Lipids:
Apolipoprotein A-1
Apolipoprotein A-II
Apolipoprotein B
Apolipoprotein C-II
Apolipoprotein C-III
Apolipoprotein E
Cholesterol
Direct HDL Cholesterol
Direct LDL Cholesterol
Lipoprotein (a)
sLDL
Triglycerides
Abstract 1


Use of a reference material proposed by the International Federation of Clinical Chemistry and Laboratory Medicine to evaluate analytical methods for the determination of plasma lipoprotein(a).


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BACKGROUND

As part of the NIH/National Heart, Lung and Blood Institute Contract for the Standardization of Lipoprotein(a) [Lp(a)] Measurements, a study was performed in collaboration with the IFCC Working Group for the Standardization of Lp(a) Assays. The aims of the study, performed with the participation of 16 manufacturers and six research laboratories, were to evaluate the IFCC proposed reference material (PRM) for its ability to transfer an accuracy-based value to the immunoassay calibrators and to assess concordance in results among different methods.

METHODS

Two different purified Lp(a) preparations with protein mass concentrations determined by amino acid analysis were used to calibrate the reference method. A Lp(a) value of 107nmol/L was assigned to PRM. After uniformity of calibration was demonstrated in the 22 evaluated systems, Lp(a) was measured on 30 fresh-frozen sera covering a wide range of Lp(a) values and apolipoprotein(a) [apo(a)] sizes.

RESULTS

The among-laboratory CVs for these samples (6-31%) were, in general, higher than those obtained for PRM (2.8%) and the quality-control samples (14%, 12%, and 9%, respectively), reflecting the broad range of apo(a) sizes in the 30 samples and the sensitivity of most methods to apo(a) size heterogeneity. Thus, although all of the assays were uniformly calibrated through the use of PRM, no uniformity in results was achieved for the isoform-sensitive methods.

CONCLUSION

Linear regression analyses indicated that to various degrees, apo(a) size heterogeneity affects the outcome of the immunochemical methods used to measure Lp(a). We have also shown that the inaccuracy of Lp(a) values determined by methods sensitive to apo(a) size significantly affects the assessment of individual risk status for coronary artery disease.
OBJECTIVE
To determine serum levels of lipoprotein(a) and lipid profile of a group of individuals submitted to coronary angiography, with the aim of establishing the possible correlation between these parameters and the severity of coronary artery disease.

METHODS AND RESULTS
Serum levels of total cholesterol, HDLC, LDLC, triglycerides, lipoprotein(a), apolipoproteins A-I and B were measured in blood samples of 17 subjects with absence of atheromatosis in the coronary arteries (control), 12 subjects presenting mild/moderate atheromatosis and 28 subjects presenting severe atheromatosis.

No significant statistical differences were found between the means of the three groups for the parameters assessed, except for lipoprotein(a) serum levels which presented significant differences between the means of the control, mild/moderate atheromatosis and severe atheromatosis groups (p<0.001).

CONCLUSION
The means obtained in the three groups for Lp(a) indicate a progressive increase in the serum levels of this parameter according to the severity of coronary atheromatosis. These findings suggest the need of additional studies in order to obtain enough evidence to support the introduction of routine assessment of Lp(a) levels in clinical laboratories in the monitoring of patients at risk for coronary artery disease (CAD).

Abstract 2
Increased serum levels of lipoprotein(a) correlated with the severity of coronary heart disease in patients submitted to angiography.

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BACKGROUND
Low-density lipoprotein (LDL) that contains Apolipoprotein (Apo) C-III makes up only 10% to 20% of plasma LDL but has a markedly altered metabolism and proatherogenic effects on vascular cells.

METHODS AND RESULTS
We examined the association between plasma LDL with ApoC-III and coronary heart disease in 320 women and 419 men initially free of cardiovascular disease who developed a fatal or nonfatal myocardial infarction during 10 to 14 years of follow-up and matched controls who remained free of coronary heart disease. Concentrations of LDL with ApoC-III (measured as ApoB in this fraction) were associated with risk of coronary heart disease in multivariable analysis that included the ratio of total cholesterol to high-density lipoprotein cholesterol, LDL cholesterol, ApoB, triglycerides, or high-density lipoprotein cholesterol and other risk factors. In all models, the relative risks for the top versus bottom quintile of LDL with ApoC-III were greater than those for LDL without ApoC-III. When included in the same multivariable-adjusted model, the risk associated with LDL with ApoC-III (relative risk for top versus bottom quintile, 2.38; 95% confidence interval, 1.54-3.68; p for trend <0.001) was significantly greater than that associated with LDL without ApoC-III (relative risk for top versus bottom quintile, 1.25; 95% confidence interval, 0.76-2.05; p for trend=0.97; p for interaction <0.001). This divergence in association with coronary heart disease persisted even after adjustment for plasma triglycerides.

