

# The role of lipids in patients with acute coronary syndrome: where is the truth?

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The scientific literature review about the role of the lipids level for the acute coronary syndrome development is given in the article.

**Key words:** coronary artery disease, acute coronary syndrome, lipids, cholesterol, cardiovascular risk factors.

Cardiovascular disease (CVD) is the leading cause of morbidity, disability and mortality among the adult population of Ukraine. CVD affects both men and women; of all deaths that occur before the age of 75 years in Europe, 42% are due to CVD in women and 38% in men. The main part to the structure of CVD contributes coronary heart disease (CHD).

CVD mortality is changing, with declining age-standardized rates in most European countries, which remain high in Eastern Europe. According to the results of the MONICA (the Multinational MONItoring of trends and determinants in Cardiovascular disease), the project observed annual decline in mortality from CHD by 4%, and in some countries (Australia, Sweden, Finland) the figure is even higher and amounts 7–8%. Unfortunately, in Ukraine the mortality rate from this pathology remains high and in 66.8% determines the level of total CVD mortality.

One of the most significant forms of coronary artery disease is acute coronary syndrome (ACS). This syndrome is abroad term that includes unstable angina (UA), non-ST-elevation myocardial infarction (NSTEMI) and ST elevation myocardial infarction (STEMI).

The most common modified risk factors associated with the development of atherosclerosis and risk of ACS include hyperlipidemia, hypertension, diabetes mellitus and metabolic syndrome.

The particular attention of scientists attracts hyperlipidemia. The first accurate information about high total cholesterol levels as a factor that leads to the development of CHD obtained in population studies in Framingham. The study was found that the high concentration of the total cholesterol in the blood occurs 4 times more often than low concentration in patients with CHD.

Combination of hypercholesterolemia with smoking, obesity, hypertension, diabetes mellitus and age is a major predictor of atherosclerosis and its complications. The prognostic significance of hypercholesterolemia was confirmed by multicenter studies, such as MRFIT (Multiple Risk Factor Intervention Trial) and Seven Countries Study. Large populations have shown growth in absolute and relative characteristics of CHD mortality in direct proportion to the level of total cholesterol.

Most of the cholesterol in blood plasma is normally carried in LDLs and, over a wide range of cholesterol concentrations, there is a strong and graded positive association between total as well as LDL cholesterol and risk of CVD. Recent studies have shown that variety other lipid spectrum disorders are also risk factors of CHD and atherosclerosis, such as hypertriglyceridemia and low HDL-cholesterol in the plasma.

However, many investigations all over the world proved that from 35% to 78.5% CVD cases arise on a background of normal total cholesterol levels.

The TARGET study was a multicenter, observational study that aimed to evaluate the epidemiological characteristics, man-

agement pattern and outcome of ACS patients in Greece. According to results of this study a diagnosis of STEMI was documented in 44.7% of cases, NSTEMI in 34.2% and UA in 21.1%. In the subgroup of ACS patients without prior CAD or CAD risk equivalents (48.6% of the total study population), 27.0% were considered to be of low risk, 41.3% of intermediate risk and only 31.8% were classified as the high or very high risk category based on the Framingham point score system. Dyslipidemia was present in 57.4% of all ACS cases.

Another study that had the aim to evaluate the lipid profile of patients admitted with acute coronary syndrome in Toledo (Spain) city hospital between 2005 and 2008 showed that the majority of patients admitted with first episode of acute coronary syndrome had a normal lipid profile according to current guidelines but only 10% of patients with recurrent acute coronary syndrome presented optimal LDL-cholesterol and HDL-cholesterol levels. The first cardiovascular event was present in 76.3% of cases, the majority of patients were men (72.4%).

Although ACS mainly occurs in patients older than 45, young men or women can develop ACS. The Swiss investigation was conducted to determine the rate of occurrence, clinical and angiographic characteristics and long-term clinical outcome of ACS in young patients from 1994 to 2010. A total of 27 young patients with ACS aged <30 years were admitted during the study period. Mean patient age was 26.8±3.5 years and 22 patients (81%) were men. Current smoking (81%), dyslipidemia (59%) and positive family history (44%) were the most frequently encountered risk factors. Typical chest pain occurred in 23 patients (85%), syncope in 3 patients (11%) and isolated dyspnea in 2 patients (7%). ST-elevation myocardial infarction (STEMI) was present in 18 patients (67%) and cardiogenic shock in 2 patients (7%). Initial mean left ventricular ejection fraction was 48%±11%.

The ERICO study (Strategy of Registry of Acute Coronary Syndrome), which was performed at a secondary general hospital in Sao Paulo, Brazil, enrolled consecutive acute coronary syndrome patients who were 35 years old or older. The sociodemographic information, medical assessments, treatment data and blood samples were collected at admission. After 30 days, the medical history was updated, and additional blood and urinary samples were collected. In addition, a retinography, carotid intima-media thickness, heart rate variability and pulse-wave velocity have been performed. Questionnaires about habitual eating, physical activity, sleep apnea and depression were also applied. At six months and annually after an acute event, information was collected by telephone. As a result, 738 patients with a diagnosis of acute coronary syndrome were enrolled. Of these, 208 (28.2%) had STEMI, 288 (39.0%) had NSTEMI and 242 (32.8%) had UA. The mean age of the patients was 62.7 years, 58.5% were men and 77.4% had 8 years or less of education. The most common cardiovascular risk factors were hypertension (76%) and sedentary life style (73.4%). Only 29.2% had a prior history of coronary heart disease. Compared with the ST-elevation myocardial infarction subgroup, the unstable angina and non-ST-elevation myocardial infarction patients had higher frequencies of hypertension, diabetes, prior coronary heart disease and dyslipidemia. Smoking was more frequent in the ST-elevation myocardial infarction patients.

