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Case Report

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Infant with a congenital nephrotic syndrome- A case report

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Abstract

Congenital Nephrotic Syndrome of Finnish type is an uncommon disorder with grave clinical course. It has an incidence of 1.2 per 10000 births. It is due to mutation of NPHS1 which encodes Nephrin, a component of podocyte slit diaphragm. End stage renal disease occurs most frequently between 3 and 8 years of age. Congenital Nephrotic Syndrome manifests in early life beginning at gestational age of 15-16 weeks which permits early diagnosis in high risk cases.

Keywords: Hypertrofic pylor stenosis, Neonatal intensive care, Vomiting in newborn.

INTRODUCTION

Congenital Nephrotic Syndrome of Finnish type is an uncommon disorder with grave clinical course. It has an incidence of 1.2 per 10000 births. It is due to mutation of NPHS1 which encodes Nephrin, a component of podocyte slit diaphragm. End stage renal disease occurs most frequently between 3 and 8 years of age. Congenital Nephrotic Syndrome manifests in early life beginning at gestational age of 15-16 weeks which permits early diagnosis in high risk cases.

CASE REPORT

A 24-year-old mother has delivered a male baby born out of a third-degree consanguineous marriage at 37 weeks of gestation by Normal Vaginal Delivery. Baby cried immediately at birth with Apgar scores of 7,8,9 at 1, 5, 10 minutes of life. Placenta was hydropic weighing 1.36kg and cord was edematous. There was previous history of two Intrauterine fetal deaths (male babies) born at 37 and 36 weeks and weighing 2.5 kg and 2.9 kg respectively. In view of placentomegaly in previous pregnancies associated with poly-hydramnios, with history of hemophilia in nephew, Gold panel Test for genetic screening was done for the partners and both were found to be heterozygous carriers of NPHS1 mutations and mother was heterozygous carrier of GBE1 gene (GSD type 4) in addition. In the present pregnancy there was increased nuchal fold thickness (>3mm) and TIFFA scan revealed bilateral hyper-echoic kidneys. Amniocentesis was done and the fetus was diagnosed as homozygous carrier of NPHS1 mutation and heterozygous carrier of GBE1 gene. Antenatal period was complicated by GDM which was controlled on diet initially and Insulin subsequently. Polyhydramnios was present (AFI - 22.5cm with deepest pool measuring 6.2cm) Baby weighed 3.04 kg at birth with head circumference of 32 cm and length of 50cm. On general examination, there were no dysmorphic features. Abdomen was soft without any organomegaly.

Evaluation

Complete urine examination showed 3+ proteinuria, no signs of hematuria, specific gravity of 1.005 and pH of 6.5. Serum albumin was 1.2g/dl. Blood urea nitrogen and serum creatinine were within normal limits. Serum cholesterol was 324 mg/dl. Complete blood count revealed haemoglobin of 21.6 g/dl with leucocyte count of 10,300 cells/mm^3 and platelet count of 1.87lakhs/mm^3. USG abdomen was done which showed normal sized kidneys with increased echotexture and normal cortico-medullary differentiation. There was trace ascites and minimal pleural effusion.

Treatment

Baby was kept under observation. Immediate postnatal period was uneventful. Direct breastfeeding was

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established. Nephrotic work up done after 72 hours of life revealed hypoalbuminemia with proteinuria and hypercholesterolemia. Nephrologist was consulted, and now baby is in our follow up.

DISCUSSION

The congenital nephrotic syndrome refers to disease that is present at birth or within the first three months of life [1]. Finnish type Nephrotic Syndrome caused by mutation of NPHS1 gene which encodes nephrin, is the most common cause of Congenital Nephrotic Syndrome. It occurs most commonly in Finland, with an incidence of 1.2 per 10,000 births. With antenatal screening, the incidence has fallen to 1 in 8000 births [2,3].

The cause of proteinuria is an inherited error in the structure of the glomerular capillary filter due to defect in gene NPHS1 on long arm of chromosome 19 which encodes for a transmembrane protein, named nephrin, a member of the immunoglobulin family of cell adhesion molecules. Electron microscopy shows only non – specific changes of diffuse foot process effacement. The most prominent feature is irregular microcystic dilatation of proximal tubules which is not specific and is not seen in all patients [4-6].

Most of infants with the CNF are born late preterm to near term at 35 to 38 weeks and are usually small for gestational ages. The placenta is enlarged, hydropic and commonly weighs more than 25 percent of the total birth weight [7]. Other causes of placentomegaly are Diabetes mellitus, anemia, hydrops, infection, aneuploidy, molar pregnancy. Edema may be present at birth or appears during the first seven days of life in 50% of cases. Severe nephrotic syndrome with marked ascites is invariably present by three months. The proteinuria is highly selective early in the course of the disease and hematuria is rare, suggesting the absence of inflammation in the glomeruli [8,9]. As the disease advances, the proteinuria becomes non-selective with severe hypoalbuminemia and hypo-gammaglobulinemia. The serum creatinine and BUN levels are initially within normal limits. Renal ultrasound shows enlarged, hyper-echogenic kidneys without normal cortico-medullary differentiation. End stage renal disease occurs usually between three and eight years of age [10,11]. CNF is always resistant to glucocorticoids and immunosuppressive drugs, as this is not an immunologic disease. Standard conservative treatment includes frequent albumin infusions, gamma globulin replacement, nutrition with a high protein, low salt diet, vitamin and thyroxine substitution, and prevention of infections and thrombotic complications. Drugs like angiotensin converting enzyme inhibitor and indomethacin reduce intra-glomerular pressure, leading to a marked reduction in proteinuria and thereby improve in nutrition and growth [12,13]. Till the baby reaches a weight of 8 to 9 kg, dialysis is done and renal transplantation can be considered at this juncture [14,15].

