Endocrine System Study Chart – Chapter 10

Referenced from ANPH 202 course textbooks:
Eisenberg, R. L. and Johnson, N. L. Comprehensive Radiographic Pathology. St. Louis, MO: Elsevier
Patton, K. T. and Thibodeau, G.A. The Human Body in Health and Disease. St. Louis, Missouri: Elsevier

Osteoporosis	**What is it?** Generalized loss of bone density. Bone is less dense but of normal composition. Most common causes are aging and post-menopausal changes in metabolism.	**Complications**: Bones fracture more easily and heal more slowly	**Radiographic Appearances**: Bones demonstrate cortical thinning with decreased density in the inner surfaces of bones, especially in the spine and pelvis. As bone density decreases the thin cortex appears as a prominent thin white line, causing a "picture frame" appearance. Weight bearing exercises, hormone replacement, and vitamin C and D supplements may slow the disease.	Eisenberg 4-42, 44
Giantism/gigantism (Hyperpituitarism)	**What is it?** An over production of growth hormone before the fusion of epiphyseal plates. Most commonly caused by a pituitary tumor	**Complications**: Excessively large skeleton. If the condition persists after the epiphyseal plates fuse then acromegaly will result.	**Radiographic Appearance**: Prominent frontal bone and mandible, widened teeth, large hands, coarse facial features. Erosion of the sella turcica. Adenoma is treated with radiation or surgery.	
Acromegaly (Hyperpituitarism)	**What is it?** An over production of growth hormone after the fusion of epiphyseal plates. Most commonly caused by a pituitary tumor	**Complications:** Because this occurs in adulthood after the epiphyseal plates have fused, the bones of the hands, feet, and face get thicker, and there is a generalized increase in the growth of the body's soft tissue, especially the heel pads, and tongue.	**Radiographic Appearance:** Prominent forehead and jaw, widened teeth, large "spade-shaped hands", coarse facial features. Expansion and erosion of the sella turcica. Best modality for diagnosis is MRI. Pituitary tumor can be treated with radiation or surgery.	Eisenberg: Fig. 10-20, 21, 22, 23

Hypopituitarism	**What is it?** Insufficient levels of growth hormone in the body. In children this can cause dwarfism. In adults there is not any significant effects	**Complications:** Limbs are short due to delayed appearance of secondary ossification centers, but over-all body is well-proportioned. The cranium maintains the proportions typically seen in childhood. Patients are sexually immature but neurologically normal.	**Radiographic Appearance:** MRI is the modality of choice for diagnosis. Can be treated with subcutaneous injections of growth hormone several times a week, and/or surgery to remove to tumour.	No image
Achondroplasia	**What is it?** The most common cause of dwarfism. A congenital condition characterized by an inability to convert epiphyseal cartilage to bone	**Complications:** Limbs are short but axial skeleton is normal in length. Head is large, with pronounced "jutting" jaw, and saddle nose. Prominent buttocks makes it look as though the lumbar spine has an extreme curvature.	**Radiographic Appearance:** Long bones are short and thick with widened metaphysis (Erlenmeyer flask deformity) No known cure, but long bones can be surgically lengthened. Patients can live normal productive life	Eisenberg: Fig. 4-11
Diabetes Insipidus	**What is it?** ADH insufficiency potentially caused by trauma to the head esp. basal skull fracture, aneurysm, tumors, or meningitis: "diuresis" means urine production, so too little antidiuretic hormone (ADH) increases urine production.	**Complications:** polyuria and intense thirst	**Radiographic considerations:** CT and MRI can demonstrate cause of pituitary disturbance. Treated with hormone replacement	No image