The PANDORA study was a cross-sectional study conducted in 6 European countries. The study required a single visit in which males aged  $\geq 45$  or females  $\geq 55$  years, with at least 1 additional risk factor, but no overt CV disease or diabetes. Data on patient demographics, vital signs, CV risk factors, lipid levels and current treatment were recorded. Eight hundred forty subjects (789 evaluable) were enrolled. Age was  $62.1 \pm 9.1$  years and body-mass index  $29.6 \pm 4.3$  kg/m<sup>2</sup>; 61.2% of the subjects were male, 47% were smokers, and 73.5% hypertensive. Dyslipidemia was present in 75.92% of cases.

The aim of the study conducted at the Department of Internal Medicine №2 Danylo Halytsky Lviv National Medical University was to investigate the frequency of low total cholesterol level in patients with ACS and to study the peculiarities of ACS in patients with low total cholesterol. It showed that normal and reduced cholesterol determined in 76% of patients with unstable angina, 81% of acute myocardial infarction and 85% of fatal ACS. Also the frequency of low total cholesterol was higher in those who had harder course of ACS.

**Роль липидов в развитии острого коронарного синдрома: где истина?**  
**Л.В. Химион, В.В. Ватага**

В статье приведен обзор современных научных данных о роли липидов в развитии острого коронарного синдрома.

**Ключевые слова:** ишемическая болезнь сердца, острый коронарный синдром, липиды, холестерин, факторы сердечно-сосудистого риска.

Researchers from different countries are interested in the investigation of ACS occurrence in patients with no clinical signs of atherosclerosis without atherosclerotic plaque damage and sometimes even with intact coronary vessels which was confirmed by Ukrainian scientists according to the protocols of autopsies patients died from ACS under age of 50 years.

Also we know that at the age under 50 years acute myocardial infarction as a rule is the first manifestation of coronary artery disease, that develops suddenly, without prior history of coronary artery disease, and in most cases is transmural.

Recently many studies demonstrated that hyper- and dyslipidemia can cause itself or in combination with other risk factors the manifestation of atherosclerotic process. Nevertheless, the level of total cholesterol and other lipid fractions in patients with ACS has significant differences according to researchers and need further investigation. So, special attention should be given to investigation of ACS risk factors in patients without dyslipidemia, which can improve the primary cardiovascular prevention programs.

**Роль ліпідів у розвитку гострого коронарного синдрому: де істина?**  
**Л.В. Хіміон, В.В. Ватага**

У статті наведено огляд сучасних наукових даних щодо ролі ліпідів у виникненні гострого коронарного синдрому.

**Ключові слова:** ішемічна хвороба серця, гострий коронарний синдром, ліпідів, холестерин, фактори серцево-судинного ризику.

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Статья поступила в редакцию 11.11.2014

НОВОСТИ МЕДИЦИНЫ

**ЧЕМ ОПАСНА ДЕТСКАЯ ДЕПРЕССИЯ**

Дети, которым поставили диагноз "депрессия" ещё в дошкольном возрасте, через несколько лет имеют меньшую, чем у других, инсулу (островок) - участок мозга, отвечающий за эмоции.

Чувство вины, если оно возникает у ребёнка, считается скорее плюсом: от обычных детей извинений не дождёшься. Однако исследователи из Вашингтонского университета показали, что у тех, кто в возрасте от 3 до 6 лет страдал от патологического чувства вины, позже уменьшена одна из областей мозга - инсула. Эта структура есть в обоих полушариях и отвечает за проявление

эмоций. В предыдущих работах выяснили, что у взрослых, страдающих депрессией, размер инсулы тоже скромный по сравнению со здоровыми сверстниками.

В работе, длившейся несколько лет, принимали участие 129 детей. У 47 из них в возрасте от 3 до 6 выявили признаки клинической депрессии. Больше половины из них страдало патологическим чувством вины: например, заходя в комнату с разбитой кем-то лампочкой, они начинали извиняться. Те 82 ребёнка, у которых депрессии не было, реже демонстрировали излишнюю вину: в 20% случаев. Когда участни-

кам исполнилось 7 лет, им стали каждые полтора года проводить МРТ-сканирование вплоть до 13-летнего возраста. Оно-то и выявило аномально маленький размер инсулы у бывших дошкольников с депрессией. Кстати, само заболевание чаще всего не исчезало полностью, и эпизоды депрессии случались не один раз.

Итак, патологическое чувство вины, проявление клинической депрессии и снижение размера инсулы связаны. Пока остается не до конца изученным, что здесь причина, а что следствие.

Источник: <http://health.unian.net>