Atherosclerotic Cardiovascular Disease in Chile 2010

In recent years, a rapidly increasing number of studies have focused on the association between metabolic syndrome and several chronic diseases. However, it is difficult to determine a well defined pathogenic relationship, due to the etiological heterogeneity and comorbidities of these diseases. Research efforts are aiming to identify the convergent biological mechanisms that mediate the effects of hyperinsulinemia, hyperglycemia, dyslipidemia, and hypertension. All these conditions define the metabolic syndrome, that increases the risk for several diseases. The knowledge of these biological mechanisms associated with this syndrome will elucidate the pathogenic association between a variety of chronic diseases, including its pathogenic link with cardiovascular diseases and the most common forms of dementia. The development of new therapeutic and preventive strategies for these diseases will be a corollary of this research.

Román D, Pizarro I, Rivera L, Cámara C, Palacios MA, Gómez MM, Solar C. An approach to the arsenic status in cardiovascular tissues of patients with coronary heart disease. Hum Exp Toxicol. 2010 Nov 18. [Epub ahead of print] Bioinorganic and Environmental Analytical Chemistry Laboratory, Chemistry Department, Faculty of Basic Science, University of Antofagasta, Antofagasta, Chile. droman@uantof.cl
Among non-cancer effects of arsenic, cardiovascular diseases have been well documented; however, few are known about the arsenic fate in cardiovascular tissues. We studied the analytic bioinorganic arsenic behaviour in cardiovascular tissues from an arsenic exposure coronary heart disease patient group from Antofagasta-Chile against a small unexposed arsenic coronary heart patient group. Total arsenic concentrations were measured in pieces of cardiovascular tissues of the arsenic-exposed and unexposed coronary heart patient groups by hydride generation atomic absorption spectrometry (HG-AAS); speciation analysis was made by high performance liquid chromatography-inductively coupled plasma-mass spectrometry (HPLC-ICP-MS). Pieces of auricle (AU), mammary artery (MAM), saphenous vein (SAP) and fat residuals (FAT) were considered in this study. The arsenic concentrations in AU and MAM tissues were significantly different between both groups of patients. Also, it was demonstrated that the AU is an ‘As(3+) target tissue.’ Otherwise, linking of the total concentrations of arsenic with conditional variables and variables related to medical geology factors allowed us to infer that the latter are more important for the cardiovascular risk of arsenic exposure in the Antofagasta region. Knowledge of total arsenic and the prevalence of the trivalent ion (As(3+)) in the AU of patients could contribute to understanding the effect of arsenic on cardiovascular diseases.

Passalacqua C, Taucher SC. [Genetic markers in essential hypertension]. Rev Med Chil. 2010 Jun;138(6):767-72. Spanish. Sección de Genética, Departamento de Medicina, Hospital Clínico Unrilrsidad de Chile. cpassalacqua@gmail.com
Essential hypertension (HTA) is a multifactorial disease and in Chile, its prevalence is 33.7%. There is a genetic predisposition to develop hypertension, whose magnitude is approximately 30 to 50%. At present, some factors are known to increase the risk for cardiovascular disease, but widely accepted biomarkers for screening are missing. The first studies that looked for candidate genes have focused on the renin-angiotensin--aldosterone, aducina, adrenoreceptors beta, G protein subunits, G protein signaling regulators, kinases associated with G proteins and Rho kinases. Studies of DNA sequencing search for polymorphisms and variants through single nucleotide polymorphisms, have been used to seek partnerships with complex or multifactorial diseases, like HTA. Examples of these are: components of collagen proteins, genes related to cell myocardial proteins belonging to cytochrome P450
and growth factors, among others. It is still unlikely to count in a near future with a universal marker. Most probably, a series of markers that confer susceptibility to a specific individual will have to be used in prevention programs or personalized therapy.


