Abstracts

Associations between smoking, components of metabolic syndrome and lipoprotein particle size

The clustering of metabolic and cardiovascular risk factors is known as metabolic syndrome (MetS). The risk of having MetS is strongly associated with increased adiposity and can be further modified by smoking behaviour. Apolipoproteins (apo) associated with low-density lipoprotein-cholesterol (LDL-C) and high-density lipoprotein-cholesterol (HDL-C) may be altered in MetS. This study aimed to examine the association between smoking and the following parameters: MetS and its components, levels of apolipoproteins and estimated lipoprotein particle size, separately for men and women, and in different body mass index (BMI) classes.

Researchers included 24 389 men and 35 078 women aged 18 - 80 years who participated in the LifeLines Cohort Study between December 2006 and January 2012; 5 685 men and 6 989 women were current smokers. Participants were categorised into three different BMI classes (BMI <25; BMI 25 - 30; BMI ≥30 kg/m^2). MetS was defined according to the National Cholesterol Education Program's Adult Treatment Panel III (NCEP:ATPIII) criteria. Blood pressure and anthropometric and lipid measurements were rigorously standardised, and the large sample size enabled a powerful estimate of quantitative changes. The association between smoking and the individual MetS components, and apoA1 and apoB, was tested with linear regression. Logistic regression was used to examine the effect of smoking and daily tobacco smoked on risk of having MetS. All models were age adjusted and stratified by sex and BMI class.

Prevalence of MetS increased with higher BMI levels. A total of 64% of obese men and 42% of obese women had MetS. Current smoking was associated with a higher risk of MetS in both sexes and all BMI classes (odds ratio 1.7 - 2.4 for men, 1.8 - 2.3 for women, all p values <0.001). Current smokers had lower levels of HDL-C and apoA1, higher levels of triglycerides and apoB, and higher waist circumference than non-smokers (all p<0.001). Smoking had no consistent association with blood pressure or fasting blood glucose. In all BMI classes, they found a dose-dependent association of daily tobacco consumption with MetS prevalence as well as with lower levels of HDL-C, higher triglyceride levels and lower ratios of HDL-C/apoA1 and, only in those with a BMI <30, LDL-C/apoB (all p<0.001).

Smoking is associated with an increased prevalence of MetS, independent of sex and BMI class. This increased risk is mainly related to lower HDL-C, and higher triglycerides and waist circumference. In addition, smoking was associated with unfavourable changes in apoA1 and apoB, and in lipoprotein particle size.

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DNA barcoding detects contamination and substitution in North American herbal products

Herbal products available to consumers in the marketplace may be contaminated or substituted with alternative plant species and fillers that are not listed on the labels. According to the World Health Organization, the adulteration of herbal products is a threat to consumer safety. This study aimed to investigate herbal product integrity and authenticity with the goal of protecting consumers from health risks associated with product substitution and contamination.

The researchers used DNA barcoding to conduct a blind test of the authenticity for: (*i*) 44 herbal products representing 12 companies and 30 different species of herbs; and (*ii*) 50 leaf samples collected from 42 herbal species. Their laboratory also assembled the first standard reference material (SRM) herbal barcode library from 100 herbal species of known provenance that were used to identify the unknown herbal products and leaf samples.

The team recovered DNA barcodes from most herbal products (91%) and all leaf samples (100%), with 95% species resolution using a tiered approach (*rbcL* + *ITS2*). Most (59%) of the products tested contained DNA barcodes from plant species not listed on the labels. Although they were able to authenticate almost half (48%) of the products, one-third of these also contained contaminants and/or fillers not listed on the label. Product substitution occurred in 30/44 of the products tested and only 2/12 companies had products without any substitution, contamination or fillers. Some of the contaminants they found pose serious health risks to consumers.

Most of the herbal products tested were of poor quality, including considerable product substitution, contamination and use of fillers. These activities dilute the effectiveness of otherwise useful remedies, lowering the perceived value of all related products because of a lack of consumer confidence in them. The authors suggest that the herbal industry should embrace DNA barcoding for authenticating herbal products through testing of raw materials used in the manufacturing of products. The use of an SRM DNA herbal barcode library for testing bulk materials could provide a method for 'best practices' in the manufacturing of herbal products. This would provide consumers with safe, high-quality herbal products.