Massive non-selective proteinuria *in utero* allows for prenatal screening. The disease may manifest during early fetal life, beginning at the gestational age of 15 to 16 weeks. Fetal proteinuria is the most common initial symptom, which causes more than 10-fold rise in the amniotic fluid alpha-fetoprotein (AFP) concentration [16,17].

Tumelo M. Satekge et al have reported a case of a 15-month-old female toddler who presented with generalised body swellings for 2 weeks of age and neuro-developmental delay and was diagnosed with renal biopsy. Child was managed with Enalapril, IV albumin, thyroxine, calcitriol and high calorie and protein diet. Unilateral nephrectomy was done due to resistant proteinuria. Child succumbed due to renal failure, bacterial peritonitis and septic shock [18].

Learning points

1. Congenital Nephrotic Syndrome should be ruled out in all infants presenting with generalised edema.
2. Finnish type Nephrotic Syndrome is a rare but an important cause of Nephrotic Syndrome.
3. Nephrotic syndrome to be ruled out in cases of placentomegaly with increased AFP and bad obstetric history.
4. If there is raised AFP, nephritic syndrome is an important differential diagnosis after ruling out neural tube defects.
5. Genetic counselling and antenatal screening for congenital nephrotic syndrome is often required and should therefore be considered early on.
6. Aggressive supportive treatment is needed in aiding growth and development.

REFERENCES

1. Hallman N, Norio R , Rapola J . Congenital Nephrotic Syndrome. Nephron 1973; 11:101.
2. Koziell A, Grech V, Hussain S, Lee G, Lenkkeri U, Tryggvson K, Scambler P (2002) Genotype/phenotype correlations of NPHS1 and NPHS2 mutations in nephrotic syndrome advocate a functional inter-relationship in glomerular filtration. Hum Mol Genet 11:379–388
3. Beltcheva OJ, Martin P, Lenkkeri U, Tryggvason K (2001) Mutation spectrum in the nephrin gene (NPHS1) in congenital nephrotic syndrome. Hum Mutat 17:368–373.
4. Rapola J, Sariola H, Ekblom P. Pathology of fetal congenital nephrosis: immunohistochemical and ultrastructural studies. Kidney Int 1984; 25:701.
5. Habib R, Bois E. [Heterogeneity of early onset nephrotic syndromes in infants (nephrotic syndrome "in infants"). Anatomical, clinical and genetic study of 37 cases]. Helv Paediatr Acta 1973; 28:91.
6. Kaplan BS, Bureau MA, Drummond KN. The nephrotic syndrome in the first year of life: is a pathologic classification possible? J Pediatr 1974; 85:615.
7. Patrakka J, Kestilä M, Wartiovaara J, Ruotsalainen V, Tissari P, Lenkkeri U, Männikkö M, Vispää I, Holmberg C, Rapola J, Tryggvason K, Jalanko H (2000) Congenital nephrotic syndrome (NPHS1): Features resulting from different mutations in Finnish patients. Kidney Int 58:972–980.
8. Bhimma R. Congenital and infantile nephrotic syndrome. Pediatric Oncall [serial online]. 2013;10(8):46.
9. Penaflor G, Cheng T. Congenital Nephrotic Syndrome. Pediatr Rev. 2001;22:32.
10. Koziell A, Grech V, Hussain S, et al. Genotype/phenotype correlations of NPHS1 and NPHS2 mutations in nephrotic syndrome advocate a functional inter-relationship in glomerular filtration. Hum Mol Genet 2002; 11:379.
11. Schultheiss M, Ruf RG, Mucha BE, et al. No evidence for genotype/phenotype correlation in NPHS1 and NPHS2 mutations. Pediatr Nephrol 2004; 19:1340.
12. Pomeranz A, Wolach B, Bernheim J, et al. Successful treatment of Finnish congenital nephrotic syndrome with captopril and indomethacin. J Pediatr 1995; 126:140.
13. Heaton PA, Smales O, Wong W. Congenital nephrotic syndrome responsive to captopril and indometacin. Arch Dis Child 1999; 81:174.
14. Mahan JD, Mauer SM, Sibley RK, Vernier RL. Congenital nephrotic syndrome: evolution of medical management and results of renal transplantation. J Pediatr 1984; 105:549.
15. Holmberg C, Jalanko H, Koskimies O, et al. Renal transplantation in small children with congenital nephrotic syndrome of the Finnish type. Transplant Proc 1991; 23:1378.
16. Mahan JD, Mauer SM, Sibley RK, Vernier RL. Congenital nephrotic syndrome: evolution of medical management and results of renal transplantation. J Pediatr. 1984 Oct;105(4):549–57.
17. Holmberg C, Jalanko H. Congenital nephrotic syndrome and recurrence of proteinuria after renal transplantation. PediatrNephrol. 2014;29(12):2309–17.
18. Satekge TM, Kiabilua O, van Biljon G, Pillay K, Pillay TS. Case Report: A Toddler With Anasarca Caused by Congenital Nephrotic Syndrome. EJIFCC. 2017 May 1;28(2):156–63.