Sick Call Screener Course

Endocrine System

(2.11)

Enabling Objectives

- 1.58 Utilize the knowledge of endocrine system anatomy while assessing a patient with a endocrine complaint
- 1.59 Utilize the knowledge of endocrine system physiology while assessing a patient with a endocrine complaint
- 1.60 Obtain history from patient with common endocrine system disorders
- 1.61 Describe the basic components of a physical examination focused on the endocrine system

Enabling Objectives (Cont.)

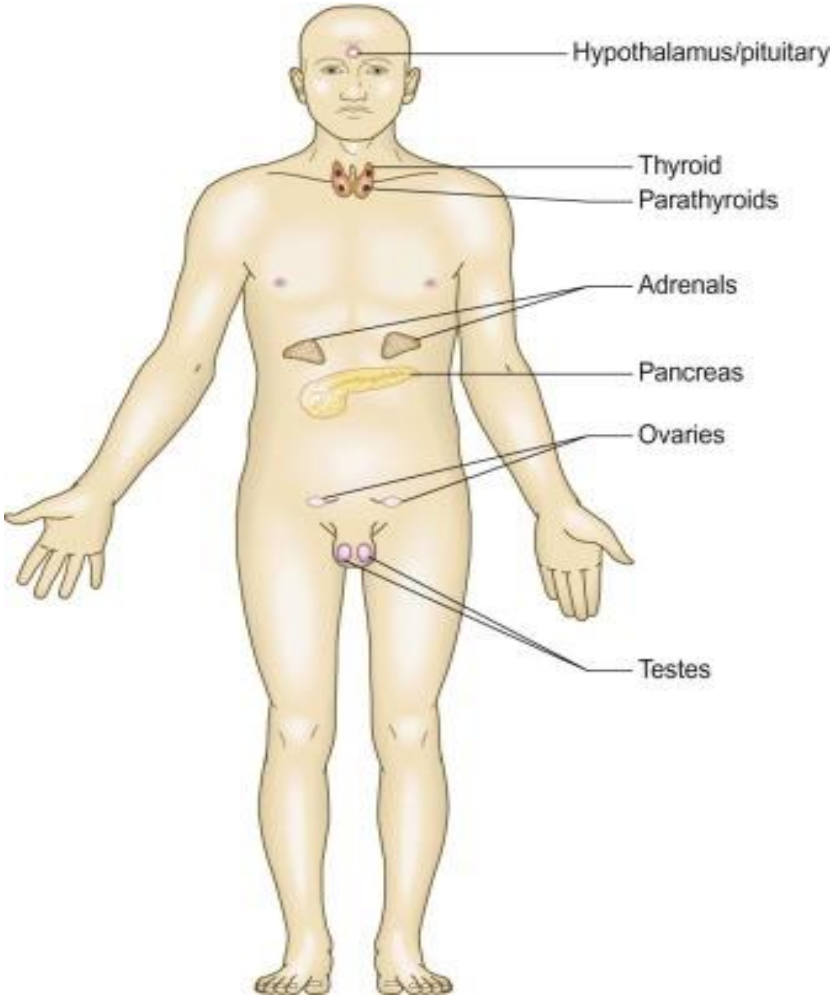
- 1.62 State signs and symptoms of common endocrine system disorders
- 1.63 State treatments for common endocrine system disorders
- 1.16 State Red Flag criteria

Introduction

- Regulates the body's activities by releasing hormones
- Making sound judgements

Anatomy & Physiology

- The Endocrine System



The endocrine system, Macleod's Clinical Examination. , Bevan, John. Published December 31, 2012. Pages 77-96. © 2013; Clinical key/ My Athens

Endocrine Glands

- The main endocrine glands:
  - Pituitary
  - Thyroid
  - Parathyroids
  - Pancreas
  - Adrenals
  - Gonads: testes and ovaries.
- Glands synthesize hormones

Hormones

- Mediator molecule
- Regulates the activity of cells
- The body contains two kinds of glands:
  - Exocrine glands
  - Endocrine glands

