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IRON NUTRITION AND INFLAMMATION IN TYPE 2 DIABETES PATIENTS WITH OR WITHOUT OBESITY

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Background: Diabetes mellitus (2DM) patients present increased iron storage and oxidative stress parameters and share with obesity a pro-inflammatory profile.

Objective: To evaluate mRNA expression of genes related to iron nutrition and inflammation in patients 2DM with or without obesity and to evaluate its association with 2DM development.

Methods: We studied 48 obese men (OB), 40 diabetics (DM), 44 obese diabetics (OBDM) and 43 healthy (Cn) subjects. Glucose, insulin, lipid profile, oxidative stress and iron nutrition parameters were evaluated. In peripheral mononuclear cells (PMCs) we isolated RN A and TNF, hepcidin, TLR4, TLR2, NF B and mTOR expression by qPCR was studied.

Results: Ferritin levels were higher in OB; DM and OBDM than Cn groups (in µg/L: 89.7; 76.2; 92.8 and 71.1, respectively; ANOVA $p<0.005$). Total body iron (TBI) and hsCRP showed the same behavior (ANOVA $p<0.01$ and <0.0001, respectively). Oxidative stress was high in OB; DM and OBDM (ANOVA: heme oxygenase $p<0.0001$ and TBARS $p<0.003$). The expressions of genes related to inflammation (TNF, TLR2, NFB, and IL6) and Hepcidin were increased in all the groups compared to controls (ANOVA $p<0.001$). mTOR was different between OBDM and controls (ANOVA $p<0.04$). Higher levels of ferritin (Q4) were associated as a risk factor for diabetes mellitus.

Conclusions: High iron deposits (ferritin and TBI) and inflammation (TNF, IL6 and TLR2) induce hepcidin expression. High levels of ferritin are a risk factor for 2DM development.

Funding: FONDECYT grant # 1110080

2

EARLY ADIPOSITY REBOUND AND METABOLIC RISK AT 7 YEARS

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Objective: We assess the association between timing of adiposity rebound (AR) and metabolic status at age 7, evaluating the potential role of adiposity, adipose functionality, and skeletal maturation in this association.

Methods: We estimated the age of AR from the BMI trajectories from 0 to 7y in 910 children from the Growth and Obesity Chilean Cohort Study (GOCCS). At 7y we measured waist circumference (WC) and blood glucose, insulin, triglycerides and HDL-cholesterol levels and constructed a metabolic risk score. We also measured percent fat mass (adiposity), serum concentrations of leptin and adiponectin (adipose functionality) and bone age using wrist ultrasound (skeletal maturation).

Results: We found that mean age at AR was 5y in girls (5.2 ± 1.8y) and boys (5.4 ± 1.7y) and 44% of the children had an AR < 5y. Earlier AR was associated with larger WC [: 5.10 (95% CI: 4.29–5.91)], higher glucose [:1.02 (1.00–1.03)], insulin resistance [HOMA-IR: 1.06 (1.03–1.09)], higher triglycerides [: 10.37 (4.01- 6.73)], and adverse metabolic score [: 0.30 (0.02–0.37)]. Associations decreased significantly if adiposity was added to the models [i.e. WC: 0.85 (0.33–1.38)], and to a lesser extent when adding adiponectin [i.e. WC: 0.73 (0.14–1.32)] and skeletal maturation [i.e. WC: 0.65 (0.10- 1.20)].

Conclusion: In GOCCS, children's AR at a younger age predicts higher metabolic risk at 7y; these associations are mostly explained by increased adiposity but adipose dysfunction and accelerated skeletal maturation also play a role.

Funding: FONDECYT # 1090252, CC has a Welcome Trust Training Fellowship.

3

A TWO HYDRO-ELECTROLYTIC SOLUTIONS SYSTEM TO MANAGE DIABETIC KETOACIDOSIS. A PRELIMINARY REPORT

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Objective: To compare the time needed to reach initial stabilization in patients with diabetic ketoacidosis (DKA) using two hydration systems: the traditional one (1 glucose/electrolyte solution) vs. the alternative one (2 glucose/electrolyte solutions).