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Aldosterone plays an important role in blood pressure homeostasis, the regulation of circulating volume, and the maintenance of the sodium-potassium balance by binding to the mineralocorticoid receptor (MR). Primary aldosteronism (PA) states are associated with an increased cardiovascular risk, mediated not only by hypertension but also by the action of aldosterone in the modulation of vasodilation/vasoconstriction and oxidative stress. In this review, we discuss some of the cardiovascular actions of aldosterone and the most frequent causes of PA.


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There is a close link between hypertension and atherosclerosis. Hypertension causes atherosclerotic damage of several organs, called target organs and the risk factors for hypertension and atherosclerosis are very similar. The risk of mortality associated to hypertension increases with blood pressure values below the cutoff point of normality (140/90 mm Hg), even below 130/85 mm Hg, and includes a stage called pre hypertension. Moreover, the initial damage of the arterial walls and target organs are present before there is a significant elevation of blood pressure. Therefore, hypertension could become a biological marker of the evolution of an underlying atherosclerotic process. A new pathophysiological paradigm has been proposed in which the severity of hypertension is not classified according to blood pressure values, but rather on the initiation and progression of vascular damage among target organs. These alterations determine the prognosis and management of systemic vascular damage that can be called "hypertensive atherosclerotic disease" or simply systemic atherosclerotic disease.


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Promotion of physical activity must be a priority in all modern societies, but there are some persons with medical conditions that can develop serious symptoms associated with sports, that can even be fatal, such as sudden death (SD). Adolescents are the age groups with the higher level of participation in recreation or competitive sports. International studies have demonstrated that approximately 1:250.000 adolescents die during the practice of sports. Of these, 50% had a prodrome 24 hours before the event and 75% had an underlying cardiovascular disease. Therefore, adolescents should be screened for cardiovascular diseases prior to their engagement in sports. This review gives a scientific approach to this issue, usually oversized by mass media. It also analyzes and reports international governmental strategies and practical tools for the clinician that must perform this type of screening.

Traditionally used medicinal plants, herbs and spices in Latin America were investigated to determine their phenolic profiles, antioxidant activity and in vitro inhibitory potential against key enzymes relevant for hyperglycemia and hypertension. High phenolic and antioxidant activity-containing medicinal plants and spices such as Chancapiedra (Phyllantus niruri L.), Zarzaparrilla (Smilax officinalis), Yerba Mate (Ilex paraguaysis St-Hil), and Huacatay (Tagetes minuta) had the highest anti-hyperglycemia relevant in vitro alpha-glucosidase inhibitory activities with no effect on alpha-amylase. Molle (Schinus molle), Maca (Lepidium meyenii Walp), Caigua (Cyclanthera pedata) and ginger (Zingiber officinale) inhibited significantly the hypertension relevant angiotensin I-converting enzyme (ACE). All evaluated pepper (Capsicum) genus exhibited both anti-hyperglycemia and anti-hypertension potential. Major phenolic compounds in Matico (Pipe\textit{r}r angustifolium R.), Guascas (Galinsoga parviflora) and Huacatay were chlorogenic acid and hydroxycinnamic acid derivatives. Therefore, specific medicinal plants, herbs and spices from Latin America have potential for hyperglycemia and hypertension prevention associated with Type 2 diabetes.


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Childhood and adolescent obesity is highly prevalent and a relevant public health problem in Chile. Metabolic syndrome (MS), which is predictive of future cardiovascular disease and type 2 diabetes, has been associated with childhood obesity and insulin resistance. The aim of this study was to determine the prevalence of MS in a non-consultant obese adolescent population and to assess the underlying factors for the MS in these subjects. The nutritional status was evaluated for 25,102 students from 10 to 18 years of age living in Concepcion and Coronel, Chile. A total of 2,308 adolescents were found to be obese (BMI \geq 95 percentile). Metabolic syndrome was defined as the presence of at least three of the following abnormalities: waist circumference \geq 90th percentile, blood pressure \geq 90th percentile, fasting glycaemia \geq 100 mg/dL, HDL-cholesterol \leq 40 mg/dL and triglycerides \geq 110 mg/dL in a representative sample of 461 adolescents. The results obtained indicate that the prevalence of obesity was 9.2% and that MS reached 37.5%. Only 4.1% of the adolescents failed to present any of the risk factors for MS. When compared with the adolescents without MS, the estimated odd ratios (OR) for the presence of the characteristics of MS were all statistically significant, with increased waist circumference reaching an OR of 21.56. A significant difference was found between adolescents with and without MS; the parameters indicated greater insulin resistance for adolescents with MS. In conclusion, MS is highly prevalent among Chilean adolescents with obesity and its prevention beginning in childhood needs to be addressed.