Target Cells

- Only affects target cells
- Chemically binds to specific protein receptors

Hormone Classes

- Chemically divided into two broad classes:
  - The **lipid-soluble** hormones include
    - steroid hormones
    - thyroid hormones
    - nitric oxide
  - The **water-soluble** hormones include
    - amine hormones
    - peptide hormones
    - protein hormones
    - eicosanoid hormones

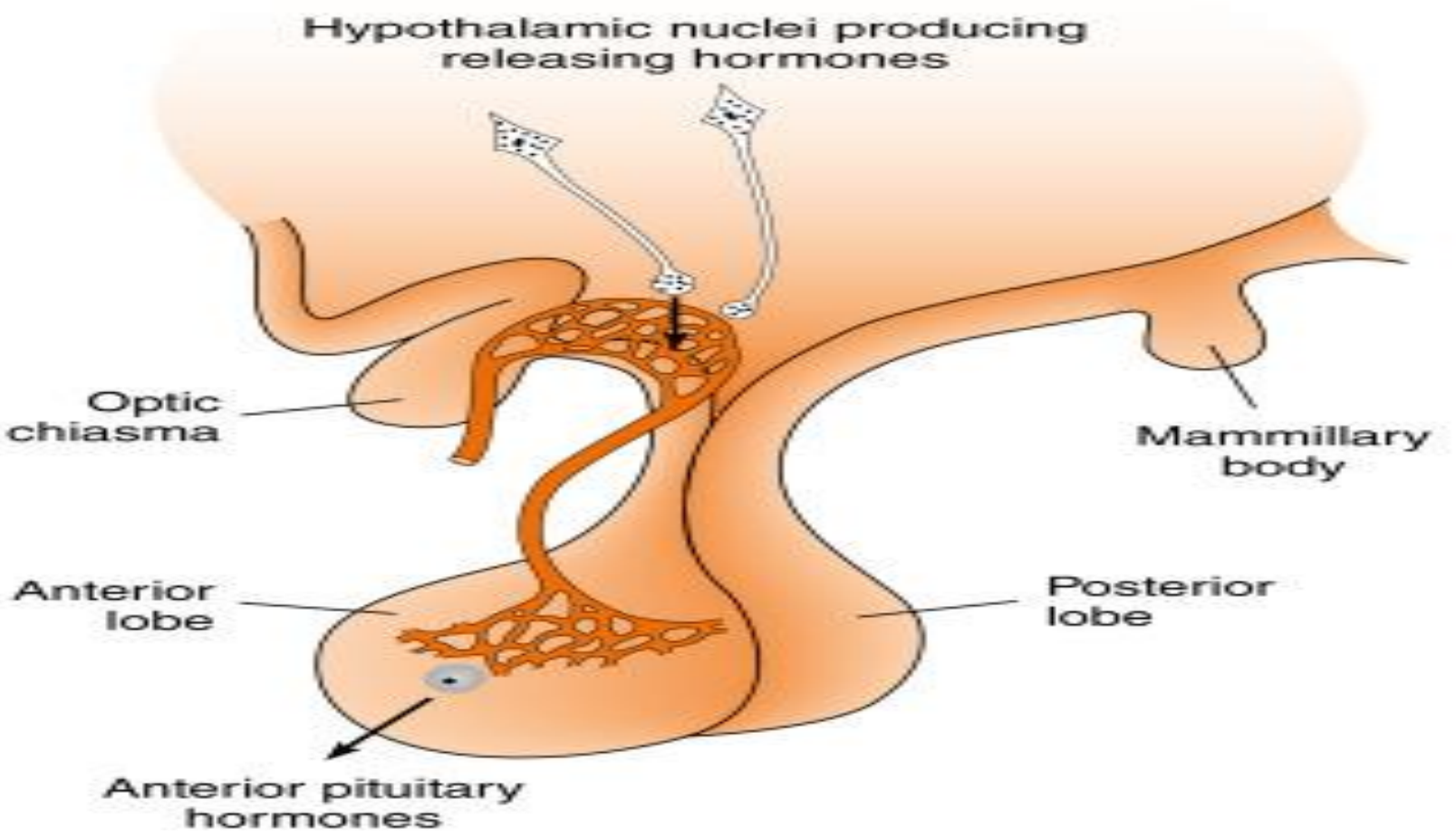
Pituitary Gland

- The “Master endocrine gland”
- Anterior: secretes hormones
  - adrenocorticotrophic
  - prolactin
  - thyroid-stimulating and gonadotrophins (luteinising)
  - follicle-stimulating

Pituitary Gland (Cont.)

- Posterior: (extension of hypothalamus) secretes
  - vasopressin (antidiuretic)
  - oxytocin

Pituitary Gland (Cont.)



Hypothalamus-Pituitary Complex Endocrine and Reproductive Physiology. White, Bruce A., PhD; Porterfield, Susan P., PhD... Published January 1, 2013. Pages 99-128. © 2013. My Athens/ Clinical key

Thyroid Gland

- The “H” shaped gland
- Located in the neck
- Iodine is necessary for the formation of T3 and T4

Thyroid Hormones

- Thyroid hormones regulate
  - Oxygen use and basal metabolic rate
  - Cellular metabolism
  - Growth and development

Parathyroid

- Parathyroid glands
  - Partially embedded
- Regulates:
  - Calcium (Ca2)
  - Magnesium (Mg2)
  - Phosphate (HPO4)