Methods: We developed a randomized controlled trial, including children aged between 1 and 18 years, admitted for DKA (serum glucose > 250 mg/dl, pH < 7.3, bicarbonate < 15 mmol/L, glycosuria and ketonuria); those who had previously received insulin were excluded. After initial emergency hydration (normal saline 20 ml/kg), patients were randomized to one of 2 hydration systems: traditional (1 electrolyte solution with glucose) or alternative (2 electrolyte solutions with different concentrations of glucose, allowing easy glucose flow variations). The hydration therapy was continued until patient stabilization (serum glucose < 250 mg/dl, pH > 7.3, bicarbonate > 15 mmol/L); the time needed to reach initial stabilization was considered the outcome variable to compare between the groups.

Results: The study considered enrolling 32 subjects, until July 2014. To date, 12 subjects were admitted (6 in each group); the average age was 9.4 ± 3.4, ten were women. The average time to reaching stabilization was significantly lower with the alternative system in comparison to the traditional one (9.8 ± 1.16 hr vs. 13.3 ± 2.8 hr; p=0.018).

Conclusion: These preliminary results show that the alternative system ("two-bags") allows reaching DKA patient stabilization in a considerably shorter time.

ClinicalTrial.gov ID: NCT01631929

4

THE ROLE OF CALCIUM IN THE EFFECTS OF TANNIC ACID, PHYTIC ACID AND PECTIN ON THE BIOAVAILABILITY OF IRON

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Objective: To determine the role of calcium on the effect exerted by phytic acid, tannic acid and pectin on the bioavailability of non-heme iron.

Methods: Fifty-eight healthy, adult females participated in two iron absorption studies using radioactive iron isotopes (59Fe and 55Fe). One group received, on different days, 5 mg of iron (as FeSO4) alone (control), together with either 10 mg of phytic acid, or 100 mg of tannic acid or 250 mg of pectin. Another group received the same Fe doses as the first group, using the same compounds, in addition to 800 mg of calcium (in the form of CaCl2). The compounds were administered after an overnight fasting, and no food or beverages were allowed for the following 3 hours. Fe nutritional status and circulating radioactivity was measured in the blood samples.

Results: The geometric means of iron bioavailability (range ±1SD) of Fe alone, Fe with phytic acid, Fe with tannic acid, and Fe with pectin were 25.0% (11.9–52.0); 18.9% (9.9–35.8); 16.8% (8.7–32.3); and 21.1% (10.2–43.9) respectively (repeated-measures ANOVA, F=4.29 p=0.0135; Dunnett´s post hoc: control *vs.* tannic acid $p<0,05$). When 800 mg of calcium was added, Fe bio-availabilities were 16.7 (10.1–27.5); 13.2 (7.1- 24.6); 14.8 (8.8–25.1); and 12.6% (5.5–28.8) respectively (repeated-measures ANOVA; NS).

Conclusion: Only tannic acid significantly decreased the Fe bioavailability on an empty stomach in a fasting state. This effect disappeared when both tannic acid and calcium were ingested together.

Funding: FONDECYT grant # 1030090

Abstracts

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OBESITY AND ESTROGEN LEVELS IN PRE-PUBERTAL GIRLS PARTICIPANTS IN THE GROWTH AND OBESITY CHILEAN STUDY

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Objective: To determine if girls with higher total body fat (TF) or central fat (CF) between 4–7 years are associated with higher levels of estrogen during pre-puberty at age 7.

Methods: Longitudinal study of 107 pre-pubertal girls, of low–middle class from Santiago, Chile (random sample of the cohort "Growth and Obesity Chilean Study"). Since age 4, nutritionists measured weight, height, circumferences and skin folds. TF includes: body mass index (BMI), the Z-score (WHO), and percent body fat and CF defined by waist circumference. At age 7 estradiol equivalent (EEq) was measured by ultrasensitive recombinant cell bioassay, DHEA-S, insulin, IGF-1, leptin, and skeletal maturation by BonAge®. We compared TF and CF in girls with EEq>4pg/ml and <4pg/ml (OR and 95% CI) adjusting by confounders.