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\textbf{BACKGROUND:} Low levels of adiponectin have been associated with metabolic risk factors (RF) and cardiac disease. Minimal data is available about the relationship between adiponectin and subclinical atherosclerosis.
OBJECTIVES: To determine the relationship of adiponectin to cardiometabolic RF, C-reactive protein (CRP), anthropometric parameters of obesity, and subclinical atherosclerosis in children. METHODS: Cross-sectional study in 103 children. We determined body mass index (BMI), waist circumference, percent fat mass, systolic and diastolic blood pressures, fasting lipid profile, glycemia and insulinemia, and CRP. Subclinical atherosclerosis was determined by carotid intima-media thickness (IMT) and flow-mediated dilation of the brachial artery (FMD). RESULTS: Mean age of the group was 12.4 +/- 1.9 years (47% girls; 20.4% prepubertal; 45 eutrophic, 23 overweight and 35 obese). Adiponectin levels were not statistically significantly different in eutrophic children versus obese+overweight: 17.7 +/- 5.6 and 15.9 +/- 5.3 microg/mL, respectively. Adiponectin levels in boys were no different from those in girls. Adiponectin correlated significantly with age, BMI, zBMI, waist circumference, systolic and diastolic blood pressures, HDL, insulinemia, and HOMA index. No statistically significant association with adiponectin was found for CRP, FMD or IMT. After adjusting by sex, pubertal status, and degree of obesity, the adiponectin levels associated significantly with HDL cholesterol and the HOMA index (r²=0.34, p<0.0001). CONCLUSIONS: Adiponectin levels were inversely correlated with anthropometric parameters of obesity and insulin resistance and directly correlated with HDL levels. However, no relationship with subclinical atherosclerosis was demonstrated in this study.


In recent years, a rapidly increasing number of studies have focused on the association between metabolic syndrome and several chronic diseases. However, it is difficult to determine a well defined pathogenic relationship, due to the etiological heterogeneity and comorbidities of these diseases. Research efforts are aiming to identify the convergent biological mechanisms that mediate the effects of hyperinsulinemia, hyperglycemia, dyslipidemia, and hypertension. All these conditions define the metabolic syndrome, that increases the risk for several diseases. The knowledge of these biological mechanisms associated with this syndrome will elucidate the pathogenic association between a variety of chronic diseases, including its pathogenic link with cardiovascular diseases and the most common forms of dementia. The development of new therapeutic and preventive strategies for these diseases will be a corollary of this research.