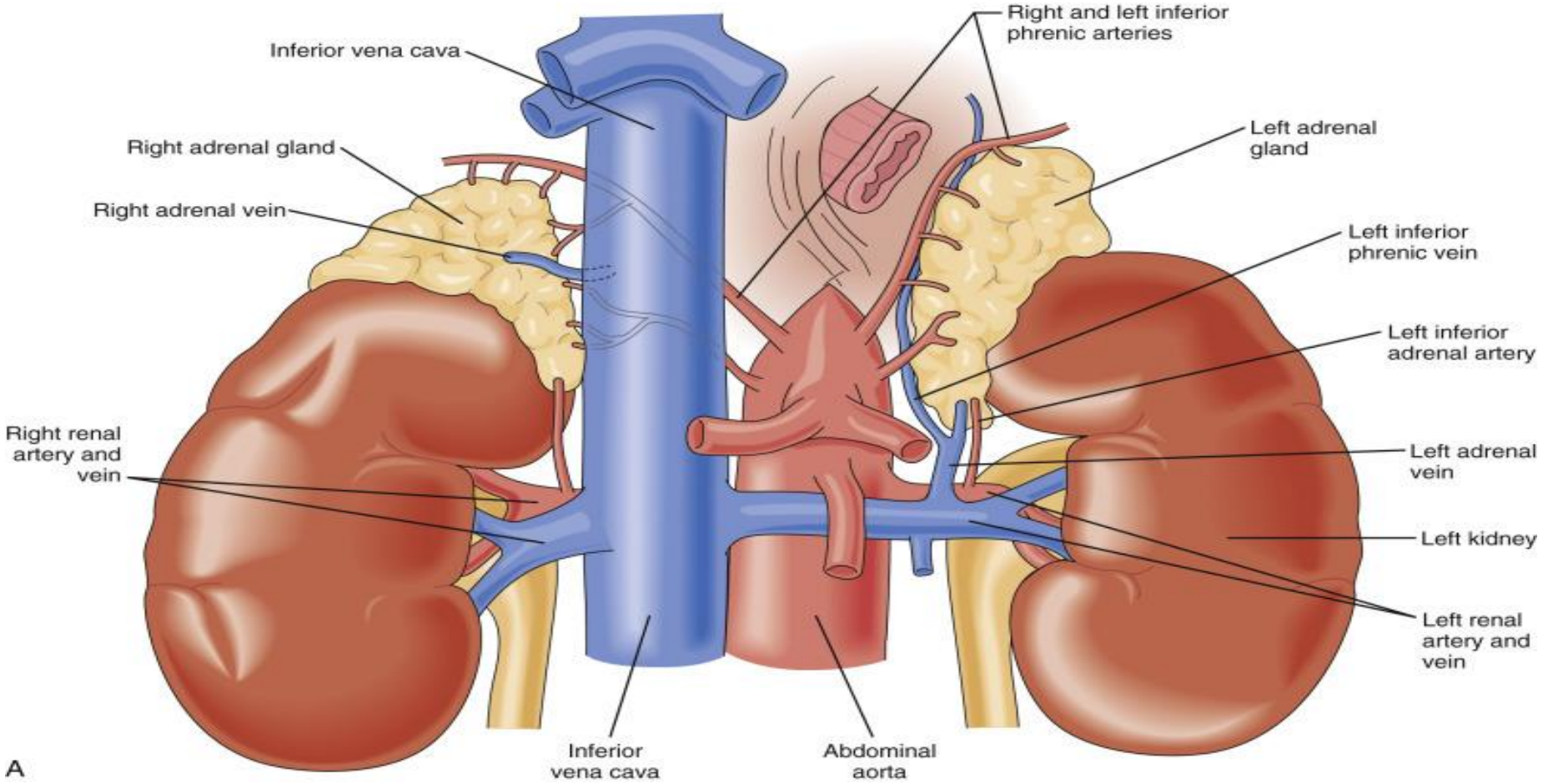
Paired Adrenal Glands

- Superior to each kidney
- Two structurally and functionally regions:
  - Adrenal cortex, comprising 80–90% of the gland
  - Small, centrally located adrenal medulla

Adrenal Cortex

- Produces steroid hormones
  - Complete loss leads to death
  - Dehydration and electrolyte imbalances
- Adrenal medulla produces three catecholamine hormones
  - Norepinephrine
  - Epinephrine
  - Small amount of dopamine

Adrenal Glands



The Adrenal Glands, Sabiston Textbook of Surgery. Yeh, Michael W.; Livhits, Masha J.; Duh, Quan-Yang. Published January 1, 2017. Pages 963-995. © 2017.
FIGURE 39-1. Clinical key/ My Athens

Gonads & Ovaries

- Produce gametes
  - Sperm in males
  - Oocytes in females
- Ovaries
  - Paired oval bodies
  - Produce several steroid hormones
  - Two estrogens and progesterone

Testes

- Oval glands
- In scrotum
- Produce testosterone
- An androgen

Pineal Gland

- Pinecone shaped
- Small endocrine gland
- Located in brain at the midline
- Secretes melatonin

