

Endocrinology Curriculum

Goal

Endocrinology is the diagnosis and care of disorders of the endocrine system. The principal endocrine problems handled by the general internist include goiter, thyroid nodules, thyroid dysfunction, diabetes mellitus, hyper- and hypocalcemia, adrenal cortex hyper- and hypofunction, endocrine hypertension, gonadal disorders, hyper- and hyponatremia, certain manifestations of pituitary tumors, disorders of mineral metabolism, and hyperlipidemias. Obesity is not strictly an endocrine disorder but is considered part of the spectrum of endocrinology because it frequently enters into the differential diagnosis of endocrine disease and is a major element in the management of non-insulin dependent diabetes. Prevention efforts focus on complications of hyperlipidemias, obesity, thyroid dysfunction, and diabetes mellitus, and on endocrinologic side effects of pharmacologic glucocorticoids and other medications.

Rotation on the medical ward services, general medical clinic and the endocrine service will provide training for the resident to (1) recognize risk factors for the development and/or exacerbation of endocrinologic disease, (2) understand the importance of primary and secondary prevention, (3) recognize the endocrinologic implications of abnormal serum electrolytes, hypertension, fatigue, and other nonspecific presentations, (4) develop a cost-effective approach to diagnose and treat endocrine diseases commonly encountered in a general internal medicine practice, (5) become proficient in the management of endocrine emergencies, including diabetic ketoacidosis, hyperosmolar nonketotic stupor, severe hyper- and hypocalcemia, and Addisonian crisis, and (6) recognize the need for and appropriate timing of endocrinology referral.

For residents who are interested, independent electives can be arranged. For those with a special interest research, a month rotation can be arranged with Dr. Lois Jovanovic at the Sansum Diabetes Research Institute. This elective offers intensive review of the physiology of diabetes in the setting of the pregnant woman as well as exposure to glucose sensing and insulin delivery devices, clinical trials and new diabetic drugs.

Although the goal of the above clinical experiences is to obtain broad exposure to endocrine disorders, those conditions less frequently encountered in clinical practice will be addressed as part of the didactic conferences.

Objectives

Patient Care

- I. Provide patient care that is compassionate, appropriate and effective for the prevention and treatment of endocrinologic disorders.

Medical Knowledge

- I. Develop the knowledge and skills to obtain an appropriate history on patients at risk for or with endocrinologic disease.

- II. Develop the knowledge and skills for performing and interpreting physical exam findings on patients with suspected endocrinologic disease including:
 - a. blood pressure
 - b. palpation of the thyroid
 - c. foot examination
 - d. funduscopic examination

- III. Develop an approach to patients with common complaints associated with disease of the endocrine system including:
 - a. amenorrhea
 - b. fatigue
 - c. galactorrhea
 - d. hirsutism and virilization
 - e. hot flashes
 - f. hypertension
 - g. impotence
 - h. infertility
 - i. obesity
 - j. orthostatic hypotension
 - k. polydipsia
 - l. polyuria
 - m. premenstrual syndrome
 - n. short stature
 - o. weight loss

- IV. Recognize risk factors, symptoms and signs, differential diagnosis and management of the following disease processes:
 - a. acromegaly and growth hormone deficiency
 - b. adrenal insufficiency, Cushing's syndrome and congenital adrenal hyperplasia
 - c. diabetes insipidus
 - d. diabetes mellitus
 - types I, II, secondary diabetes, and gestational diabetes
 - diabetic ketoacidosis
 - diabetic complications including dermatopathy, foot ulcers, infections, gastroparesis, macrovascular disease, nephropathy, neuropathy, and retinopathy
 - hyperosmolar nonketotic coma
 - hypoglycemia – factitious and organic
 - e. disorders of vitamin D metabolism
 - f. hormone-producing neoplasms – carcinoid syndrome, multiple endocrine neoplasia, pheochromocytoma, insulinoma, gastrinoma, and small cell cancer.
 - g. hyper- and hypoaldosteronism
 - h. hyper- and hypocalcemia
 - i. hyper- and hyponatremia
 - j. hyper- and hypoparathyroidism

