

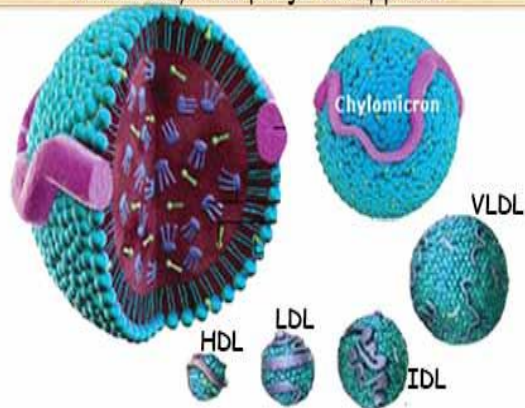
# Apheresis as novel treatment for refractory angina with raised lipoprotein(a): A Randomized Controlled Trial

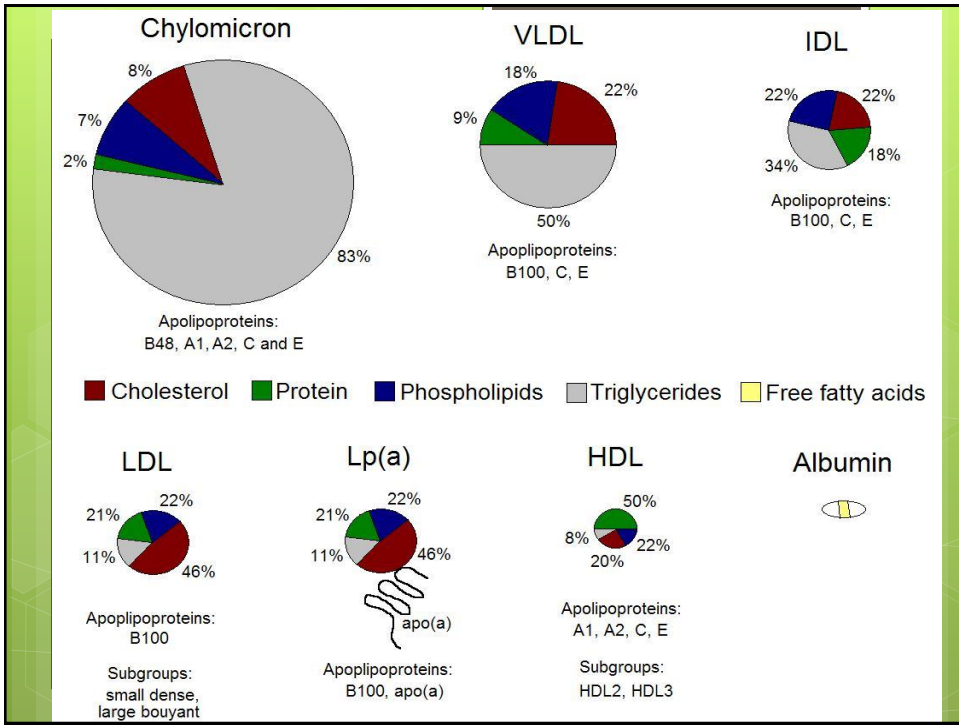
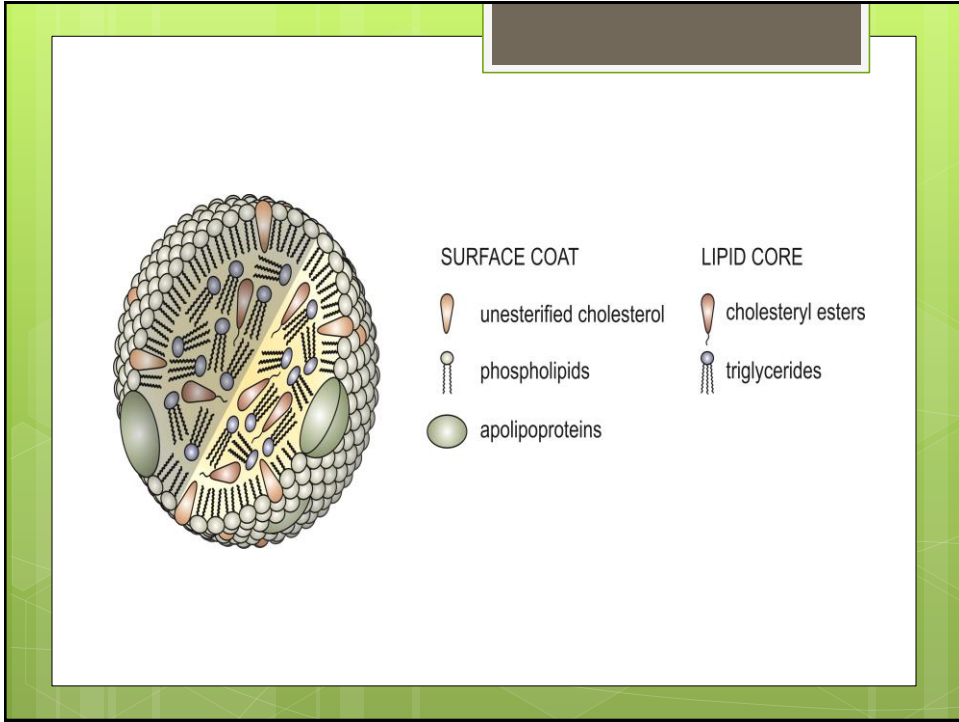
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## Lipoprotein (Chylomicron, VLDL, IDL, LDL & HDL)