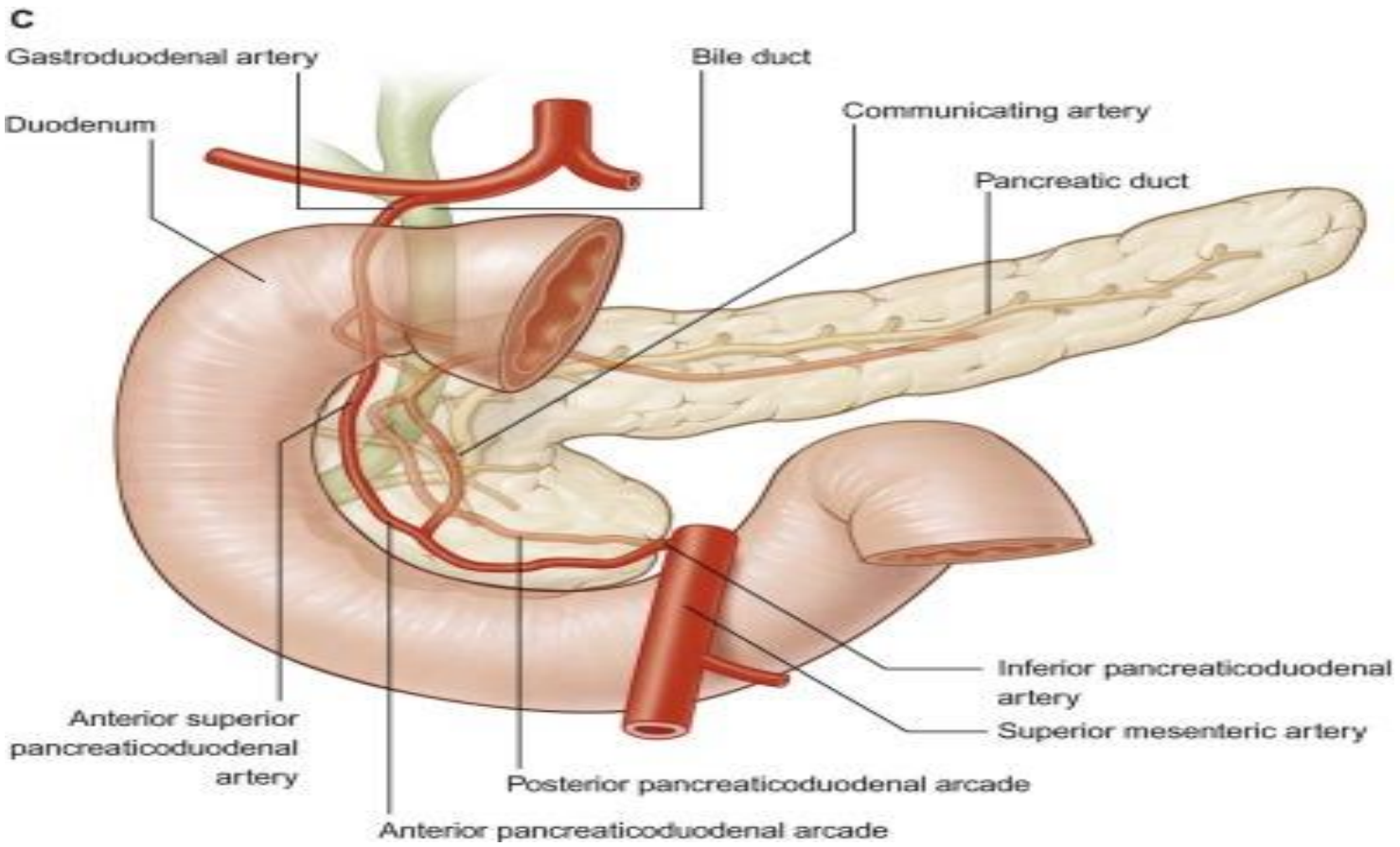
Pancreas

- Located behind the stomach horizontally
- Head attached to the duodenum
- Tail reaches to spleen
- Islets of Langerhans that secrete insulin
- Insulin lowers the blood glucose

Pancreas (Insulin)

- Without insulin
  - Serum glucose level rises
  - Glucose cannot enter cells
  - Spills over into urine
- The amount of insulin released is determined by the level of sugar in the blood

Pancreas (Cont.)



Pancreas Gray's Anatomy. Standring, Susan, MBE, PhD, DSc, FKC, Hon FAS, Hon FRCS... Published January 1, 2016.Pages 1179-1187.e3. © 2016. My Athens/ Clinical Key

Obtain History

- Patient's Responses provide clues
- Targeted topics in the HPI, PMH & ROS
  - HPI
  - Responses provide clues
  - Questions regarding medication use

Obtain History (Cont.)

- CC, example:
  - "Excessive thirst" = ask patient about
- HPI
- PMH
  - Tuberculosis and HIV infection are associated with adrenal insufficiency

Obtain History (Cont.)

