LDL apheresis in a woman with severe heterozygous familial hypercholesterolemia. Late, but not too late

Agnieszka Mickiewicz[1], Marcin Fijałkowski[1], Andrzej Rynkiewicz[1], Grzegorz Raczak[2], Marcin Gruchała[1]

[1]First Department of Cardiology, Medical University of Gdansk, Gdansk, Poland
[2]Department of Electrocardiology, Medical University of Gdansk, Gdansk, Poland

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Corresponding author:
Agnieszka Mickiewicz
First Department
of Cardiology
Medical University of Gdansk
7 Debinki St
80-952 Gdansk, Poland
Phone: +48 502 639 051
Fax: +48 346 12 01
E-mail:
amickiewicz@gumed.edu.pl

Familial hypercholesterolemia (FH) is an under-recognized and undertreated common lipid metabolism disorder [1, 2]. Early and intensive treatment reduces consequent mortality from coronary heart disease [3, 4]. A promising tool for retarding or arresting the atherosclerotic process in hypercholesterolemic patients refractory to maximally tolerated pharmacotherapy is LDL apheresis [5, 6].

We present the case of a 44-year-old woman with FH, who was admitted to our hospital with myocardial infarction of the anterior wall. She was diagnosed with heterozygous familial hypercholesterolaemia at the age of 41, based on clinical criteria of the Dutch Lipid Network-WHO. The diagnosis was established as "definite" FH equal to premature coronary artery disease (CAD) and high LDL cholesterol concentrations before lipid-lowering treatment (417 mg/dl). DNA analysis also confirmed a mutation in exon 8 of the LDL receptor gene (p.G373).

Her medical history from the last three years prior to admission documented that she had recurrent acute coronary syndromes. Most of these were cased by stent thrombosis (5 ST-elevation myocardial infarction (STEMI), 2 non-ST-elevation myocardial infarction (NSTEMI) and 2 cases of unstable angina).

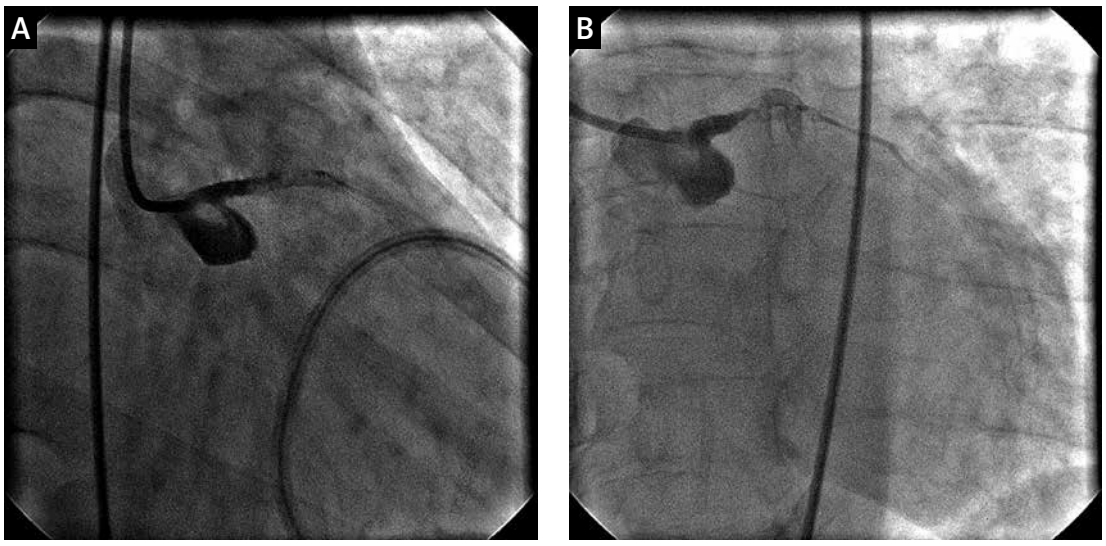

Figure 1. Coronary angiography: left main coronary artery occluded by stent thrombosis

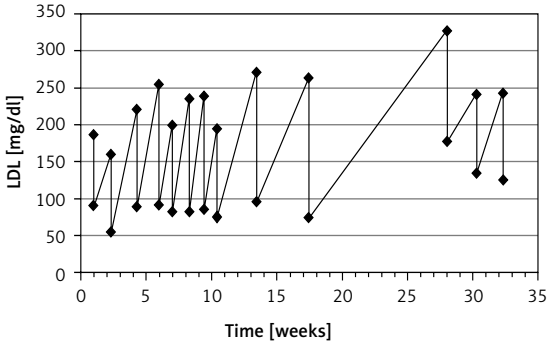

Figure 2. LDL-C concentrations before and after apheresis sessions

The coronary angiography at admission revealed a stent thrombosis in the left main coronary artery and a successful thrombectomy and balloon angioplasty was performed (Figure 1 A–B). Nevertheless, the patient developed cardiogenic shock followed by chronic heart failure with low left ventricular ejection fraction (23%). Based on additional laboratory tests, resistance to aspirin was diagnosed. A treatment using acetylsalicylic acid in high doses (300 mg daily), ticlopidine, bisoprolol, ramipril, spironolactone, furosemide, ezetimibe and rosuvastatin was prescribed. Despite maximal doses of rosuvastatin 40 mg/day and ezetimibe 10 mg/day, the lowest observed LDL-C level was 181 mg/dl. Systematic weekly/biweekly cascade lipoprotein filtration was started. The treatment was well tolerated and the only side effects observed were hypocalcemia and mild hypotension.

The average LDL-C levels before and after treatment were 233 ±43 mg/dl and 96.92 ±31.8 mg/dl respectively (Figure 2). The mean acute LDL-C reduction of all apheresis sessions was 58.73 ±8.71%. Cascade filtration also decreases the level of the clotting factor fibrinogen resulting in a reduction of thrombosis risk. During the last ten months of LDL apheresis therapy, no clinical or angiographic progression of coronary artery disease was noted.

The most important factors determining the clinical course of FH are early initiation of treatment and a low interval mean LDL cholesterol concentration. In the described case, earlier LDL apheresis treatment could have prevented the major cardiovascular events leading to congestive heart failure. Fortunately it was not too late for this patient, because acute coronary syndrome was no longer observed after initiation of LDL apheresis treatment. We conclude that it was due to reduction of the clotting factor fibrinogen and thrombosis risk. Only selected methods of apheresis, such as the described cascade filtration, are able to remove fibrinogen.

In conclusion, our report supports the view that long-term reductions of LDL cholesterol and fibrinogen concentrations together with the pleiotropic effects significantly reduce cardiovascular risk and improve the quality of life of those with FH [6, 7]. LDL apheresis remains an underutilized option for FH patients with an uncontrolled high LDL-C level [5].

Conflict of interest

The authors declare no conflict of interest.

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