Cushings	**What is it?** An excess level of glucocorticoids (e.g. cortisone) in the blood stream. Can originate with pituitary or adrenal gland pathologies, but most often is caused by systemic cortisone therapy used to treat inflammatory conditions.	**Complications:** Increased levels of lipids, salts, and water in the blood. Leads to classic signs and symptoms of **Cushing's**: increased obesity in the trunk of the body, buffalo hump, and moon face, loss of muscle mass, and bone density, and high blood pressure. Because of the powerful anti-inflammatory effects of increased cortisone levels in the body, secondary infections can be over-looked.	**Radiographic complications:**	No image
Addison's	**What is it?** An acute inflammatory disease caused by insufficient production of cortisone. Most common in women between 30 and 60	**Complications:** hypoglycemia, weight loss, fatigue. Hormone replacement treatment is required.	**Radiographic complications:** Enlargement of the adrenal glands can be visualized with MRI and CT	No Image
Hyperthyroidism (most commonly caused by Grave's disease)	**What is it?** Autoimmune disorder that causes over secretion of thyroid hormone. More common in women.	**Complications:** elevated metabolic rate leading to sweating, sleeplessness, tremors, tachycardia, nervousness, weight loss, and exophthalmos (protruding eyeballs caused by edema posterior to eyes). May lead to cardiomegaly and pulmonary congestion	**Radiographic considerations:** Treated with surgical resection of thyroid gland, radiation treatment, or anti-thyroid drug therapy	No image

Hypothyroidism (leading to Myxedema and Goiter)	**What is it?** Under- production of thyroid hormone. May stem from problem with thyroid gland, pituitary pathologies, or be caused by low intake of dietary iodine	**Complications:** decreased metabolic rate leading to **myxedema (mucous swelling)** in adults; chills, thick dry skin, constipation, lethargy, mental slowness. **Goiter (enlarged thyroid)** will develop in cases where hypothyroidism is caused by insufficient dietary iodine. The thyroid gland does not have the correct ingredients to produce normal thyroid hormone, but will work over-time because of continuous output of TSH being produced by the pituitary gland.	**Radiographic considerations:** Hormone therapy is treatment of choice	**No significant image.**
Cretinism (Infant hypothyroidism)	**What is it?** Hypothyroidism originating from birth. May be developmental, or caused by a maternal diet that is too low in iodine	**Complications:** Short stature, protruding tongue, flattened nose and wide set eyes, multiple developmental deficits.	**Radiographic considerations:** Thyroid replacement and/or iodine supplements can prevent this disease. Radiographs reflect changes discussed in "complications" box to the left.	**Eisenberg Fig. 10-30**
Hyperparathyroidism	**What is it?** Over secretion of Parathyroid H. causing increased blood calcium levels. (Calcium and phosphorous leaches from bones into blood stream) Most commonly associated with renal failure.	**Complications:** Decreased bone density (osteopenia) causes bones to have a "ground glass" appearance, with lytic lesions. Increased blood calcium may lead to kidney stones, or a build-up of calcium deposits in articular cartilage and joint capsules. Patient will be prone to fractures.	**Radiographic considerations:** This is a subtractive disease leading to osteopenia, and as such routine examinations will require a reduction in technique.	**Eisenberg: Fig. 10-38 to 10-43**

Hypoparathyroidism	**What is it?** Decreased levels of parathyroid h. leading to decreased blood calcium levels. May be caused by accidental removal of parathyroid glands during a thyroidectomy, tumours, trauma etc.	**Complications:** tetany; if not treated then respiratory paralysis and death.		No significant images to look at.
Diabetes Mellitus	**What is it?** Chronically high levels of blood sugar (hyperglycemia) due to insufficient insulin production or uptake. Type I -congenital or juvenile diabetes, requires regular insulin injections. Type 2 – Adult onset, or insulin resistant diabetes is less severe and can usually be managed by diet.	**Complications:** Chronic hyperglycemia, increased thirst, increased urine production. Increased blood sugar reduces circulation in the peripheral vessels leading to neuropathy, infection and gangrene, especially in the feet. Coronary artery disease (CAD) and kidney failure are chronic complications that often lead to death.	**Radiographic complications:** Insulin shock (hypoglycemic shock) can occur in diabetics if they have taken too much insulin, have not had enough food, or have exercised too much. Symptoms include faintness, tremors, light-headedness, and perspiration. Diabetic patients who have been fasting to prepare for a specialized radiographic examination, are particularly susceptible. Juice or candy should be given immediately given to the patient, juice or candy.	Eisenberg 10-48,50,51