CONCLUSION
The risk of coronary heart disease contributed by LDL appeared to result to a large extent from LDL that contains ApoC-III.
BACKGROUND
Coronary artery disease (CAD) is a leading cause of morbidity and mortality in the developed world and is rapidly assuming epidemic proportions in developing countries including India. This has led to extensive research to determine the risk factors unique to this group which may predispose to the elevated risk of this disease. Important amongst them are lipoproteins, homocysteine, lipoprotein(a), pro-inflammatory cytokines etc. The following study was undertaken to evaluate the role of the apolipoprotein-B100 (apo-B)/apolipoprotein-AI (apo-AI) ratio as a predictor of CAD risk in the atherosclerosis-prone Indian population, as compared to other conventional lipid ratios.

METHODS
The study group comprised 100 clinically assessed patients with acute myocardial infarction (AMI) diagnosed on electrocardiographic and biochemical criteria and 100 age-matched healthy control subjects. Apo-B and apo-AI levels were estimated by the immunoturbidimetric method, using kits from Randox, UK. Lipid profile was determined using standard enzymatic methods. The exponential regression coefficient beta was calculated for total cholesterol/high-density lipoprotein cholesterol (TC/HDL), TC-HDL/HDL, low-density lipoprotein (LDL) cholesterol/HDL and apo-B/apo-AI ratios.

RESULTS
The TC/HDL ratio was 5.15 +/- 1.7 and 3.45 +/- 0.87 in patients with AMI and control subjects, respectively (p < 0.001). The TC-HDL/HDL ratio was 4.61 +/- 2.6 and 2.22 +/- 1.14 in the patients with AMI and the control subjects (p <0.001). The LDL/HDL ratio was 3.32 +/- 1.5 in the AMI patients and 1.84 +/- 0.78 in the control subjects (p <0.001); whilst the apo-B/apo-AI ratio in the patients with AMI was 0.96 +/- 0.30 and 0.71 +/- 0.20 in the control subjects (p <0.001). The exponential value of the regression coefficient beta (Exp [beta]) for apo-B/apo-AI ratio was 111.9, as compared to 4.4 for the LDL/HDL ratio, 3.5 for the TC/HDL ratio and 2.2 for the TC-HDL/HDL ratio, though all the lipid ratios were significantly higher in cases than in control subjects.

CONCLUSION
Our findings suggest that the apo-B/apo-AI ratio is a better discriminator of CAD risk in the atherosclerosis-prone Indian population, than any of the conventional lipid ratios. The reduction of value of the apo-B/apo-AI ratio may drastically decrease the risk for CAD. Hence, the apo-B/apo-AI ratio may be suggested as an alternative to other lipid ratios for risk assessment in patients with CAD.

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Abstract 5
Small dense LDL cholesterol is a robust therapeutic marker of statin treatment in patients with acute coronary syndrome and metabolic syndrome.

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BACKGROUND
Small dense low-density lipoprotein (sd-LDL) is an atherogenic LDL subfraction and often increased in metabolic syndrome (MetS). This study aimed to determine whether sd-LDL cholesterol (sd-LDL-C) is a therapeutic marker of statin treatment in patients with acute coronary syndrome (ACS) and MetS.

METHODS
We examined 71 patients with ACS and 50 non-ACS subjects with normal coronary arteries (controls). The patients with ACS were treated with life-style modifications (n=36) or those plus 20mg atorvastatin daily (n=35) for six months. We measured sd-LDL-C by a novel detergent-based homogenous assay and calculated buoyant LDL-C (b-LDL-C).

RESULTS
The patients with ACS had higher sd-LDL-C than the controls (30±14 vs. 22±8 mg/dl, p<0.001). Furthermore, sd-LDL-C was higher in the patients with ACS and MetS (n=31) than in those without MetS (n=40) (35±17 vs. 27±11 mg/dl, p<0.05). Atorvastatin reduced LDL-C and sd-LDL-C by 31% (102±23 to 70±28 mg/dl, p<0.0001) and 24% (29±15 to 22±13 mg/dl, p<0.01). The reduction in sd-LDL-C by atorvastatin was 5.5-fold greater in the patients with ACS and MetS than in those without MetS (p<0.001). Contrary, that in b LDL-C was similar between the groups.