Results: At 4, 5 and 7 years, percentage of girls with overweight (BMI>1SD) were 44%, 35% and 40%, and mean body fat percentage was 24%, 25% and 28%, respectively. At 7 years, 11% had central obesity (waist circumference >90th percentile) and showed a mean EEq of 3.6 pg/ml (+/-2.3 pg/ml). In crude and adjusted models we did not find any association between the TF and CF and EEq.

Conclusion: The girls in this study have higher levels of EEq than those reported in previous studies at same age (3.6 pg/ml (+/-2.3 pg/ml) vs. 0.6 pg/ml (+/-0.6 pg/ml)). These higher levels of EEq are not associated with obesity, thus this could be associated with other potential endocrine disruptors.

6

IS THERE A RELATIONSHIP BETWEEN UNHEALTHY SNACKING AT SCHOOL AND ACADEMIC OUTCOMES? A POPULATION-BASED STUDY IN CHILEAN SCHOOL-AGE CHILDREN.

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Objective: We examined the association between unhealthy snacking at school and academic performance in students from Santiago Metropolitan Region (Chile) after controlling for potential confounders (e.g. sex, SES, type of school).

Methods: In a random sample of 1,258 students (13.3 ± 2.3 years old) we measured the nutritional quality of snack at school, accounting the amount of saturated fat, fiber, sugar and salt in the food, and academic performance, using national standardized tests scores in Language and Mathematics. Bivariate and multivariate regression analyses were used to model the relation between academic outcomes and this health-related behavior. Two outcomes were considered: (1) poor academic standing according to the Ministry of Education, and (2) poor academic standing according to a discretionary standard (tests z-scores <50th percentile).

Results: Fifty-eight percent of students ate items at snack time that were high in fat, sugar, salt, and calories, and thus were considered to have unhealthy snacking. Thirty-five percent were considered to be at risk of unhealthy snacking. Unhealthy snacking significantly increased the odds of poor academic outcomes in Language (OR: 2.1; 95%CI: 1.2–3.9) and Mathematics (OR: 2.3; 95%CI: 1.3–4.1).

Conclusion: School kids eating unhealthy items at snack time have worse academic performance in Language and Mathematics, as measured by a standardized test. Our findings support the notion that academic and health-related behaviors are linked and, similarly, that school health programs may have positive effects on educational outcomes.

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COLOSTRUM RETINOL CONCENTRATIONS AND VITAMIN A DEFICIENCY IN MOTHERS IN A PUBLIC MATERNITY HOSPITAL OF RIBEIRÃO PRETO (SÃO PAULO, BRAZIL)

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Background: Vitamin A deficiency (VAD) is endemic in Brazil, mainly in its subclinical form. Colostrum is an important source of vitamin A early in life. In addition, human milk constitutes the only source of vitamin A for infants exclusively breastfed.

Objective: To verify the prevalence of VAD and concentrations of retinol in colostrum of mothers in a public maternity hospital of the municipality of Ribeirão Preto (São Paulo, Brazil); to correlate the maternal nutritional status to the end of gestation with the concentrations of retinol in colostrum.

Methods: Colostrum samples were obtained from 146 mothers of healthy term neonates born in a public maternity hospital in the municipality of Ribeirão Preto. Weight and height were obtained from the mothers at the time of admission for labor. Colostrum retinol concentrations <1.05 µmol/l were considered deficient.

Results: 28.1% (41/146; CI95%: 20.9–36.1) of the mothers had VAD. The average concentrations of retinol in colostrum were 3.03 µmol/l (SD: 2.70). 34.2% (50/146) of the mothers had a body mass index (BMI) within the normal range. 15.8% (23/146), 28.8% (42/146) and 21.2% (31/146) presented with BMIs ranging from underweight, overweight and obesity, respectively. There was no correlation between the nutritional status of mothers and retinol concentrations in colostrum (ANOVA).

Conclusion: Although the average concentrations of retinol in colostrum were in normal range, VAD was observed in high proportions in this population. There was no correlation between maternal nutritional status and concentrations of colostrum in the group studied.

