Thyrovigilance in diabetes; glucovigilance in thyroidology

Sanjay Kalra,[1] Deepak Khandelwal[2]

Abstract

The concept of glucocrinology calls for an understanding of the links between diabetes and endocrine function. One of the most clinically relevant aspects of glucocrinology is the relationship of thyroid function and glucose metabolism. This review discusses the vigilance that one must exercise, with respect to thyroid and glycaemic status, while managing diabetes and thyroid disease respectively. We term this clinical approach as thyrovigilance in diabetes, and as glucovigilance in thyroidology.

Keywords: Hypothyroidism, Hyperthyroidism, Type 1 diabetes, Type 2 diabetes, Metformin, Insulin.

CO-Existence

Thyroid dysfunction and diabetes may coexist together.[1-3] The high prevalence of both these conditions means that this can be a causal association. There are specific associations however. These include polyglandular autoimmune syndromes 1 and 2, multiple endocrine neoplasia MEN 1 and 3, genetic and autoimmune associations.

Phenotype

The type 2 diabetes and thyroid phenotypes have many similarities. Both share similar symptoms, including easy fatigability, tiredness, and alteration in appetite and weight. Hypothyroidism and type 2 diabetes are associated with the metabolic syndrome phenotype (DHOLL).[4] On the other hand, hyperthyroidism and insulinopenic diabetes, whether type 1 diabetes or type 2 diabetes with extremely poor control, may have overlapping clinical presentations.

Complications of both conditions may demonstrate even greater overlap. The symptoms and signs of hypothyroidism show uncanny resemblance to those of diabetic kidney disease and diabetic heart disease. Both hypothyroidism and nephropathy may be associated with hypoglycaemia.[5] The dermopathy of Graves' disease may be confused with that of diabetes. These may delay the diagnosis of diabetes or thyroid function, to the detriment of the patient's health.

Department of Endocrinology, [1]Bharti Hospital, Karnal, [2]Maharaja Agrasen Hospital, New Delhi, India.

Correspondence: Sanjay Kalra. Email: brideknl@gmail.com

Impact on Investigations

Acute illness alters thyroid function tests, and this hold true for acute illness in persons with diabetes.[6] Thyroid function tests should be interpreted with caution in patients with acute comorbidity. On the other hand, glycated haemoglobin (HbA1C) may not be a reliable marker of glycaemia in uncontrolled thyroid disorders because of alteration of the lifespan of red blood cells.[7]

Impact of Treatment

Some glucose lowering drugs may impact thyroid function. Metformin is known to reduce TSH (thyroid stimulating hormone) levels, and this property may be beneficial in refractory hypothyroid patients with concomitant diabetes.[8] Older sulfonylureas exhibit a goitrogenic effect, and inhibit the synthesis of thyroid hormone.[9] Pioglitazone can cause orbital oedema by increasing IGF1 (insulin like growth factor-1), adipose tissue synthesis and TSH secretion.[10]

There are reports of increased risk of thyroid malignancy with older sulfonylurea and certain insulin analogues, but these are not substantiated and do not impact modern clinical practice.[11,12] Liraglutide is contraindicated in persons with medullary thyroid carcinoma.[13]

Glucocorticoids are sometimes used in the management of thyrotoxicosis. These drugs may cause hyperglycaemia, and may unmask latent diabetes.[14] Similarly, beta blockers such as propranolol are used to manage tachycardia in thyrotoxicosis. These may be associated with metabolic adverse effects including hypoglycaemia unawareness.[15]

Impact on Clinical Course

Thyroid dysfunction is a common cause of refractory diabetes. Hypothyroidism is a frequent reason for unexplained hypoglycaemia, but may also be a cause of insulin resistance.[2,5] Hyperthyroidism can lead to difficult to control hyperglycaemia, which resolves once anti thyroid drug therapy is instituted. Uncontrolled diabetes may influence thyroid function as well. The similarity of symptoms may delay diagnosis and institution of

appropriate therapy.

Summary

This brief communication has listed the relationship between thyroid dysfunction and diabetes. Co-existence of these conditions, overlap between their symptomatology and phenotype calls for thyrovigilance in diabetes and glucovigilance in thyroidology. This vigilance should not be limited to screening: the potential impact of glucose lowering therapy on thyroid function, and of drugs used in thyroid practice on glycaemic status implies that thyrovigilance and glucovigilance should continue throughout the course of clinical care.

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