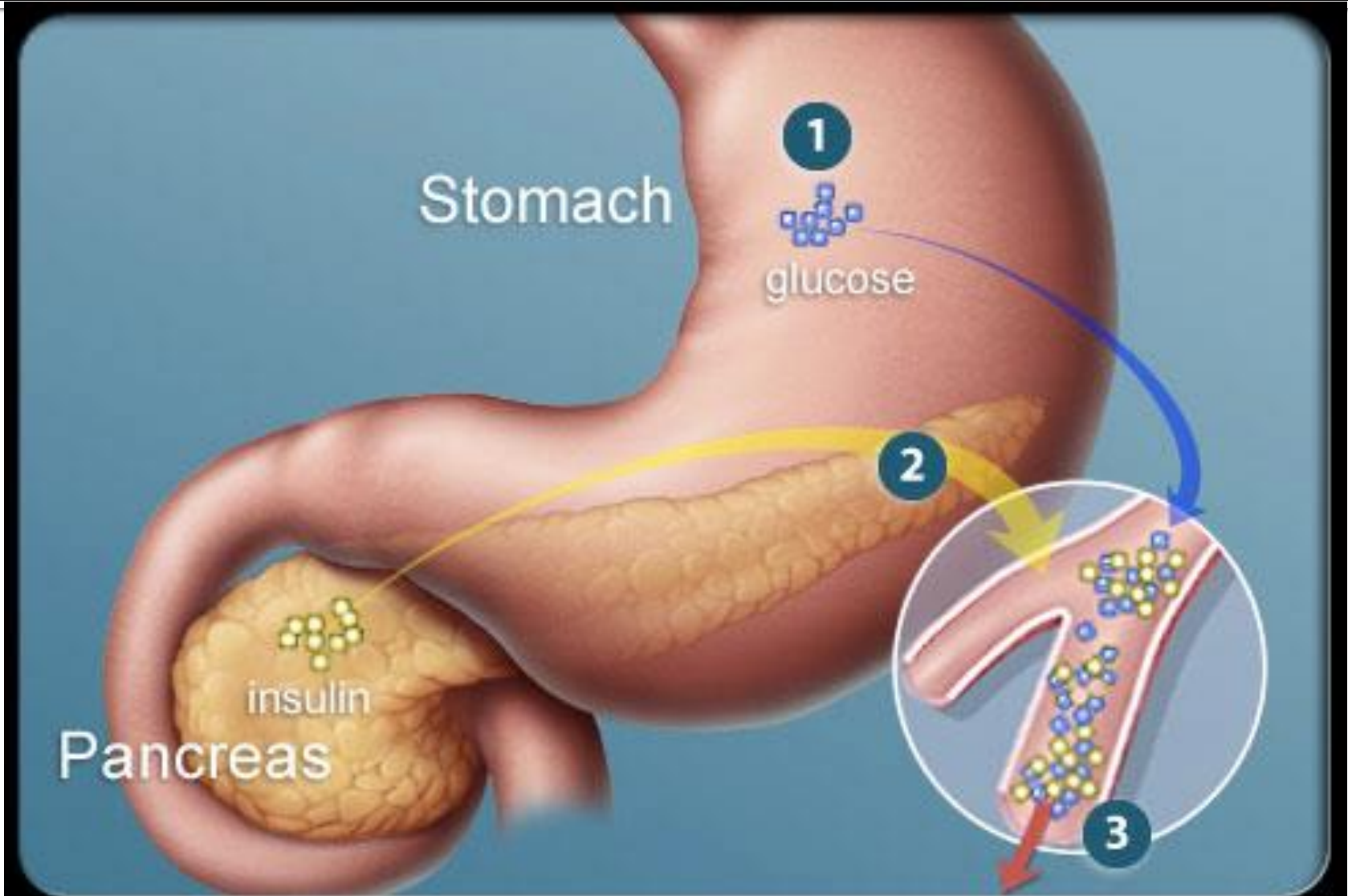


Diabetes

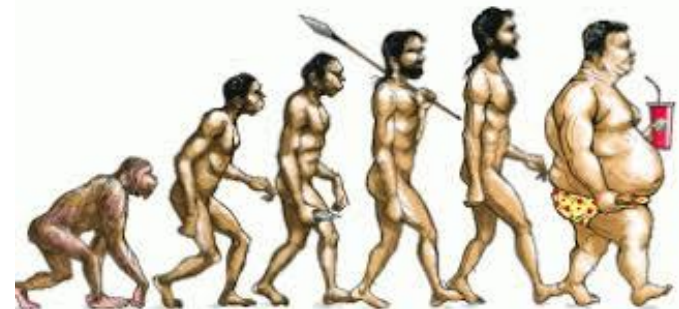
Charles Brackett, MD, MPH

Diabetes Mellitus



Types of Diabetes

- Type 1 (5%): Autoimmune destruction of β cells
 - “juvenile onset”
 - “insulin dependent” - DKA
- Type 2 (95%): Insulin resistance
 - “adult onset”
 - “non-insulin dependent” (but often on insulin)
 - Strongly genetic (90% concordance in identical twins)
 - Strongly related to lifestyle
 - “Diabetes epidemic”



Diagnostic Criteria

- FBS > 126 mg/dl (on 2 occasions)
 - RBS > 200 with symptoms
 - OGTT with glucose > 200 2 hours after load
 - HgbA1c > 6.5
-