CONCLUSION
sd-LDL-C is a superior therapeutic marker of statin treatment in patients with ACS and MetS.
Abstract 6
A rice bran diet improves lipid abnormalities and suppress hyperinsulinemic responses in rats with streptozotocin/nicotinamide-induced type 2 diabetes.

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AIM
The aim of this study was to determine the effects of rice bran oil (RBO) on lipid metabolism and insulin resistance in rats with streptozotocin/nicotinamide-induced type 2 diabetes mellitus (T2DM).

METHODS AND RESULTS
Rats were divided into two groups: the control group (15% soybean oil, contains 0g gamma-oryzanol and 0g gamma-tocotrienol/150g oil for five weeks) and the RBO group (15% RBO, contains 5.25g gamma-oryzanol and 0.9g gamma-tocotrienol/150g oil for five weeks). Compared with the control group, the RBO group had a lower plasma nonesterified fatty acid concentration, ratio of total to high-density-lipoprotein cholesterol, hepatic cholesterol concentration, and area under the curve for insulin. The RBO group had a higher high-density-lipoprotein cholesterol concentration and greater excretion of fecal neutral sterols and bile acid than did the control group.

CONCLUSION
RBO may improve lipid abnormalities, reduce the atherogenic index, and suppress the hyperinsulinemic response in rats with streptozotocin/nicotinamide-induced T2DM. In addition, RBO can lead to increased fecal neutral sterol and bile acid excretion.
Abstract 7


Prevalence and projections of diabetes and pre-diabetes in adults in Sri Lanka - Sri Lanka Diabetes, Cardiovascular Study (SLDCS).

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AIM
To determine the prevalence of diabetes mellitus and pre-diabetes (impaired fasting glucose and impaired glucose tolerance) in adults in Sri Lanka. Projections for the year 2030 and factors associated with diabetes and pre-diabetes are also presented.

METHODS AND RESULTS
This cross-sectional study was conducted between 2005 and 2006. A nationally representative sample of 5000 adults aged ≥18 years was selected by a multi-stage random cluster sampling technique. Fasting plasma glucose was tested in all participants and a 75-g oral glucose tolerance test was performed in non-diabetic subjects. Prevalence was estimated for those ≥20 years of age.

Response rate was 91% (n = 4532), males 40%, age 46.1 ± 15.1 years (mean ± standard deviation). The age-sex standardized prevalence (95% confidence interval) of diabetes for Sri Lankans aged ≥20 years was 10.3% (9.4-11.2%) [males 9.8% (8.4-11.2%), females 10.9% (9.7-12.1%), p = 0.129]. Thirty-six per cent (31.9-40.1%) of all diabetic subjects were previously undiagnosed. Diabetes prevalence was higher in the urban population compared with rural [16.4% (13.8-19.0%) vs. 8.7% (7.8-9.6%; p < 0.001]. The prevalence of overall, urban and rural pre-diabetes was 11.5% (10.5-12.5%), 13.6% (11.2-16.0%) and 11.0% (10.0-12.0%), respectively. Overall, 21.8% (20.5-23.1%) had some form of dysglycaemia. The projected diabetes prevalence for the year 2030 is 13.9%.

CONCLUSION
Those with diabetes and pre-diabetes compared with normal glucose tolerance were older, physically inactive, frequently lived in urban areas and had a family history of diabetes. They had higher body mass index, waist circumference, waist-hip ratio, systolic/diastolic blood pressure, low-density lipoprotein cholesterol and triglycerides. Insulin was prescribed to 4.4% (2.7-6.1%) of all diabetic subjects. One in five adults in Sri Lanka has either diabetes or pre-diabetes and one-third of those with diabetes are undiagnosed.
BACKGROUND
The metabolic syndrome (MetS) is a cluster of metabolic abnormalities comprising visceral obesity, dyslipidaemia and insulin resistance (IR). With the onset of IR, the expression of lipoprotein lipase (LPL), a key regulator of lipoprotein metabolism, is reduced. Increased activation of glucocorticoid receptors results in MetS symptoms and is thus speculated to have a role in the pathophysiology of the MetS. Glycyrrhizic acid (GA), the bioactive constituent of licorice roots (Glycyrrhiza glabra) inhibits 11 beta-hydroxysteroid dehydrogenase type 1 that catalyzes the activation of glucocorticoids. Thus, oral administration of GA is postulated to ameliorate the MetS.

