

ENDOCRINE & METABOLISM MODULE

PHASE II



FACULTY OF MEDICAL SCIENCES
UNIVERSITY OF SRI JAYEWARDENEPURA



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- Dr. Maduwanthi Wannigama [Demonstrator]

Introduction.

The endocrine and metabolism module is a four week module that you will follow during phase 2 of your medical curriculum. This module will help the student to develop the skills needed to diagnose and treat patients with various endocrine and metabolic problems using their own basic knowledge. The student will learn to identify clinical features of endocrine disorders, their presentations, clinical course and the expected outcome. The student will also improve his or her ability to perform a comprehensive diagnosis of the endocrine and metabolic disorders, request perform and interpret endocrine tests and make important decisions that affect therapeutic outcomes.

This module will cover most of the important areas of endocrine and metabolic disorders seen in clinical practice. However, this module should be considered as a guide to the relevant topics but not as a comprehensive coverage of the whole subject area. Therefore the emphasis should be on active learning and self study by the student using the module as a guide.

Teaching of this module will be in the form of lectures , tutorials, problem based learning, practical's and teacher-student seminars. There will also be sessions in the skills laboratory that will help you master 'hands on skills which will be essential in the diagnosis and management of endocrine and metabolic diseases.

General objectives

At the end of the module students should be able to:

- Describe the clinical presentations of common endocrine and metabolic diseases.
- Apply the knowledge of the normal structure and function of the endocrine glands to interpret the symptoms and signs of endocrine and metabolic diseases.
- Obtain a relevant history and carry out an appropriate examination in patients with an endocrine or metabolic disease.
- To formulate a satisfactory clinical diagnosis based on an understanding of the pathophysiology of the disease condition.
- Plan appropriate and cost effective procedures and be able to interpret the results to arrive at a definite diagnosis.

General objectives.....

- Make a rational management plan utilizing the resources available in Sri Lanka.
- Maintain accurate clinical records based on the above observations; communicate with other health care providers effectively both verbally and in writing.
- Communicate effectively with patients with endocrine diseases, counsel and educate family members in the long term management of disease conditions such as diabetes mellitus.
- Identify high risk groups for certain endocrine and metabolic diseases in the community (eg. Diabetes mellitus, Obesity) and undertake appropriate measures to provide health promotion to prevent such diseases.

Main Content Area

- Diseases of the Thyroid gland
- Disorders of Pituitary and Adrenal glands
- Disorders of Glucose Metabolism
- Obesity & Metabolic Syndrome
- Disorders of Lipid Metabolism
- Disorders of Bone and Calcium Metabolism

1. Diseases of the Thyroid gland

Intermediate objectives	Content areas	Learning activity	Department	Time
<p>Structure and function of thyroid gland The student should be able to, Recall the development, anatomy and developmental anomalies of the thyroid gland.</p> <p>Recall the iodine metabolism, regulation of thyroid hormone secretion and physiological actions of thyroid hormones.</p>	<p>Anatomy and developmental disorders.</p> <p>Physiology of hypothalamic-pituitary-thyroid axis, thyroid hormone biosynthesis and physiological actions</p>	FiLM	Anatomy and physiology	2x 45 minutes
<p>Structural disorders of thyroid –‘Goitre’ Define goitre and describe the pathogenesis, macroscopic and microscopic appearances of different types of goitres.</p> <p>Classify thyroid neoplasm and discuss the methods of investigations.</p>	<p>Diffuse enlargement Multinodular goitre Solitary nodule</p> <p>Classification and investigations of thyroid neoplasm.</p>	Lecture Practical	Pathology Pathology	45 minutes 45 minutes
<p>Investigations of thyroid disorders Request the appropriate investigations in a patient with a thyroid disorder and interpret the results.</p>	<p>T3, T4 (Free and total) TSH Thyroid antibody tests Radio iodine uptake test FNAC USS of thyroid</p>	Lecture	Pathology	45 minutes