- “Prediabetes”: FBS 100-125, A1c 5.8-6.4

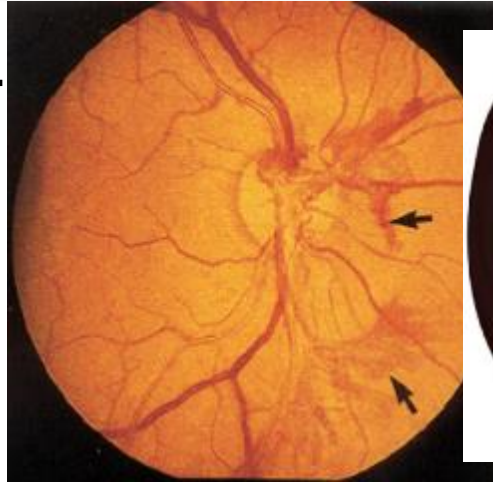
Short Term Complications

- Symptoms of hyperglycemia
 - Polyuria/polydipsia, weight loss
 - Immune dysfunction
- Diabetic ketoacidosis (Type 1)
 - Lack of insulin +/- stress
 - Hyperglycemia → diuresis → dehydration
 - Ketosis due to insulin deficiency → burn fatty acids
 - Sx: n/v, abd pain, Kussmaul respirations, Δ MS
- Hyperosmolar nonketotic state
 - Extreme hyperglycemia → volume depletion and Δ MS

Long Term Complications

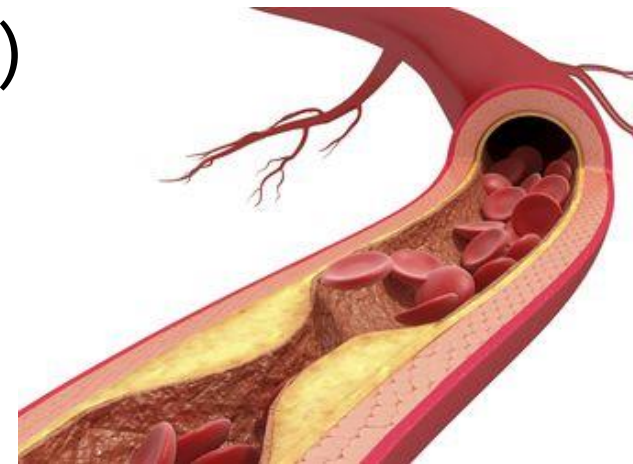
- Microvascular

- Retinopathy
- Nephropathy
- Neuropathy



- Macrovascular (atherosclerosis)