- FH
  - Thyroid disease and diabetes mellitus may run in families
- SH
- ROS

Perform Examination

- Includes HEENT and Neurological exams
- HEENT exam – special attention to:
  - Eyes
  - Mouth
  - Neck
  - Overall body shape

HEENT Examination

- Visual acuity
- Eyes and optic fundi
- Smell patient's breath
- Front of neck
- Thyroid

Thyroid Examination

- Examination of the thyroid gland involves
  - Inspection
  - Palpation
  - Occasionally auscultation

Thyroid Palpation

- From behind patient
- Fingertips of both hands
- Locate cricoid cartilage
- Index finger just under lower rim
- Rotate 2nd & 3rd fingers

Seidel's Guide to Physical Examination. 2018. Clinical key/ My Athens

Thyroid Palpation (Cont.)

- Movement as patient swallows
- Thyroid lobes
- Smooth, firm yet pliable tissue
- Normal or subnormal size

Seidel's Guide to Physical Examination. 2018. Clinical key/ My Athens

Abnormal Thyroid

- Nodules found should be characterized:
  - By number
  - Smooth or irregular
  - Soft or hard
- If the thyroid gland is enlarged
  - Auscultate for vascular sounds

Endocrine Examination

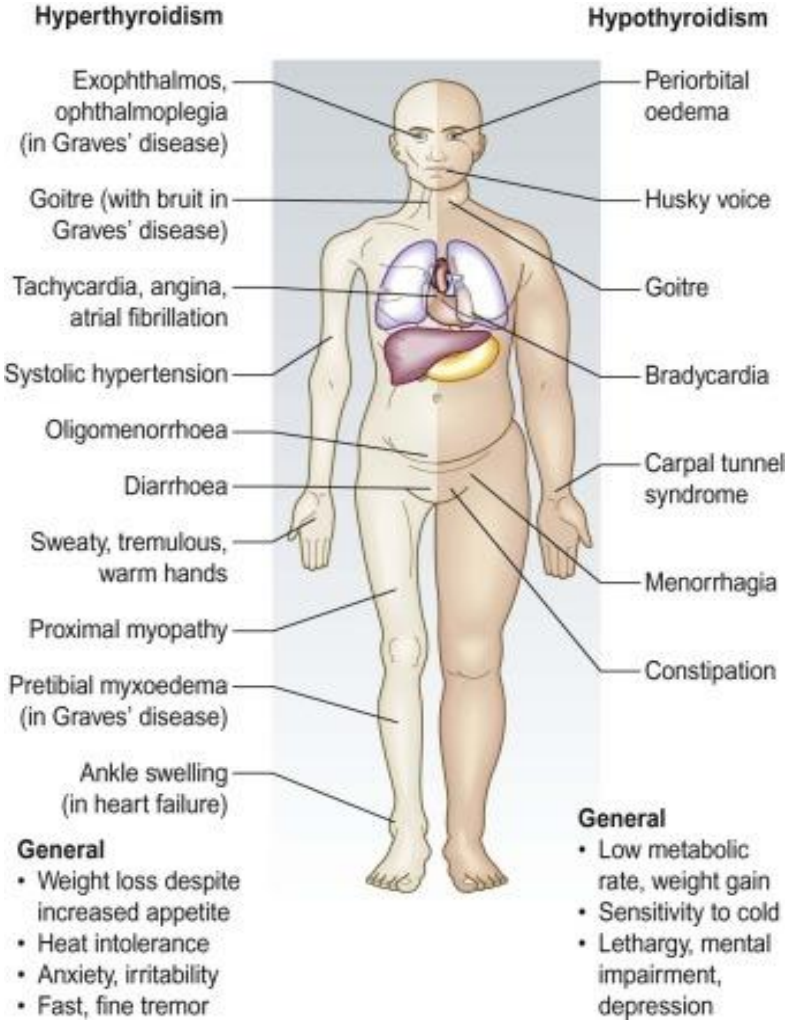
- Look for evidence of weight loss and dehydration
- Signs of skin infections and rashes
- Note hair distribution patterns
- Cardiovascular exam
- Respiratory and Gastrointestinal exams
- Neurology exam

