Hypercalcemia

Definition: Above normal levels of calcium (Ca2+) in the blood

Risk factors & causes: Hyperparathyroidism or malignancy

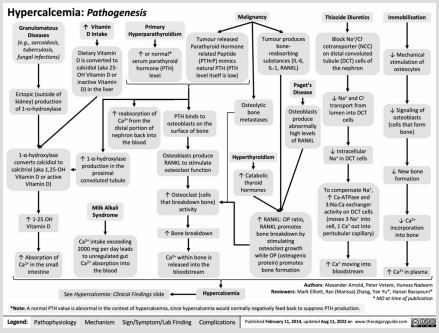
Signs & symptoms:
- Cognitive dysfunction
- Fatigue
- Muscle weakness
- Constipation
- Decreased appetite
- Polyuria (↑ urination)
- Polydipsia (excessive thirst)

Pathophysiology & mechanism: Changes in Ca2+ concentration in the blood cause alterations in the balance of electrical charges of cell membranes leading to sluggish neuronal activity → ↓Ca2+ causes a ↓ in the permeability of collecting duct membrane in the nephrons → ↓ Ca2+ leads to increase in Na/Cl into tubule lumen (nephrons) with osmotic effects → leads to less water reabsorbed into the blood; & more water eliminated in the urine

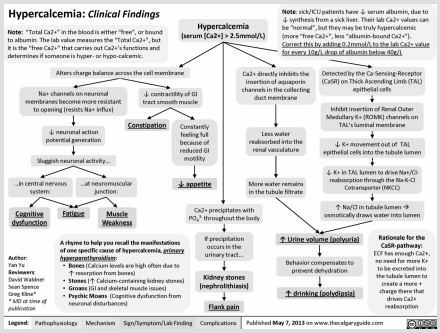
Complications: Ca deposition in different parts of the body causing stones (urolithiasis), flank pain (not specific)

Treatment: Medication & surgery

Hypercalcemia



Hypercalcemia (contnd)



Osteoporosis

Definition: Imbalance of bones formation & reabsorption leading to brittle bones

Risk factors & causes:
- Females more likely
- Age
- White or Asian
- FHx
- Small body frames

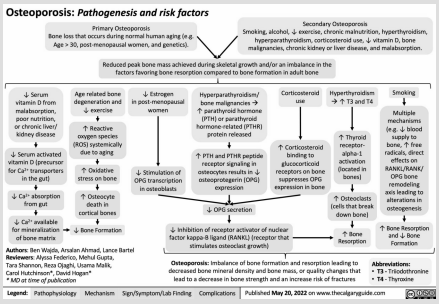
Pathophysiology & mechanism: In osteoporosis imbalance in bone reabsorption vs bone formation leading to a ↓ in bone density & bone mass → ↓ serum concentrations of vitamin D lead to a decrease in Ca2+ available for the mineralisation of bone

Signs & symptoms:
- Pain (from fractures & other conditions associated with osteoporosis)
- Postural changes
- Fractures
- Loss of height

Complications: Bone fractures (mainly spine & hips)

Treatment: Prevention - Supplements & weight bearing exercise

Osteoporosis



Hypothyroidism

Definition: Thyroid gland doesn't produce enough thyroid hormone (underactive thyroid)

Risk factors & causes:

- Autoimmune diseease
- Thyroid surgeery
- Radiation therapy
- Thyroiditis
- Medicine (e.g. lithium used to treat severe depression)
- Pituitary disorder (insufficient produce of thyroid-stimulating hormone)
- Women, FHx, Type 1 diabetes

Pathophysiology & mechanism: Impaired function of the gland & a ↓ in the secretion of thyroid hormones T3 & T4 → engages number of mechanisms (circled in red)

Signs & symptoms:

- Thinning/losing hair
- Eyebrow hair loss
- Puffy face
- Enlarged thyroid
- Dry & coarse skin
- Slow heartbeat
- Poor appetite
- Constipation
- Infertility / heavy menstruation
- Cool extremities & swelling of the limbs
- Carpal tunnel syndrome
- Weight gain
- Poor memory
- Fatigue

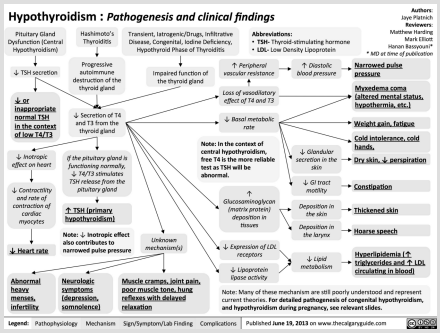
Hypothyroidism (cont)

Complications:

- Goiter
- Cardiac problems
- Peripheeral neuropathy
- Infertility
- Birth defects

Treatment: Medicaation

Hypothyroidism



Hypocalcemia

Definition: Low Ca2+ levels in the blood serum

Risk factors & causes:

