

## **Endocrinology across Specialties**

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A hormone is a chemical messenger produced by specialized secretory cells, having action on nearby (paracrine) or distant (endocrine) cells. Endocrine system co-ordinates the activities of different cells and tissues thereby maintaining homeostasis. Endocrinology is the studies of diseases caused by hormonal dysfunction and have multi-system clinical manifestation and present across specialties. Many patients are being cared by multiple specialties in coordination with endocrinologists. Endocrinology includes many chronic conditions that need long-term management, but there are acute endocrine emergencies (diabetic ketoacidosis, adrenal crisis, thyrotoxic storm or myxoedema coma) requiring urgent attention. An early recognition of the presentation, investigation and treatment of these endocrine conditions is imperative.

Endocrine diseases are intricately linked and are becoming more common because of lifestyle changes and aging population. Obesity is causally associated with diabetes and Cushing's syndrome. Obesity and hypothyroidism are two common clinical conditions that have been linked together closely. High leptin levels in obesity may increase susceptibility to thyroid autoimmunity and subsequent hypothyroidism [1]. Conversely thyrotoxicosis and Addison's disease (AD) can present with weight loss.

Diabetes is the most common endocrine problem with widespread ramifications. But rarely other endocrine disorders like acromegaly, Cushing's syndrome, thyrotoxicosis, primary aldosteronism may cause secondary diabetes. Epidemiological studies have shown that certain cancers occur more frequently in people with type 2 diabetes probably due to shared risk factors like obesity, ageing, smoking, hyperinsulinaemia. Dyslipidaemia, common in diabetes, is associated with increased cardiovascular morbidity but remains undiagnosed, regular practically feasible screening needs to be established. Certain diabetes complications have ethnic variability, like lower prevalence of peripheral artery disease (PAD) among Indians.

30% of adult population is hypertensive, 50% of diabetics have hypertension, which is clearly a major risk factor for many complications [2]. Obesity, type 2 diabetes, growth hormone deficiency and hypogonadism is associated with decline in lean body mass and increase in fat mass leading to insulin resistance and increased sympathetic nervous system activity causing hypertension. Primary aldosteronism (PA) a commonly overlooked condition has an estimated prevalence of 5% in all patients with hypertension, 13% in moderate to severe hypertension and 23% in resistant hypertension [3]. Normokalemic aldosteronism is common. Pheochromocytomas represent a reasonably rare but a "high-risk" cause for hypertension and the symptomatology is often similar to numerous other conditions [2]. Thus the diagnostic workup, while important, is often not cost effective. Another treatable cause of hypertension is Cushing syndrome- 80% have hypertension. Excess glucocorticoids act as a functional mineralocorticoid causing hypokalemia and stimulating RAS. The morbidity and mortality in Cushing's syndrome is mainly determined by hypertension and diabetes [4]. Endogenous Cushing's syndrome is rare but exogenous steroid overdose, even topical, is a common consideration in patients presenting with Cushingoid features. Subclinical Cushing's syndrome and hypertension though controversial, but will become increasingly important, due to emerging group of adrenal or pituitary incidentalomas. Increasing peripheral vascular resistance and arterial stiffness is observed in hypothyroidism whereas hyperdynamic circulation is seen in hyperthyroidism [2].

Presence of mental depression in patients suffering from diabetes has been a common finding. But it is not certain whether the relationship is one of cause or effect. Bjorntorp has formulated an interesting theory on the biological plausibility of association between stress and diabetes by activation of the hypothalamo - pituitary - adrenal axis [5]. Cushing's syndrome and hypothyroidism is commonly associated with depression. But rarely Addison's disease and adult growth hormone deficiency may present with depression. Lloyd., et al. has indicated the possible relationship between psychological stress with both onset and exacerbation of diabetes and anxiety can be an important contributory factor [6]. Anxiety is a common presenting feature of thyrotoxicosis.

Hyponatremia is seen in AD, SIADH, hypothyroidism and hypopituitarism. Hyponatremia is described in 85 - 90% of AD with hyperkalemia in 65% [4]. Hyponatremia is seen in diabetes insipidus, while Cushing's, Conn's syndrome thyrotoxicosis are differentials in hypokalemia. Endocrine diseases causing hypercalcemia and hypocalcemia include primary hyperparathyroidism (PHPT), hypoparathyroidism, thyroid disorders, hyperadrenocorticism, hypoadrenocorticism. PHPT in India is a severe symptomatic disorder with skeletal (osteoporosis), renal and pancreatic manifestations while in west it presents as asymptomatic hypercalcemia detected early on routine screening. Vitamin D deficiency Cushing's syndrome and type 1 diabetes can cause osteoporosis and fractures. Frozen Shoulder is a common ailment for orthopaedicians with an increased prevalence in diabetes and associated with microvascular complications like retinopathy.

Female infertility occurs in about 37% of all infertile couples and ovulatory disorders account for more than half of these [7]. Ovaries are in continuous interaction with the other endocrine organs. Polycystic ovary syndrome and primary ovarian insufficiency are frequent endocrine cause of infertility. A hypothalamic/pituitary diseases including hyperprolactinemia has well characterized effects on gonadal function [7]. Thyroid disorders, acromegaly and Cushing's disease may impair fertility at different levels [7]. Endocrine disorders are commonly encountered in pregnancy- most common being diabetes, followed by hypo and hyperthyroidism [8]. Clinicians should be aware of their diagnosis and current guidance on treatments.

In conclusion, endocrine diseases including diabetes have multisystem manifestations and presents across specialties and confound various clinical states. Clinicians across disciplines should have a working knowledge and clinical acumen about endocrinology. This can facilitate suspicion and early diagnosis of endocrine disorders which are commonly missed and diagnosed late. Up-to-date reference and competence in managing endocrine emergencies and basic diabetes management including insulin initiation is essential.

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