BACKGROUND: There are several diagnostic criteria for Metabolic Syndrome (MS) definition. AIM: To study their application in the Chilean general adult population. MATERIAL AND METHODS: We analyzed data from a random sub sample of 1,833 adults aged 17 years and older surveyed during the First Chilean National Health Survey conducted in 2003. The prevalence of MS was estimated using the update Adult Treatment Panel III (ATP III) of the National Cholesterol Education Program (NCEP) and the International Diabetes Federation (IDF 2005) criteria. The distribution of MS was analyzed according to age, gender, educational level, geographic area, obesity and sedentary lifestyle. RESULTS: The overall prevalence of MS was 31.6% (95% CI 28.5-34.9) and 36.8% (95% CI 33.5-40.3), according to update ATPIII-NCEP and IDF criteria respectively. Both criteria had a 90% concordance. Demographic and socioeconomic distribution was similar for both criteria. The prevalence of high blood pressure, high fasting glucose, and low HDL cholesterol (MS components) were: 46, 22 and 53% respectively. The prevalence of abnormal waist circumference was 30 and 59% according to update ATPIII-NCEP and IDF criteria, respectively. Using update ATPIII-NCEP criteria, the gender, age and educational level adjusted odds ratio (OR) for having MS was 9.59 (95% IC 6.8-13.6) for obese subjects compared with normal weight subjects and 2.14 (95% IC 1.3-3.7) for sedentary subjects compared with non sedentary. CONCLUSIONS: There was a 90% agreement between update ATPIII-NCEP and IDF criteria for the diagnosis of MS. The overall prevalence of MS in this population was 32% using update ATPIII-NCEP criteria, with higher prevalence among obese and sedentary subjects.
Intervention with education and exercise reverses the metabolic syndrome in adults.
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About 29% of the adult population of Talca, Chile, suffers from the metabolic syndrome (MS), a value higher than the national prevalence. Evidence indicates that exercise and nutritional changes reduce the predominance of this syndrome. The goal of this study was to evaluate the effects of a structured interventional program of physical activity and nutritional counseling in adults with MS. Fifty-one subjects were studied: 27 were included in the interventional program (I-MS). The control group was formed by 24 individuals who did not participate in the program (NI-MS). We assessed body weight, corporal composition, arterial pressure, glycemia, and lipid profile at baseline and after 18 weeks of treatment. After this period, the I-MS group showed a significant decrease in triglycerides (geometric mean 202.2 to 110.5 mg/dL, P < .001), diastolic blood pressure (mean 85.4 to 79.6 mm Hg, P = .001), waist circumference (mean men 101.5 to 94.1 cm, P < .001; mean women 107.2 to 96.2 cm, P < .001), weight (mean 81.1 to 77.2 kg, P < .001), and body mass index (mean 31.8 to 30.2 kg/m(2), P < .001). In the NI-MS group, the individual parameters did not change significantly. Our results show that a non-pharmacological treatment based on exercise exerts an important beneficial effect in patients with MS, mainly on the waist circumference, blood pressure, and triglycerides.

Reyes M, Espinoza A, Rebollo MJ, Moraga F, Méricq V, Castillo-Durán C.
[Ultrasound measurements of intra-abdominal adiposity and factors associated with cardiovascular risk in obese children].
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BACKGROUND: Cardiovascular risk factors are commonly present in obese children. AIM: To evaluate the association among radiological measurements of intra-abdominal adipose tissue, and cardiovascular risk factors, in prepuberal obese children. PATIENTS AND METHODS: We evaluated 30 obese (body mass index > p95) children aged 6 to 12 years (15 males). Anthropometry and blood pressure were measured. Subcutaneous and intra-abdominal fat thickness and fat area were measured by ultrasound (US) and computed tomography. Serum insulin, glucose and lipid profile were measured in a fasting blood sample. Homeostasis model assessment (HOMA) was calculated as an index of insulin resistance. RESULTS: There was a significant correlation between US intra-abdominal fat thickness and HOMA (r = 0.47, p < 0.01), serum triglycerides (r = 0.46, p < 0.05) and with positive criteria for metabolic syndrome (r = 0.66, p < 0.01). A receiver operating curve (ROC) analysis showed that, above a cut-off of 45 mm for intra-abdominal fat thickness, US was able to identify insulin resistance with a sensitivity and specificity of 79 and 69% respectively and metabolic syndrome with sensitivity and specificity of 100 and 67% respectively. US and computed tomography measurements for intra-abdominal fat thickness were significantly correlated (r= 0.62, p < 0.01). CONCLUSIONS: US measurements of intra-abdominal fat thickness identify obesity-associated damage in childhood. Age-specific measurements of intra-abdominal adipose tissue may improve the detection power of this approach.