Intermediate objectives	Broad content areas	Activity	Department	Duration
<p>Hypothyroidism Discuss the patho-physiology, epidemiology and causes of hypothyroidism in adults and children.</p> <p>Describe the clinical manifestations and request the appropriate investigations to confirm the diagnosis.</p> <p>Discuss the management of hypothyroidism and monitoring of therapy.</p>	<p><i>Primary:</i> Congenital, Iodine deficiency, Autoimmune, Post surgery & post irradiation, Malignancy, Drug induced (Antithyroid)</p> <p><i>Secondary:</i> hypopituitarism</p> <p>Clinical features Investigation Management</p>	<p>Lecture</p> <p>Tutorial</p>	<p>Medicine</p> <p>Paediatrics</p>	<p>45 minutes</p> <p>45 minutes</p>
<p>Hyperthyroidism List the causes of hyperthyroidism and discuss the pathophysiology.</p> <p>Describe the clinical features, complications, differential diagnosis and relevant investigations to confirm the diagnosis. Discuss the management of hyperthyroidism and its complications.</p>	<p>Grave's disease Toxic multinodular goiter Solitary toxic nodule, thyroiditis and other causes Clinical features Investigations</p>	<p>Lecture</p>	<p>Medicine</p>	<p>45 minutes</p>

Intermediate objectives	Broad content areas	Activity	Department	Duration
<p>Examination of a goitre Examine a patient with a goiter and elicit physical signs in disorders of the thyroid gland.</p>	Clinical examination of a goiter and other physical signs	Skills lab	Medicine and surgery	45 minutes
<p>Antithyroid drugs and thyroxin Discuss the pharmacokinetics and side effects of anti-thyroid drugs. Discuss the principles of thyroid hormone replacement therapy.</p>	<p>Antithyroid drugs: Carbimazole, thiouracils and radio-active iodine</p> <p>Thyroxin replacement</p>	<p>Lecture</p> <p>Tutorial</p>	<p>Pharmacology</p> <p>Pharmacology</p>	<p>45 minutes</p> <p>45 minutes</p>
<p>Operative surgery List the different types of thyroid operations. Discuss the possible complications of thyroid surgery and management of these complications.</p>	Types of thyroid surgery and post surgical complications	Lecture	Surgery	45 minutes

2. Disorders of Pituitary and Adrenal glands

Intermediate objectives	Broad content areas	Activity	Department	Duration
<p>Hypothalamic- pituitary –adrenal axis Recall the development, structure and functions of hypothalamus and pituitary.</p> <p>Recall the structure of the adrenal gland, biosynthesis of adrenal hormones, regulation and their physiological effects.</p>	<p>Hypothalamic-pituitary-adrenal axis Synthesis, secretion and physiological actions of pituitary hormones</p> <p>Glucocorticoids, mineralocorticoids & adrenal androgens</p>	FiLM	Anatomy Physiology Biochemistry	45min
<p>Investigation of Hypothalamic/pituitary disorders List disorders of anterior pituitary hormone secretion and request and interpret the relevant laboratory investigations of anterior pituitary disorders.</p>	<p><i>Hypopituitarism</i> Pituitary dwarfism, Sheehan's, Hypogonadotropic hypogonadism</p> <p><i>Pituitary Hypersecretion</i> Acromegaly, hyperprolactinaemia and other tumours</p>			

Intermediate objectives	Broad content areas	Activity	Time	Duration
<p>Clinical presentations of anterior pituitary disorders Describe the clinical manifestations of pituitary hypofunction in children and adults</p> <p>Discuss the clinical manifestations, diagnosis and management of pituitary tumours.</p>	<p>Pituitary hypofunction -Pituitary dwarfism in children -Panhypopituitarism in adults</p> <p>Clinical presentation of pituitary tumours -Acromegaly/ gigantism -Hyperprolactinaemia -Cushings disease</p> <p>Non endocrine manifestations -Pressure effects of tumours</p> <p>Management- Surgical, medical and radiotherapy</p>	Lecture	Medicine	45 min
<p>Antidiuretic hormone Recall the synthesis, secretion and action of antidiuretic hormone (ADH). List the disorders of of antidiuretic hormone secretion and activity.</p> <p>Discuss the clinical manifestations, diagnosis and management of diabetes insipidus.</p> <p>List the causes and discuss briefly the investigations and management of the syndrome of inappropriate ADH secretion (SIADH)</p>	<p>Antidiuretic hormone</p> <p>Cranial diabetes insipidus Nephrogenic diabetes insipidus Inappropriate secretion of ADH (SIADH)</p> <p>Urine and serum osmolality Water deprivation test Common causes of SIADH Diagnosis Management</p>	CAL	Medicine	45 min