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Vitamin D supplementation to prevent osteoporosis inappropriate

A study from New Zealand, published recently in the *Lancet*, suggests that the widespread use of vitamin D for preventing osteoporosis in healthy adults without specific risk factors for vitamin D deficiency is not effective.

The authors point out that recent meta-analyses of vitamin D supplementation without co-administration of calcium have not shown fracture prevention, possibly because of insufficient power or inappropriate doses. It may also be that the intervention was not targeted to deficient populations. However, in spite of this, nearly 50% of adults older than 50 take daily vitamin D supplements. This study investigated whether vitamin D supplementation affects bone mineral density.

In the anlysis, the authors searched Web of Science, Embase, and the Cochrane Database, from inception to 8 July 2012, for trials assessing the effects of vitamin D (D_3 or D_2, but not vitamin D metabolites) on bone mineral density. They included all randomised trials comparing interventions that differed only in vitamin D content, and which included adults (average age >20 years) without other metabolic bone diseases. They pooled data with a random effects meta-analysis with weighted mean differences and 95% confidence intervals (CIs) reported. To assess heterogeneity in results of individual studies, they used Cochran's *Q* statistic and the I^2 statistic. The primary endpoint was the percentage change in bone mineral density from baseline.

Of 3 930 citations identified by the search strategy, 23 studies (mean duration 23.5 months, comprising 4 082 participants, 92% women, average age 59 years) met the inclusion criteria. Nineteen studies had mainly white populations. Mean baseline serum 25-hydroxyvitamin D concentration was less than 50 nmol/l in eight studies (n=1 791). In 10 studies (n=2 294), individuals were given vitamin D doses less than 800 IU per day. Bone mineral density was measured at 1 - 5 sites (lumbar spine, femoral neck, total hip, trochanter, total body, or forearm) in each study, so 70 tests of statistical significance were done across the studies. There were six findings of significant benefit, two of significant detriment, and the rest were non-significant. Only one study showed benefit at more than one site. Results of the meta-analysis showed a small benefit at the femoral neck (weighted mean difference 0.8%, 95% CI 0.2 -1.4) with heterogeneity among trials (I^2=67%, p<0.00027). No effect at any other site was reported, including the total hip. The authors recorded a bias toward positive results at the femoral neck and total hip.

The conclusion is that the continued widespread use of vitamin D supplementation in healthy people in the community is inappropriate.

Reid IR, et al. Lancet, 11 October 2013 (epub ahead of print). [http://dx.doi.org/10.1016/S0140-6736(13)61647-5]

Quantification of harms in cancer screening trials: Literature review

The objective of this review was to assess how often harm is quantified in randomised trials of cancer screening. Two authors independently extracted data on harms from randomised cancer screening trials. Binary outcomes were described as proportions and continuous outcomes with medians and interquartile ranges. For cancer screening previously assessed in a Cochrane review, the authors identified trials from their reference lists and updated the search in CENTRAL. For cancer screening not assessed in a Cochrane review, the authors searched CENTRAL, Medline, and Embase.

Randomised trials that assessed the efficacy of cancer screening for reducing incidence of cancer, cancer specific mortality, and/or all cause mortality were included. Two reviewers independently assessed articles for eligibility. Two reviewers, who were blinded to the identity of the study's authors, assessed whether absolute numbers or incidence rates of outcomes related to harm were provided separately for the screening and control groups. The outcomes were false positive findings, overdiagnosis, negative psychosocial consequences, somatic complications, invasive follow-up procedures, all cause mortality, and withdrawals because of adverse events.

Out of 4 590 articles assessed, 198 (57 trials, 10 screening technologies) matched the inclusion criteria. False positive findings were quantified in two of 57 trials (4%, 95% confidence interval 0% - 12%), overdiagnosis in four (7%, 2 - 18%), negative psychosocial consequences in five (9%, 3% - 20%), somatic complications in 11 (19%, 10 - 32%), use of invasive follow-up procedures in 27 (47%, 34 - 61%), all cause mortality in 34 (60%, 46 - 72%), and withdrawals because of adverse effects in one trial (2%, 0% - 11%). The median percentage of space in the results section that reported harms was 12% (interquartile range 2 - 19%).

Cancer screening trials seldom quantify the harms of screening. Of the 57 cancer screening trials examined, the most important harms of screening — overdiagnosis and false positive findings — were quantified in only 7% and 4%, respectively.

Heleno B, et al. BMJ 2013; 347 [http://dx.doi.org/10.1136/bmj.f5334]