- Hypoparathyroidism
- Vitamin D inadequacy or resistance
- Renal disease
- Terminal liver disease with vitamin D inadequacy

Pathophysiology & mechanism: Ca2+ changes lead to a change in cell membrane polarisation → ↓ in the threshold for cell depolarisation causing an increase in neuronal excitability → Sx & SSx

Signs & symptoms:

- Paraesthesia (burning/prickling sensation)
- Numbness
- Chvostek's sign (twitching facial muscles)
- Trousseaus's sign (hand & wrist twitching)

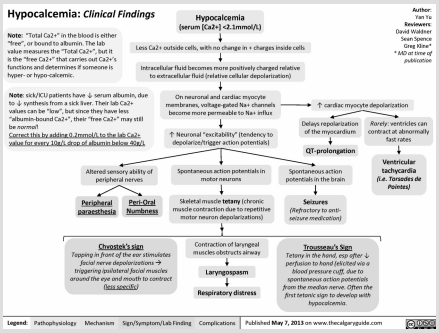
Hypocalcemia (cont)

Complications:

- Ventricular tachycardia
- Seizures
- Respiratory disease

Treatment: Iv infusion & medication

Hypocalcemia



Diabetes mellitus

Definition: Body can't produce enough insulin (high blood sugar levels)

Risk factors & causes: Unhealthy lifestyle → intraperitoneal cavity accumulates visceral fat (endocrine organ that secrets 'bad' hormones)

Pathophysiology & mechanism: Manifested by a state of resistance to the effects of insulin, consequently →

- various organs are less able to use glucose as a source of energy
- There's hyperglycaemia leading to glucotoxicity, i.e. damage to pancreatic cell that produce insulin
- Deficient insulin causes diabetes

Diabetes mellitus (cont)

Signs & symptoms: Depend on the specific body system affected

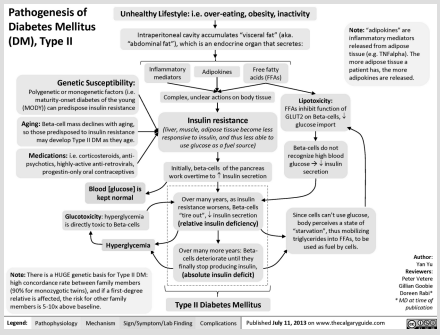
- Frequent urination
- Excessive thirst
- Unexplained weight loss
- Extreme hunger
- Sudden vision changes
- Tingling or numbness in the hands or feet
- Feeling very tired much of the time
- Very dry skin

Complications:

- Cardiovascular disease
- Nerve damage
- Kidney damage
- Eye damage
- Foot damage
- Skin & mouth conditions
- Hearing impairment

Treatment: Prevention - Healthy diet & exercise

Diabetes mellitus



Hyperthyroidism

Definition: Thyroid creates excessive thyroid hormones → speeding up the body's metabolism

Risk factors & causes:

- Graves' diseases (attacks thyroid)
- Overactive thyroid nodules (toxic adenoma)
- Thyroiditis (inflamed thyroid)
- FHx
- Recent pregnancy

Hyperthyroidism (cont)

Pathophysiology & mechanism: ↑ in production of thyroid hormone → abnormal ↑ in its endocrine effects over various organs & systems => Includes ↑ cardiac output, gut hypermotility, CNS overstimulation, increased thermogenesis, ↑ in osmotic pressure behind the eyes & changes in the dermis & subcutaneous tissues

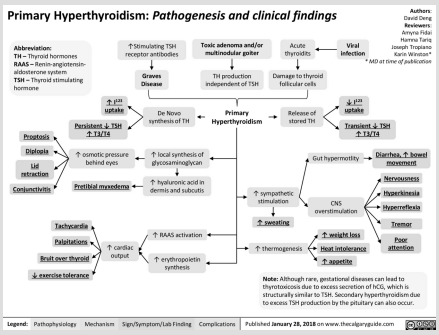
Signs & symptoms: May occur in various body systems → eyes / systemic signs / heart / nervous system / GI system / nutritional state / thermoregulation

Complications:

- Cardiac problems
- Brittlee bones
- Discoloured / swollen skin
- Vision problems

Treatment: Medicine, therapy &/or surgery

Hyperthyroidism



Hypercortisolemia

Definition: Abnormal ↑ of cortisol in the blood → ↑ in the effects of cortisol on various systems of the body

Risk factors & causes: Cortisol is normally released in the blood in response to stress

Pathophysiology & mechanism: ↑ in circulating cortisol → generalised catabolic state, i.e. the body breaks down / burns tissues & reserves in order to release energy → most systems are affected

Signs & symptoms:

- Easy bruising
- Supraclavicular & dorsal fat pads
- Central obesity
- Round face
- Proximal muscle weakness
- Purple striae
- Hypertension
- Arrhythmia, paralysis, cramps
- Hirsutism, acne

Complications: Affects all the systems

Hypercortisolemia