Intermediate objectives	Broad content areas	Learning activity	Department	Time
<p>Investigation of adrenal disorders Discuss the investigations in the diagnosis of Cushing's syndrome, Addison's disease, Pheochromocytoma and Conn's syndrome</p>	<p><i>Cushing's syndrome</i> 24 hour urinary free cortisol Low dose dexamethasone suppression test High dose dexamethasone suppression test <i>Addison's disease</i> ACTH stimulation test <i>Conn's syndrome</i> Serum renin and aldosterone levels <i>Pheochromocytoma</i> 24 hour urinary VMA assay</p>	<p>Lecture Tutorial</p>	<p>Pathology Pathology</p>	<p>45 minutes 45 minutes</p>
<p>Clinical manifestations of adrenal disorders Discuss the clinical manifestations, investigations, and management of adrenal cortical disorders.</p>	<p>Congenital adrenal hyperplasia Adrenogenital syndrome Cushings syndrome Addisons disease Acute adrenal failure/ crisis Phaeochromocytoma</p>	<p>FiLM Lecture</p>	<p>Paediatrics Medicine</p>	<p> 45 minutes</p>

Intermediate objectives	Broad content areas	Activity	Department	Duration
Corticosteroid therapy Discuss the use of adrenocortical hormones as therapeutic agents.	Corticosteroids and anabolic steroids. - Indications, pharmacokinetics and side effects	Lecture	Pharmacology	45 minutes
		Tutorial	Pharmacology	45 minutes

Intermediate objectives	Broad content areas	Activity	Department	Duration
Reproductive endocrinology	Oral Contraceptives, Oxytocin, Ergometrine	Lecture	Pharmacology	45 minutes
	Clinical aspects of the use of the above drugs	Lecture	Prof Deepal Weerasekara	45 minutes

3. Disorders of Glucose Metabolism

Intermediate objectives	Broad Content areas	Learning activity	Department	Time
Recall the functions of insulin and other hormones involved in maintaining glycaemic control.	Functions of insulin Other hormones in glucose homeostasis e.g. adrenalin and glucagons	Lecture	Medicine	45 minutes
Describe the laboratory diagnosis of diabetes mellitus and investigation of acute diabetic emergencies: diabetic ketoacidosis, hyperosmolar non-ketotic coma (HONK) and hypoglycaemia.	Glycosuria, estimation of blood sugar and OGTT Urinary ketone bodies	Practical	Pathology	45 minutes
Outline the epidemiology and pathogenesis of diabetes mellitus. Discuss the classification and diagnostic criteria of diabetes mellitus. Discuss the clinical presentations of diabetes mellitus.	Pathogenesis & diagnostic criteria of type 1 and type 2 diabetes mellitus Clinical features	Lecture	Medicine	45 minutes
Describe the pathogenesis and principles of management of diabetic ketoacidosis	Diabetic ketoacidosis	Tutorial	Pharmacology	45 minutes
Outline the long-term complications of diabetes; screening, importance of prevention and management.	Microvascular complications Macrovascular complications	Lecture	Endocrinologist, CSTH	45 minutes

Intermediate objectives	Broad content areas	Learning activity	Department	Time
Discuss the pharmacological aspects of insulin and oral hypoglycaemic therapy and complications of treatment.	Insulin; Actions, pharmacokinetics, preparations and prescription of insulin. oral hypoglycaemic drugs; Sulphonylureas, Biguanides and other drugs	Lecture x 2	Pharmacology	2x45 minutes
		Tutorial	Pharmacology	45 minutes
Discuss the management of type 2 diabetes, the role of self-management and importance of patient education. Outline the preventive strategies of Type 2 diabetes.	Diet, drug therapy & life style modification Risk factor identification & life style modification	Lecture Student Seminar	Endocrinologist, CSTH Medicine, Family Medicine Pharmacology	45 minutes 2x 45 minutes

