A case report of lecithin-cholesterol: acyltransferase (LCAT) deficiency

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ABSTRACT

Familial lecithin-cholesterol: acyltransferase (LCAT) deficiency is a rare autosomal recessive disorder of lipid metabolism. This case report describes a rare case of LCAT deficiency presenting with progressive renal disease, proteinuria, hemolytic anemia, decreased HDL-cholesterol level, corneal opacity, and low plasma LCAT levels. Stable proteinuria and an abnormal lipid profile were first noted in early 30s of our patient, and a renal biopsy performed 19 years prior to admission showed mesangial matrix expansion with positive immunoreactivity for C3 and borderline IgA and IgM immunoreactivity in the mesangium. We initiated treatment with a renin-angiotensin system blocker and a lipid lowering agent. Further increases in proteinuria were observed, the patient subsequently received prednisolone and immunosuppressants, which resulted in decreased proteinuria. In spite of medical treatment, the renal disease progressed gradually, and after 18 years of follow-up, he began receiving renal replacement therapy.

(Key words: Lecithin-cholesterol: acyltransferase (LCAT) deficiency; Immunosuppressants; Proteinuria)
INTRODUCTION

Familial lecithin–cholesterol: acyltransferase (LCAT) deficiency (FLD) was first described in 1967 in a Norwegian family.\(^1\) This very rare autosomal recessive disorder is caused by mutations in the \(LCA{T}\) gene that occurs in 1 in 1,000,000 individuals.\(^2\) LCAT is a glycoprotein enzyme that mediates esterification of cholesterol and plays a central role in the reverse cholesterol pathway of high density lipoprotein (HDL) metabolism. Consequently, in FLD, the proportion of free cholesterol comprising the circulating lipoproteins is greatly increased, and the presence of cholesterol in various tissues leads to progressive renal disease, hemolytic anemia, and corneal opacification.\(^3\)

Proteinuria is an early sign of renal disease in FLD and indices of renal function such as serum creatinine usually remain normal in the first three decades of life. Deterioration of renal function may occur suddenly with progression of renal insufficiency and an increase in proteinuria.\(^4\) The mechanism underlying renal injury is poorly understood, but lipids accumulate in the glomeruli are assumed to induce sclerosis.\(^5,6\)

Herein, we present clinical and renal histological findings of FLD. The outcome after long–term observation supports the efficacy of renin-angiotensin–aldosterone system (RAAS) blockers and corticosteroids in the treatment of proteinuria in patients with FLD.

CASE REPORT

A 56–year–old male was admitted to the Department of Nephrology for renal replacement therapy. Stable proteinuria and an abnormal lipid profile were first noted in his early 30s. The patient had no siblings and his parents had died of unknown reason, when he was early 20s. At the age of 37 (in 1993), he had a blood pressure of 130/80 mmHg and bilateral corneal opacification near the limbus. He presented with anemia (hemoglobin 11.7 g/dL) with a normal plasma creatinine level (0.8 mg/dL). Urinalysis revealed proteinuria and microscopic hematuria. A 24–hour urine collection showed subnephrotic range proteinuria at 2.2 g/day. His total cholesterol was 114 mg/dL, triglycerides 215 mg/dL, HDL-cholesterol 21 mg/dL, and low density lipoprotein (LDL)-cholesterol 50 mg/dL. Complement factors were normal, and tests for anti–nuclear antibodies or anti–double stranded DNA were negative.

A renal biopsy specimen examined by light microscopy showed expansion of the mesangial matrix with a focal reticulated appearance and irregular thickening of the glomerular basement membrane (GBM) with a vacuolated appearance (Fig. 1). The presence of mesangial foam cells was not noted. Immunofluorescence was positive for C3, and showed trace immunoreactivity for IgA and IgM. Electron microscopic studies showed glomerular lipid deposits characterized by irregularly distributed,