- Ischemic heart disease: MI
- Cerebrovascular disease: Stroke
- PVD: amputation



Reducing the Risk of Diabetic Complications Is Essential

Leading cause
of blindness
in working age
adults



**Diabetic
Retinopathy**



Stroke

Two- to 4-fold
increase in
cardiovascular
mortality
and stroke



**Diabetic
Nephropathy**

Leading cause of
end-stage renal
disease



**Cardiovascular
Disease**



**Diabetic
Neuropathy**

Leading cause of nontraumatic
lower extremity amputations

Prevention of Complications

- Glycemic Control
- Blood Pressure Control
- Lipid Control (statins)
- Aspirin (risk > 10%/10 years)
- Smoking cessation
- Screening for:
 - Retinopathy → dilated eye exams
 - Nephropathy → urine for albumin/creatinine
 - Neuropathy → foot inspection/monofilament

Glycemic Control

- Usual goal is $A_{1c} < 7$

Monotherapy

Metformin

Lifestyle Management

EFFICACY*	high
HYPO RISK	low risk
WEIGHT	neutral/loss
SIDE EFFECTS	GI/lactic acidosis
COSTS*	low

If A1C target not achieved after approximately 3 months of monotherapy, proceed to 2-drug combination (order not meant to denote any specific preference — choice dependent on a variety of patient- & disease-specific factors):

Dual Therapy

Metformin +

Lifestyle Management

	Sulfonylurea	Thiazolidinedione	DPP-4 inhibitor	SGLT2 inhibitor	GLP-1 receptor agonist	Insulin (basal)
EFFICACY*	high	high	intermediate	intermediate	high	highest
HYPO RISK	moderate risk	low risk	low risk	low risk	low risk	high risk
WEIGHT	gain	gain	neutral	loss	loss	gain
SIDE EFFECTS	hypoglycemia	edema, HF, fxs	rare	GU, dehydration, fxs	GI	hypoglycemia
COSTS*	low	low	high	high	high	high

If A1C target not achieved after approximately 3 months of dual therapy, proceed to 3-drug combination (order not meant to denote any specific preference — choice dependent on a variety of patient- & disease-specific factors):

Triple Therapy

Metformin +

Lifestyle Management

Sulfonylurea +	Thiazolidinedione +	DPP-4 inhibitor +	SGLT2 inhibitor +	GLP-1 receptor agonist +	Insulin (basal) +
TZD	SU	SU	SU	SU	TZD
or DPP-4-i	or DPP-4-i	or TZD	or TZD	or TZD	or DPP-4-i
or SGLT2-i	or SGLT2-i	or SGLT2-i	or DPP-4-i	or SGLT2-i	or SGLT2-i
or GLP-1-RA	or GLP-1-RA	or Insulin*	or GLP-1-RA	or Insulin*	or GLP-1-RA
or Insulin*	or Insulin*		or Insulin*		

Treatment of hypoglycemia

- Sx: HA, visual changes, Δ MS, seizure, autonomic activation: tremor, sweating, palpitations.
- If awake- give glucose tab, juice....
- If severe, not taking po- 25-50g of D50 IV
- If no IV- glucagon 0.5-1mg IM or SC

Diabetes (or any chronic disease!) and Behavioral Health

- Importance of patient self-management
 - Adherence with medications, follow-up
 - Adherence with lifestyle changes
- Behavioral Health issues can interfere
 - Motivation, helplessness, trust, organizational skills, stigma/shame, denial/delusional beliefs
- Social Determinants of health can interfere
 - Financial barriers, access to healthy food, exercise...
 - Hierarchy of needs
- Additional Risks
 - Smoking
 - Antipsychotic medications have metabolic SEs:
 - Weight gain, hyperlipidemia, hyperglycemia, htn