Intermediate objectives	Broad content areas	Activity	Department	Duration
Outline the clinical presentation, diagnosis and management of diabetes mellitus in children.	Diabetes mellitus in children.	Lecture	Paediatrics	45 minutes
Outline the surgical problems caused by diabetes mellitus including diabetic foot.	Diabetic foot, treatment and prevention of foot ulcers, orthotics	Lecture	Surgery	45 minutes

4. Obesity & Metabolic Syndrome

Intermediate objectives	Broad content areas	activity	Department	Time
Define obesity and metabolic syndrome. Outline the epidemiology and impact of obesity on the population.	BMI and grading of obesity Metabolic syndrome Epidemiology Social & economic impact	Lecture	Medicine	45 minutes
Discuss the pathophysiology and causes of obesity.	Hormones in regulating body mass and basic physiology. Causes; Endocrine disorders of obesity, Environmental and genetic factors			
List the complications of obesity.	Mechanical, cardiovascular, respiratory, gastrointestinal, metabolic and psycho social			
Discuss the principles of management of obesity.	Life style modification Drugs Surgical intervention			

5. Disorders of Lipid Metabolism

Intermediate objectives	Broad content areas	Activity	Department	Time
Recall the classification and metabolism of lipids.	Classification of lipids Digestion & absorption Transport & metabolism Dietary influences on lipids	Revision of Phase 1 contents	Biochemistry	45 min
Discuss the importance of lipids & other factors in the pathogenesis of arterial disease (CAD, Stroke and PVD) List the causes for primary & secondary hyperlipidaemias. Discuss the role of plasma lipid measurement in Cardiovascular disease	Lipids in arterial disease Classification of hyperlipidaemias Measurement of plasma lipids in heart disease	Lecture	Cardiologist, Dr. Constantine	45 minutes
Interpret a lipid profile report and outline the necessary steps taken according to the report	Lipid profile report	Role play/ small group discussion	Pathology	45 minutes
Discuss the pharmacological basis for the use of lipid lowering drugs	Pharmacokinetics, dynamics, side effects and drug interactions of the commonly used lipid lowering drugs	Lecture	Pharmacology	45 minutes

6. Disorders of Bone and Calcium Metabolism

Intermediate objectives	Broad content areas	Activity	Department	Time
Describe the regulation of calcium homeostasis	Physiological actions of parathormone, calcitonin and vitamin D	Revision of Phase 1	Biochemistry	
<p>Parathyroid disorders Describe the clinical manifestations and management of diseases of the parathyroid and disorders of calcium metabolism.</p> <p>Describe briefly the relevant investigations in the diagnosis of parathyroid disorders.</p>	<p>Hyperparathyroidism (Primary, secondary and tertiary) Hypoparathyroidism Hypercalcaemia Hypocalcaemia</p> <p>Ionized calcium Serum calcium corrected for Alb PTH assay. X ray hands U/S of thyroid glands, SESTAMIBI scan</p>	Lecture	Medicine	45 minutes
<p>Osteoporosis Describe the pathophysiology, epidemiology and natural history of osteoporosis</p> <p>Discuss the approaches to the diagnosis and management.</p> <p>Discuss the preventive strategies.</p>	<p>Pathophysiology & epidemiology</p> <p>Radiological investigations including DEXA scan Drug therapy</p> <p>Identification of risk factors and prevention</p>	<p>Lecture</p> <p>Lecture</p>	<p>Pharmacology</p> <p>Pharmacology</p>	<p>45 minutes</p> <p>45 minutes 21</p>

Skills that need to be acquired

Should be able to perform;

- Examination of a goiter
- Capillary blood sugar estimation
- Examination of urine for sugar and ketone bodies.
- To measure height and weight accurately and calculate the BMI.

Should have observed;

- Taking of an FNAB from a thyroid gland.