- k. hyperlipidemia
 - l. hypogonadism – primary and secondary
 - m. hypothalamic disorders
 - n. insulinoma
 - o. metabolic syndrome
 - p. osteomalacia and osteoporosis
 - q. Paget’s disease
 - r. polycystic ovary disease
 - s. precocious and delayed puberty
 - t. thyroid disease
 - euthyroid sick syndrome
 - goiter
 - hypothyroidism and myxedema coma
 - hyperthyroidism and thyroid storm
 - thyroid cancer
 - thyroid nodules
- V. Understand appropriate management of diabetes including:
- a. health maintenance exams for eye and foot care
 - b. rationale for and use of diabetic diets
 - c. prescription of exercise programs
 - d. use of oral hypoglycemic agents, and conventional and intensive insulin therapy, including use of combination therapy and adverse effects of therapy
 - e. understanding of the measurement of hemoglobin A1c
 - f. understanding of the appropriate use of A1c and c-peptide levels and anti-insulin and anti-islet cell antibodies
 - g. use of glucose monitoring devices and insulin pumps
 - h. use of medic alert bracelets
- VI. Develop competence in the use of physiologic steroids in the settings of known adrenal insufficiency and sepsis, the withdrawal of steroid therapy, and the management of secondary complications.
- VII. Understand appropriate use and interpretation of diagnostic studies, including:
- a. serum and urine electrolytes
 - b. serum osmolarity
 - c. serum pH
 - d. lipid profile
 - e. microalbumin assessment
 - f. PTH
 - g. PTH-related peptide
 - h. serum total and free testosterone
 - i. LH and FSH levels
 - j. prolactin level
 - k. aldosterone and renin levels
 - l. saline suppression test

- l. cortisol and ACTH levels
- m. Cortrosyn stimulation test
- n. dexamethasone suppression test
- o. GHRH/Arginine stimulation test
- p. c-peptide and insulin levels
- o. glycosylated hemoglobin
- p. insulin antibody levels
- q. islet cell levels
- r. prolonged fast
- s. screen for hypoglycemic agents
- t. urinary and serum catecholamine levels
- u. thyroid function tests
- v. bone radiographs
- w. bone scan
- x. dexa scan
- y. imaging studies of the thyroid, pituitary, adrenal glands and hypothalamus

Practice-Based Learning and Improvement

- I. Utilize multidisciplinary team including endocrinologist, social worker, nurse, pharmacist and dietician to care for patients with endocrine problems.
- II. Be able to access clinical practice guidelines to help improve care of patients with endocrine disorders.
- III. Perform independent research for best evidence-based practice to answer specific clinical questions arising from patient care.
- IV. Review current literature for changes in standard of care applicable to general practice.
- V. Review patient care errors with attention to changes in systems to prevent recurrence.
- VI. Utilize information technology to enhance patient education.

Interpersonal and Communication Skills

- I. Communicate effectively with patients and families in a compassionate, culturally sensitive and patient-centered manner to improve understanding and compliance.
- II. Ensure charting is legible, thoughtful, complete and timely to facilitate communication within the health care team.

Professionalism

- I. Understand impact of gender, age, culture, religion, and socioeconomic status on patient choices regarding therapies.
- II. Understand how to inform patients regarding the natural history of their disease and therapeutic options, and obtain consent to implement a treatment plan.
- III. Provide meaningful feedback to colleagues and students regarding performance and behavior.

Systems-Based Practice

- I. Ensure patient has access to a multidisciplinary team including endocrinologist, social worker, nurse, pharmacist, dietician, and billing coordinator to provide optimal care.
- II. Understand the socioeconomic impact and physical disability induced by poor diabetes control.
- III. Apply evidence-based, cost-conscious strategies to prevention, diagnosis and disease management.
- IV. Develop skills in identifying opportunities for quality improvement, risk management and cost-effectiveness within a practice.

Teaching Methods

- I. Attending supervision of resident activities in patient care
- II. Teaching rounds
- III. Conferences
- IV. Recommended reading

Resident Evaluation

- I. Attending feedback to residents on strengths and weaknesses throughout the rotation
- II. Attending written evaluation of residents at the end of the rotation
- III. Mini-CEX bedside evaluation tool

Resources

Williams Textbook of Endocrinology, 10th ed. Saunders, 2002 (print and CD-ROM).

Greenspan's Basic & Clinical Endocrinology, 7th Ed. Appleton & Lange, 2003.

Scientific American

MKSAP

On-line Resources

- UptoDate
- MDConsult
- practice guidelines
 - American Association of Clinical Endocrinologists - www.aace.com
 - Thyroid Disease Manager - www.thyroidmanager.org

Residents should review *Annals of Internal Medicine* for recent Updates in Endocrinology section as well as ACP journal club for pertinent articles.