

Nephrotic syndrome induced Hypothyroidism – A case Report

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Abstract

A girl of 12 years old admitted in the department of Pediatric Nephrology, National Institute of Kidney Diseases and Urology (NIKDU), Sher-E-Bangla Nagar, Dhaka who was diagnosed as a case of nephrotic syndrome induced hypothyroidism. She had no family history of renal disease or any consanguinity. She was treated with oral steroid with careful monitoring of her hypothyroidism. Though hypothyroidism may associated with Nephrotic syndrome, it should be carefully evaluated.

Key words : Nephrotic Syndrome, Hypothyroidism.

Introduction

Nephrotic syndrome is a common renal disease all over the world among children. The clinical and biochemical features of nephrotic syndrome result from heavy proteinuria (more than 40 mg/m²/hour), hypoalbuminemia, lowered plasma oncotic pressure and edema.¹ Proteinemia is below 50 gm/L in 80% of patients and below 40 gm/L in 40% of patients.² Hyperlipidaemia is a consequences of increased hepatic synthesis of cholesterol, triglycerides and lipoproteins, decreased catabolism of lipoproteins, a decreased LDL receptor activity and an increased urinary loss of HDL.³ During nephrotic syndrome thyroxine may be reduced due to decreased thyroid binding globulin. Therefore, TSH level in blood became high. Several cases of glomerular diseases have been associated with thyroid diseases both in adults and in children. Although pseudohypothyroidism is well-known in nephrotic pathophysiology.⁴

Case Report

A 12 year old girl, first issue of non-consanguineous parents admitted in the department of pediatric nephrology, National Institute of Kidney Diseases and Urology (NIKDU) on 12th May '2011, presented with gradual swelling of whole body which was first appeared at face with scanty micturation for the last 3 months and a swelling on the front of her neck for one and half months. For these reasons her parents consulted with several medicine specialists and took medicine according to the prescription of the physicians but her condition was not improved. After that she was seen by an endocrinologist and diagnosed as a case of Hypothyroidism. She was treated with tab. Levothyroxine (50µg) but her condition remain unchanged. Then she was seen by a Paediatric Nephrologist and diagnosed her as a case of Nephrotic Syndrome and referred to NIKDU for better management.

She has no history of skin diseases, sore throat, headache, joint pain, oral ulcer or constipation. Her milestone of development was normal. She was vaccinated as per EPI schedule. She came from a middle class family and her IQ was normal. During her treatment under different physicians she took many antibiotics and tab. thyroxine (50µg) for about 6 weeks.

During admission, she was ill looking, her height was 143 cm and weight was 41 kg. She was edematous. Her thyroid gland was enlarged, surface smooth, move with deglutition. Other systems reveal no abnormality. Bed side urinary albumin was three plus (+++).

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On investigation (during admission) her CBC was Hb%-13.48 gm/dl, total count of WBC-7950/cmm, Platelets-342000/cmm.

Urine R/M/E shows Albumin- +++, Pus cell- 3-5/hpf, RBC-nil Serum Creatinine-0.6 mg/dl. Serum Cholesterol-500 mg/dl, Serum Albumin-1.40 gm/dl,

S. Electrolytes- Sodium (Na)- 139 mmol/L, Potassium (K)-4.4 mmol/L, Chloride (Cl)-114 mmol/L. ANA (Anti Nuclear Antibody)- Negative. HBsAg-Negative Anti HCV-Negative, Urine C/S-No Growth.

USG of Thyroid shows Normal study. Thyroid Stimulating Hormone (TSH)-12.7 iu/ml (Normal value 0.70–5.70 iu/ml).

After one week of admission we started treatment with steroid in adequate dose and duration for nephrotic syndrome and discontinued tab. levothyroxine.

One week later her Urine R/M/E-Alb+, Pus cell- 2-4/hpf, RBC-nil.

Serum T4 was-3.10gm/dl (Normal value 5.5-15 gm/dl), TSH-8.81 iu/ml (0.70–5.7 iu/ml).

USG of KUB reveals- Parenchymal echogenecity is slightly raised with poorly defined cortico-medullary differentiation. The remark was Bilateral early parenchymal disease of Kidneys.

Renal biopsy shows all glomeruli are normal in respect to mesangial cellularity and basement membrane thickness. Renal tubules, interstitium and blood vessels are normal. Mild Granular deposition of IgA and IgM in the mesangium.

Then we discharge the patient only with steroid as treatment protocol for first attack of nephrotic syndrome.

On follow up visit after four weeks of her discharge, her urine for R/M/E-Alb-nil, pus cell-1-2/hpf, RBC-nil.

Serum T3-1.38 ngm/ml (0.86–02.70 ngm/ml), Serum T4-7.82 µgm/dl (5.50–15.00 µgm/dl), TSH-3.14 iu/ml (0.47-5.01 iu/ml).

Discussion

Thyroid hormones (TH) are essential for an adequate growth and development of the kidney. Conversely, the kidney is not only an organ for metabolism and elimination of thyroid hormone(TH)^{5,6} but also a target organ of iodothyronines actions. Thyroid dysfunction causes remarkable changes in glomerular and tubular functions and electrolyte and water homeostasis. Hypothyroidism may coexist with nephrotic

syndrome and accompanied by a decrease in glomerular filtration, hyponatremia, and an alteration of the ability for water excretion. Thyroid dysfunction acquires special characteristics in those patients with advanced kidney disease⁷. The kidney also plays a role on the regulation of metabolism and elimination of TH.^{8,9}

Thyroid disease may be linked to different forms of glomerulonephritis¹⁰. Hypothyroidism can coincide with different forms of glomerular disease. The more frequent form in case of adult is membranous glomerulopathy associated with nephrotic syndrome (NS).¹¹ Thyroid dysfunction has been reported to be associated with IgA glomerulonephritis¹⁷ mesangiocapillary or membranoproliferative glomerulonephritis¹³ and minimal change glomerulonephritis.^{11,14} In children there is not enough study have been found.

NS is associated with changes in serum TH levels^{15,16,17}. Urinary losses of binding proteins, such as thyroxine binding globulin (TBG), transthyretin or pre-albumin, albumin, and TH binded to them, result in a reduction in serum total thyroxine (T4) and, sometimes, in total T₃ levels.

There is no such study regarding renal histopathological changes in nephrotic syndrome associated hypothyroidism in children in our country. Here this girl had features of hypothyroidism and generalized swelling. Therefore, her features of nephrotic syndrome overlooked by the physicians. But these hormonal changes are related both to the degree of proteinuria and to serum albumin levels.¹⁸

Conclusion

In this case this child presented with generalized swelling and a swelling on the front of her neck. Although her generalized swelling appeared first but her neck swelling drew the attention of most of the physicians.

After admission in NIKDU we took her history properly and did all the investigations as required. We treated the child with steroid (Tab. Prednisolon 2 mg/kg body weight) and discontinued tab. levothyroxine. After one week of treatment her proteinuria was subsided and thyroid swelling also reduced. Her thyroid hormone status became normal after four weeks of her discharge. Therefore we conclude that her hypothyroidism was due to nephrotic syndrome.

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