RESULTS
In this study, daily oral administration of 50mg/kg of GA for one week led to significant increase in LPL expression in the quadriceps femoris (p < 0.05) but non-significant increase in the abdominal muscle, kidney, liver, heart and the subcutaneous and visceral adipose tissues (p > 0.05) of the GA-treated rats compared to the control. Decrease in adipocyte size (p > 0.05) in both the visceral and subcutaneous adipose tissue depots accompanies such selective induction of LPL expression. Consistent improvement in serum lipid parameters was also observed, with decrease in serum free fatty acid, triacylglycerol, total cholesterol and LDL-cholesterol but elevated HDL-cholesterol (p > 0.05). Histological analysis using tissue lipid staining with Oil Red O showed significant decrease in lipid deposition in the abdominal muscle and quadriceps femoris (p < 0.05) but non-significant decrease in the heart, kidney and liver (p > 0.05).

CONCLUSION
Results from this study may imply that GA could counteract the development of visceral obesity and improve dyslipidaemia via selective induction of tissue LPL expression and a positive shift in serum lipid parameters respectively, and retard the development of IR associated with tissue steatosis.
BACKGROUND
The metabolic syndrome, known also as the insulin resistance syndrome, refers to the clustering of several risk factors for atherosclerotic cardiovascular disease. Dyslipidaemia is a hallmark of the syndrome and is associated with a whole body reduction in the activity of lipoprotein lipase (LPL), an enzyme under the regulation of the class of nuclear receptors known as peroxisome proliferator-activated receptor (PPAR). Glycyrrhizic acid (GA), a triterpenoid saponin, is the primary bioactive constituent of the roots of the shrub Glycyrrhiza glabra. Studies have indicated that triterpenoids could act as PPAR agonists and GA is therefore postulated to restore LPL expression in the insulin resistant state.

RESULTS
Oral administration of 100 mg/kg of GA to high-fat diet-induced obese rats for 28 days led to significant reduction in blood glucose concentration and improvement in insulin sensitivity as indicated by the homeostasis model assessment of insulin resistance (HOMA-IR) (p < 0.05). LPL expression was up-regulated in the kidney, heart, quadriceps femoris, abdominal muscle and the visceral and subcutaneous adipose tissues but down-regulated in the liver, a condition in reverse to that seen in high-fat diet-induced obese rats without GA. With regard to lipid metabolism, GA administration led to significant hypotriglyceridemic and HDL-raising effects (p < 0.05), with a consistent reduction in serum free fatty acid, total cholesterol and LDL cholesterol and significant decrease in tissue lipid deposition across all studied tissue (p < 0.01).

CONCLUSION
In conclusion, GA may be a potential compound in improving dyslipidaemia by selectively inducing LPL expression in non-hepatic tissues. Such up-regulation was accompanied by a GA-mediated improvement in insulin sensitivity, which may be associated with a decrease in tissue lipid deposition. The HDL-raising effect of GA suggests the antiatherosclerotic properties of GA.
OBJECTIVE
Age-related macular degeneration (AMD) is one of the leading causes of visual loss among people aged 65 and older. At present the origin of AMD still remains unknown. The objective was to evaluate the chosen lipid and lipoprotein concentrations in blood of patients with AMD.

METHODS AND RESULTS
Sixty women aged 55-71 (mean age 65.1 +/- 5.7) were treated in the outpatient ophthalmological clinic for more than two years because of AMD. We evaluated total serum cholesterol (TCH), triglycerides (TG), HDL-cholesterol (HDL), LDL-cholesterol (LDL), lipoprotein (a) (Lp(a)), apolipoprotein AI (Apo AI) and apolipoprotein B (Apo B) by direct spectrophotometry (Randox standard kits, USA). We found a significant increase of TCH, LDL and TG (224.36 +/- 41.67 mg/dl, 159.02 +/- 39.66 mg/dl and 120.92 +/- 42.64 mg/dl), and a significant decrease of HDL (38.68 +/- 6.36 mg/dl) in the AMD patients when compared with the control group.

CONCLUSION
We have not found a significant difference in the average TG level between the studied groups. The concentration of Apo B was markedly increased (164.66 +/- 46.46 mg/dl) and Apo AI concentration was markedly decreased (128.9 +/- 17.01 mg/dl) in the AMD patients when compared with the control group. There was no significant difference in the concentration of the Lp(a) between the two groups. The results of our present study could point to the fact that changes in the lipid metabolism could be one of the very important risk factors involved in the pathogenesis of AMD.
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