Blood is watery, & cholesterol is fatty. To transport cholesterol in the bloodstream, it needs to carry in small packages called lipoproteins.





## Lp(a)

- More atherogenic
- Impair the endothelial function
- Thrombo-genic
- Essentially resistant to conventional lipid-lowering treatment with statins !!!

## Overview

- Lipoprotein apheresis, a therapy normally used to filter excess cholesterol from the blood of patients with familial hypercholesterolemia, may have a new role in patients with refractory angina.
- New results reported during a Hot Line session at ESC Congress 2016 showed the extracorporeal treatment resulted in significant improvements compared to sham therapy in patients who had refractory angina along with raised levels of lipoprotein(a).

## Background

- Refractory Angina is challenging to manage and novel therapeutic options are needed.
- Raised lipoprotein(a) [Lp(a)] is an independent cardiovascular risk factor that can be effectively reduced by lipoprotein apheresis.
- Raised Lp(a) may be prevalent in Refractory Angina.
- To date there is no randomized controlled data assessing the clinical benefit of lipoprotein apheresis in patients with refractory angina and raised lipoprotein(a).

## Purpose

- To determine the effect of LA on quantitative myocardial perfusion, carotid atheroma, exercise capacity, angina symptoms and quality of life (QoL) in patients with refractory angina and raised Lp(a) >500mg/L.

## Methods

- An RCT with cross-over design in 20 patients with refractory angina and Lp(a) > 500mg/L and LDL <4mmol/L, randomised to 3 months of blinded weekly lipoprotein apheresis or sham, followed by crossover.

## Primary endpoint

- Was change in quantitative myocardial perfusion reserve (MPR) by cardiovascular magnetic resonance (CMR).

## Secondary endpoints

- included measurement of carotid atheroma burden by CMR, exercise capacity, angina symptoms and quality of life.

- Participants were randomised to weekly lipoprotein apheresis or sham treatments for 3 months and then crossed over for another 3 months .

## Results

- Primary endpoint: MPR increased by 0.47 [95% CI, 0.31 to 0.63] from  $1.45 \pm 0.36$  to  $1.93 \pm 0.45$  following apheresis, but decreased during sham by  $-0.16$  [95% CI,  $-0.33$  to  $0.02$ ] from  $1.63 \pm 0.43$  to  $1.47 \pm 0.30$ ; yielding a net treatment increase of 0.63 [95% CI 0.37 to 0.89;  $p < 0.001$  between groups].

## Secondary endpoints

- Significant improvements in exercise capacity, angina symptoms, quality of life and atheroma burden

- SAQ treatment satisfaction score improved slightly by 6.25 during apheresis vs 0.0 or no change during sham.
- Similarly, physical component scores of quality of life assessed by the Short Form (SF)-36 Questionnaire also improved significantly after apheresis but not sham.

## Conclusions

- In patients with refractory angina and raised Lp(a), apheresis leads to statistically significant benefits in
  - myocardial perfusion,
  - carotid atheroma,
  - exercise capacity,
  - angina symptoms and • quality of life



