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HYPOTHYROIDISM PRESENTING AS REVERSIBLE RENAL IMPAIRMENT

General Medicine

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ABSTRACT

We describe an interesting case of reversible renal impairment secondary to hypothyroidism. A 54-year-old female came with the complaints of b/l leg swelling for 2 weeks which was gradual in onset . H/o peri-orbital and facial oedema (+). Two-week history of swelling was preceded by several months of vague constitutional symptoms including tiredness, lethargy, and leg muscle cramping. She was found to have hypothyroidism, and thyroid hormone replacement therapy (THRT) was started which resulted in reversal of the renal dysfunction. There was marked improvement in estimated glomerular filtration rate. Several studies have described the pathophysiology of diminished renal function in hypothyroidism. Few studies or case reports have shown total amelioration of renal impairment as seen in our patient. The etiology is presumed to be multifactorial, in which hemodynamic effects and a direct effect of thyroid hormone on the kidney play an important role. We suggest that patients with renal impairment of unknown cause have thyroid function tests undertaken as part of routine investigation.

KEYWORDS

Acute kidney injury, chronic kidney disease, glomerular filtration rate, hypothyroidism, renal impairment, thyroid hormone replacement therapy

INTRODUCTION :

Primary hypothyroidism refers to a systemic hypometabolic status due to hypothyroxinemia or thyroid hormone resistance caused by pathologic changes to the thyroid gland There are several interactions between thyroid and kidney functions in each other organ's disease states. Thyroid hormones affect renal development and physiology. Hypothyroidism is associated with reduced GFR. Hypothyroidism tends to be neglected or misdiagnosed due to its trivial and nonspecific clinical manifestations, and a combined renal dysfunction is rarely reported. Herein a case of kidney dysfunction caused by hypothyroidism is reported and relevant literature was reviewed.

CASE STUDY :

A 54-year-old female came with the complaints of b/l leg swelling for 2 weeks which was gradual in onset . H/o peri-orbital and facial oedema (+). No H/O shortness of breath, dyspnoea on exertion and no other cardiac symptoms. No H/o urinary retention or other symptoms suggestive of renal failure. Two-week history of swelling was preceded by several months of vague constitutional symptoms including tiredness, lethargy, and leg muscle cramping. N/K/C/O T2DM / SHTN/BA/EPILEPSY .O/E patient conscious oriented afebrile, Pallor +, b/l pedal oedema + , CVS : S1S2 heard , RS : B/L AE + , CNS : NFND , P/A : soft , BP : 130/90mmhg , PR : 78/min ,spo2 : 99% in room air Investigations: Hb 8.2 g/dL, Wbc 6.8 × 10^3/dL, esr 70 mm, microcytic hypochromic anemia on peripheral blood film, serum urea 76mg/dL, creatinine 2.3 mg/dL, estimated GFR (eGFR) 30mL/min/1.73 m^2 by Cockcroft--Gault equation, sodium 138 mEq/L, potassium 4.2 mEq/L, chloride 106 mEq/L, calcium 8.8 mg/dL, phosphorous 3.2 mg/dL, uric acid 6.3 mg/dL, random blood sugar 81 mg/dL , Urine examination showed no albumin or sugar, and culture was sterile . 24-hour urine protein levels were 81 mg (normal 50–150 mg). Ultrasound showed normal b/l kidney size and normal patent renal arteries on both sides on Doppler. Thyroid function test : TSH : 66mlU/L , Ft3 : 1.9pg/ml , Ft4:1ng/dl

The patient was treated with 100 microgram of levothyroxine daily and advised to follow-up for renal dysfunction. The serum creatinine had normalized at 2-month follow-up visit. After six months of THRT, the patient became totally asymptomatic and had the following test results: hemoglobin 11.2 g/urea 23 mg/dL, creatinine 0.8 mg/dL, eGFR of 86 mL/min/1.73 m^2 by Cockcroft--Gault equation, serum cholesterol 164 mg/dL, triglycerides 153 mg/dL and a normal thyroid function (TSH 2.55 mIU/L and FT4 1.0 ng/dL

CONCLUSION :

In the reported case, the initial finding of renal impairment guided further investigations, leading to the diagnosis of hypothyroidism and THRT brought about complete recovery of renal function. These types of presentation are very rare but have been reported previously also

DISCUSSION :

Primary hypothyroidism is associated with a reversible elevation of serum creatinine. This increase is observed in more than half (>55%) of adults with hypothyroidism.

Thyroid hormone (TH) affects nearly all organ systems in the body. In the kidney, it is involved in renal development and growth, renal hemodynamics and sodium and water homeostasis. GFR is also known to be influenced by thyroid dysfunction. Hypothyroidism-associated kidney dysfunction seems to be more related with the decline in TH levels rather than with thyroid autoimmunity The pathophysiology of impaired renal function in hypothyroidism is multifactorial. Among the mechanisms involved are direct effects of TH on the cardiovascular system lead to lower cardiac output and renal blood flow (RBF) resulting in reduction in GFR

Primary hypothyroidism is associated with a reduction of GFR and RBF that are normalized following levothyroxine administration. Similarly, normalization of circulating TH concentrations with replacement therapy in hypothyroid patients with chronic kidney disease (CKD) can significantly improve GFR. Therefore, patients with CKD should positively be examined for thyroid function, and appropriate THRT should be started if needed. Hypothyroidism is an underappreciated cause of renal impairment. The classical clinical signs and symptoms may be subtle or absent, even in severe hypothyroidism. We suggest that patients with renal impairment of unknown cause have thyroid function tests undertaken as part of routine investigation. Thyroid function should be assessed in patients with deteriorating renal function, including those with known renal impairment in whom the deterioration is unexpected. It is worthwhile to examine the thyroid function in known CKD patients and institute appropriate THRT to correct the reversible hypothyroidism-induced renal impairment.

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