Images in Cardiology

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Type III Hyperlipoproteinemia

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FIG. 1 Xanthoma striata palmaris.

A 41-year-old male presented with a non-Q-wave myocardial infarction (MI), and cardiac catheterization documented triple-vessel disease. He underwent triple-vessel coronary artery bypass graft and coronary endarterectomy.

His risk factors for coronary artery disease (CAD) included 25 pack years of tobacco abuse, 20 years of hyperlipidemia, family history (his father had an MI at 40 years of age), and a distant history of 10 years of crack cocaine abuse. Physical examination was remarkable only for xanthoma striata palmaris (Fig. 1) and tuberoeruptive xanthomas on elbows and knees (Fig. 2).

A lipid profile showed total cholesterol 226, high-density lipoprotein 42, very low-density lipoprotein (VLDL) 119, and low-density lipoprotein (LDL) 65, while the patient was taking 80 mg atorvastatin (Lipitor®) daily. Thyroid and liver function tests and electrolytes were normal. This clinical data suggested the diagnosis of Friedrichson's Type III hyperlipoproteinemia, which was confirmed by SDS-gel electrophoresis that documented the E2/2 phenotype of apolipoprotein E (Apo E).

This rare familial disorder was first identified by Gofman in 1952 and is associated with premature atherosclerosis, CAD, and peripheral vascular disease. The physical signs of xanthoma striata palmaris, tuberoeruptive xanthoma, and tendinous xanthomas are pathognomonic.

FIG. 2 Tuberoeruptive xanthomas on (A) elbows and (B) knees.

The pathogenesis of Type III hyperlipoproteinemia is closely related to mutations of Apo E gene. Apo E is a constituent of several lipoproteins and occurs in VLDL, chylomicrons, and chylomicron remnants. The E2/2 phenotype is the rarest polymorphism, with incidence of fewer than 1 to 5 individuals per 5,000 of the normal population. This atherogenic state is due to the fact that Apo E2 has defective binding capacity for the LDL receptor, hence has impaired lipoprotein clearance.

Among Apo E2 homozygotes, men are more susceptible than women for atherosclerosis. Estrogen affects LDL-receptor expression and is hypothesized to explain the preponderance of the disease in men. Present recommendations are to treat this disorder with niacin and statin therapy.

This case illustrates this rare and frequently overlooked cause of premature atherosclerosis.

Reference

Davignon J, Genest J Jr: Genetics of lipoprotein disorders. *Endocrinol Metab Clin North Am* 1998;27(3):521-550