Xanthine-oxidase inhibitors and statins in chronic heart failure: Effects on vascular and functional parameters.
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BACKGROUND: Increased oxidative stress in heart failure (HF) leads to inflammation and endothelial dysfunction (ED). Both statins and allopurinol have known anti-oxidant properties, but their utility in HF has not been fully assessed. METHODS: This investigation was a prospective, double-blind, double-dummy study, performed between March 2007 and June 2009. Seventy-four HF patients, with New York Heart Association (NYHA) Class II or III status and left ventricular ejection fraction (LVEF) <40%, were included. Patients received placebo during 4 weeks and were
then randomized to receive 4 weeks of either atorvastatin 20 mg/day plus placebo (ATV+PLA group) or atorvastatin 20 mg/day orally plus allopurinol 300 mg/day orally (ATV+ALLO group). Malondialdehyde (MDA), extracellular superoxide dismutase (ecSOD) activity and uric acid (UA) levels, among others, were determined at baseline and after 4 weeks of treatment. ED was assessed by flow-dependent endothelial-mediated vasodilation (FDD), and functional capacity by 6-minute walk test (6MWT). RESULTS: Thirty-two patients were randomized to ATV+PLA and 38 to ATV+ALLO. Mean age was 59 ± 2 years, 82% were male, and 22% had an ischemic etiology. Hypertension was present in 60% and diabetes in 15% of those studied. No significant differences were observed between baseline measurements and after placebo. After 4 weeks of treatment, both groups showed a significant decrease on MDA (0.9 ± 0.1 to 0.8 ± 0.1 and 1.0 ± 0.5 to 0.9 ± 0.1 μmol/liter, p = 0.88), UA (7.4 ± 0.4 to 6.8 ± 0.3 and 7.2 ± 0.4 to 5.0 ± 0.3 mg/dl, p < 0.01) and FDD (3.9 ± 0.2% to 5.6 ± 0.4% and 4.6 ± 0.3% to 7.1 ± 0.5%, p = 0.07) with increased ecSOD activity (109 ± 11 to 173 ± 13 and 98 ± 10 to 202 ± 16, U/ml/min, p = 0.41) and improved 6MWT (447 ± 18 to 487 ± 19 and 438 ± 17 to 481 ± 21 m, p = 0.83), with all values for ATV+PLA and ATV+ALLO, respectively; p-values are for comparison between groups after treatment. CONCLUSION: Short-term ATV treatment in heart failure (HF) patients reduces oxidative stress and improves FDD and functional capacity. These beneficial effects are not strengthened by the addition of allopurinol.


BACKGROUND: In Chile, the Ministry of Health implemented an integral therapeutic program to reduce cardiovascular risk and increase physical activity (PA) among the population. AIM: To assess the effectiveness of the program in a group of overweight or obese adult women with a family history of Type 2 Diabetes and / or prehypertensive and / or prediabetes. MATERIAL AND METHODS: A group of 128 women aged 35 ± 10 years with a mean body mass index (BMI) of 33 kg/m2 were invited to participate in a program that lasted four months and included PA sessions and workshops with psychologists and nutritionists. Weight and waist circumference were measured at baseline and at four and six months of follow up. The blood glucose was measured at baseline and at 4 months, only in the affected income. RESULTS: At four months the reduction in weight and waist circumference observed, was around 2%, and at 6 months the reductions was around 3%. The largest reductions were observed at 6 months in obese patients ≥ 40 years. Women that were more compliant with PA sessions had a greater weight reduction. The blood glucose levels decreased significantly independent of the reduction of anthropometric parameters. CONCLUSIONS: The program is considered successful to reduce cardiovascular risk factors and increase the practice of PA. The intervention was especially effective in patients > 40 years possibly due to higher food education, maturity and responsibility to the intervention.