Labs

- Urinalysis
- Provider may request to:
  - Measure serum hormone levels
  - Suppression tests
  - Modern imaging

Signs and Symptoms

- Hypothyroidism
- Hyperthyroidism
- Diabetes Mellitus



The endocrine system Macleod's Clinical Examination. Published December 31, 2012. Pages 77-96. © 2013. Fig. 5.3 Features of hyper- and hypothyroidism. Clinical key/ My Athens

Hypothyroidism

- Inadequate production of thyroid hormone
- Hypometabolic state
- Also called Myxedema (severe)
- Treatment replaces T4 with oral thyroid medication

Hypothyroidism (Cont.)

A

B

The endocrine system Macleod's Clinical Examination. Bevan, John. Published December 31, 2012. Pages 77-96. © 2013. Fig. 5.7 Hypothyroidism. (A) Before treatment. (B) After levothyroxine replacement. Clinical key/ My Athens

Hyperthyroidism

The endocrine system. Macleod's Clinical Examination. Bevan, John. Published December 31, 2012. Pages 77-96. © 2013. Fig. 5.4 Graves' hyperthyroidism. (A) Typical facies. (B) Severe inflammatory thyroid eye disease. (C) Thyroid acropachy. (D) Pretibial myxoedema. Clinical key/ My Athens

Hyperthyroidism (Cont.)

- Excessive production of thyroid hormone
- Graves disease
- Autoimmune disorder
- Abnormal antibodies stimulate thyroid binding at same site as TSH
- TSH stimulation stopped

Pituitary Tumor

- A tumor in the pituitary
- Secretes excessive TSH
- Exophthalmos

Diabetes Mellitus

- Carbohydrates (glucose) metabolism disorder
- Inadequate production or utilization of insulin
- There are two types; Type I and Type II

Type I Diabetes

- Occurs abruptly due to a decline in insulin
- Periodic administration of insulin
- Called insulin dependent diabetes

Type II Diabetes

- Most common
- 40 and over and overweight
- Controlled by diet, exercise, and oral antidiabetic drugs
- Three classic symptoms
- Elevated blood glucose
- U/A may have glucose

Diabetes Mellitus Plan

- A: Diagnosed by provider
- P: Therapy augmented

Summary and Review

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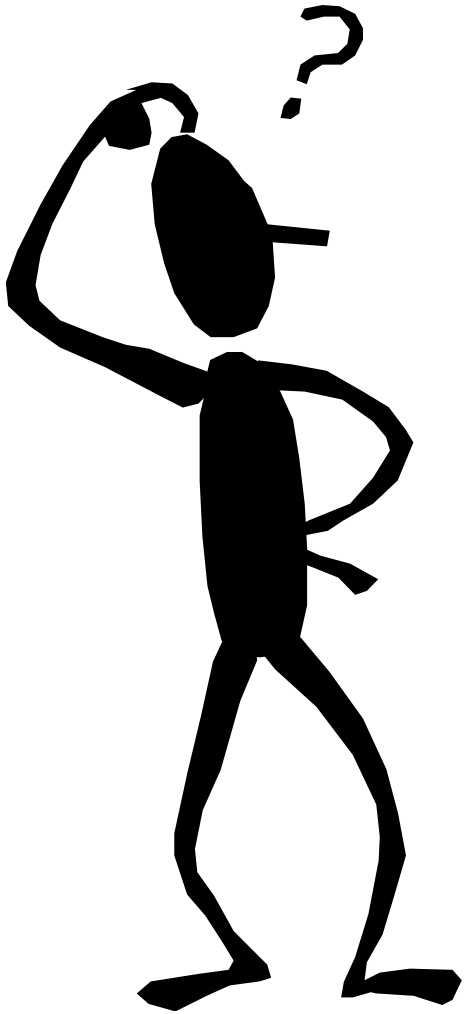
Questions



Assignment Sheet

- Assignment Sheet SCSC 2.11-3, Endocrine System