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Case Report (Pages: 5583-5586)

Hypertension in Hypothyroidism; a Rare Association in Childhood

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Abstract

The association of hypothyroidism with hypertension is an uncommon phenomenon. Hypertension adds to cardiovascular risk in any population and hypertension due to hypothyroidism is reversible with hormonal replacement. Although there are various case studies exists in adults but such reports are rare in children.

Key Words: Children, Hypertension, Hypothyroidism.

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1- INTRODUCTION

Hypothyroidism is one of the most common endocrine abnormality encountered and thus have a significant health effect in any population. Untreated hypothyroidism has varied effects involving multiple systems. Hypothyroidism has been linked with both hypothyroidism and hypertension in adults. Several studies have shown the association of hypertension with subclinical hypothyroidism in adults (1). However, such reports are lacking in children. The index case had overt hypothyroidism and had significant hypertension which is rarely reported till date.

2- CASE REPORT

A 14- year- old- boy presented with complain of pain in both groins since last 5 months and generalized body swelling. The pain was insidious in onset and progressive in nature. He had received anti-tubercular drugs for this complains by local physician. As he was not improving and the child started limping along with the development of generalised body edema, he was referred to our institute. Parents were also very much concerned about the mental slowing and poor academic performance of the child. On physical examination, patient's vital signs were temperature 97.6 Fahrenheit, pulse- 78/minute, blood pressure- 140/90mmhg, respiratory rate 18/minute.

General physical examination revealed mild pallor, non-pitting edema, thick tongue, coarse dry skin and cool extremities. His movements were very slow and he was limping on left side although complaint of pain was on both sides of hips. Hypertension was never documented in the past and there was no history of hypertension in parents. Investigation revealed macrocytic anemia with Hb-12.6gm/dl, MCV-92fl. Thyroid stimulating hormone (TSH) level was markedly raised (above 150mIu/ml) and levels of Thyroxine (T4) (6nmol/l), (Triiodothyronine level - 0.14 nmol/l) were significantly low. Thyroid antiperoxidase antibody (TPO-Abs) level (1,300U/ml), and antithyroglobulin antibodies level (486U/ml) were very high and suggestive of autoimmune thyroiditis.

There was moderate elevation of Aspartate aminotransferase (207U/L), and Alanine aminotransferase (156U/L). Serum urea and creatinine were within normal limit. The serum sodium and potassium values were 137/meq/l and 3.8meq/l, respectively.

Serum cholesterol-was elevated (361mg/dl), and serum triglycerides 227 mg/dl, HDL cholesterol-68mg/dl,VLDL-45.2mg/dl, LDL-247mg/dl. He was further investigated to rule out other etiology of hypertension. Ultrasonography of the abdomen showed fatty liver with mild hepatomegaly and normal kidneys. Renal artery doppler study was normal.

Echocardiography and Electrocardiogram was suggestive of left ventricular hypertrophy, but fundus examination did not revealed any abnormality. Overnight dexamethasone suppression test was normal. X-Ray of both hips joint revealed mild erosion of head of femur on the left side.

The patient was started on levothyroxine initially with low dose and subsequently the dose was increased. Orthopedic consultation was sought for the erosion of head of femur, Perthes disease was suspected and hip spica was applied with a plan for surgical containment in future. At 6 weeks follow-up, child improved significantly. Pain in groin subsided considerably and child was able to walk normally. Blood pressure was towards normal and tapering of antihypertensives was started in follow-up and subsequently stopped and the child is currently on follow up.

3- DISCUSSION

Renal parenchymal diseases and renovascular disease continue to be the commonest cause of hypertension in children. Hypothyroidism is currently not recognized as an etiological agent for secondary hypertension in children and adolescents. There is significant burden of hypothyroidism in India. The prevalence is approximately 11% which is comparatively higher to developed nation like United States of America and United Kingdom with prevalence of 4.6% and 2%, respectively (3, 4).

Various studies in the past have shown association between hypertension and hypothyroidism in adults. Itterman et al. have shown the association of serum TSH level with systolic and diastolic hypertension and found a positive relationship between serum TSH levels and hypertension in children (2). However, only few studies have shown of hypertension in hypothyroid children. A number of mechanisms have been postulated as cause of hypertension in hypothyroidism. 3, 5, 3´-triiodothyronine is the metabolically active thyroid agent that possibly has a vasodilatory effect on the vascular muscle cells (5, 6).

In euthyroid state there is a balance between vasoconstrictor and vasodilator mechanism. T3 deficiency in hypothyroidism is associated with peripheral vasoconstriction. Hypothyroidism also leads to endothelial dysfunction through alteration in local vasodilatory effect of T3, (down-regulation of endothelial nitric oxide production occurs in hypothyroidism) leading to increased arterial stiffness thus lead to arteriosclerosis (7).

Hypertension itself induces changes in arterial wall further leading to reduced elasticity and increasing stiffness. Thyroid hormones affect both alpha and beta adrenergic response. They increase the number of beta-adrenoceptors thus potentiating beta-adrenergic response which have a vasodilator effect while decreasing alpha adrenergic response. In hypothyroidism alpha-adrenergic responses are potentiated while beta-adrenergic are blunted thus resulting in vasoconstriction and elevation of systemic vascular resistance (8, 9).

Fommel et al. found in their study a highly significant association between free T3 and diastolic hypertension. Elevated levels of adrenaline and noradrenaline were uniformly found in hypothyroid states suggesting sympathetic over activity in this condition (10). Hypothyroidism is a low renin state and renin-angiotensin system does not play role in elevation of blood pressure in hypothyroidism (11).

This case exemplifies a case of acquired hypothyroidism that goes unrecognized by caregivers due to subtle nature of the disease. In a well-grown child acquired hypothyroidism can go undiagnosed especially in a male as disease presentation can be very subtle and non-specific. In this case child had developed a number of complications before coming to medical attention. Poor parental supervision played a significant role. Non availability of social services and poor primary health care are other contributing factors.

4- CONCLUSION

To conclude, hypothyroidism is associated with hypertension in children is a very uncommon phenomenon and paediatrician should be aware of this perplexity, and any child with hypertension should be investigated for the underlying hypothyroidism state.

5- ABBREVIATION

- Hb: Haemoglobin,
- MCV: Mean corpuscular volume,
- HDL: High-density lipoproteins,

- VLDL: Very low-density lipoprotein,
- LDL: Low density lipoprotein,
- TSH: Thyroid stimulating hormone,
- T3: Triiodothyronine,
- T4: Tetraiodothyronine.

6- CONFLICT OF INTEREST: None.

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