Funding: CAPES and FAEPA grants

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GLUCOLIPOTOXICITY EFFECT OVER VIABILITY, INFLAMMATION AND FUNCTIONALITY IN BETA CELL

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Objective: To evaluate the viability, mRNA expression of genes related to inflammation and apoptosis and insulin secretion in beta cells challenged with high glucose and/or palmitic acid concentrations.

Methods: β-Cells (MIN6) were cultivated with glucose 50 mM and/or palmitic acid (PA) 1 mM for 2, 6, 12 hours and 5 days. Further it was determined cellular viability (MTT), insulin secretion (RIA) and mRNA expression of TXNIP, IL1, TNF and IL6 by qRT-PCR.

Results: Cellular viability (VC) decreased 20% after 2 hours of exposure to high glucose (one-way ANOVA; $p<0.05$). When the time of exposure was increased (6–12 hours) the decrease in CV with PA was higher (one-way ANOVA; $p<0.001$). When cells were challenged with glucose CV decreased 30% (one-way ANOVA; $p<0.001$). The insulin secretion did not change in any time nor treatment studied. The mRNA relative abundance of TXNIP, IL1, TNF and IL6 were increased in cells treated with glucose or PA for 2, 6 and 12 hours (one-way ANOVA; $p<0.001$); when the cells were exposed for 12 hours to glucose/PA the mRNA expression of these genes was increased (one-way ANOVA; $p<0.001$).

Conclusion: The exposure (2 hours to 5 days) with high concentrations of glucose and PA does not affect the viability of MIN6 cells. However, PA decreases the viability and increases the expression of pro-inflammatory and pro-apoptotic genes, without affecting the insulin secretion.

Funding: FONDECYT grant # 3130375

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BREAST MILK INTAKE AND ADIPOSITY IN 3-MONTH-OLD INFANTS

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Objective: To verify the association of maternal milk intake and infant adiposity in breastfeeding children.

Methods: Cross-sectional study in breastfeeding infants, with birth weight > 2500 g, both sexes. Mothers were excluded if had a medical history of smoking, hypertension, drug addiction or severe pathology. Breast-milk intake (ILM) was measured by the dose-to the mother methodology, as well as infant's adiposity and nutritional status. The results were expressed as median and inter-quartile range (25 -75 percentile). Adiposity was compared by Z-IMC and body fat (%) between infants who were above the median on ILM, and below. Non-parametric test were utilized to assess significant differences. The study was approved by INTA's Ethical Committee and participant mothers signed the informed consent.

Results: Twenty-seven breastfeeding infants with age 3.2 (3.0 a 3.4) months, had an intake of 1.0 (0.9 a 1.1) l of maternal milk. A higher breast milk intake was associated to a higher infant adiposity (28.7% versus 24.1%, $p < 0.05$) e IMC-z (1.27 versus 0.16, $p<0.05$) respectively, when comparing breastfeeding infants above and below the median. Maternal fat (%) assessed by deuterium dilution was high, 39% (34%- 42%).

Conclusion: As expected, infants with higher breast milk intake have higher adiposity and BMIz at three months of age. The application of stable isotopic methodology does not affect the maternal and infant health, and constitutes a reference method to assess breast milk volume as well as maternal body composition.

Funding: RLA6071 (IAEA)

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PERCENTAGE OF FAT BUT NOT BMI IS ASSOCIATED WITH VITAMIN D STATUS IN 9-11Y CHILDREN: EVIDENCE FROM THE GROWTH AND OBESITY CHILEAN COHORT STUDY

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Objective: To evaluate the relationship between indicators of total and central adiposity and serum 25-hidroxi-vitamin-D (VD) in Chilean children participating in the Growth and Obesity Cohort Study (GOCS).

Methods: 572 children 9-11y were evaluated [total adiposity based on BMI: (weight/height^2), skinfolds (Huang's equation), bio-impedance (TANITA-418-C), and a 3-component model (3C-Model: BOP-POD and D2O-dilution)], the latter as a gold standard. Central adiposity was based on waist circumference, waist-to-height ratio, and skinfolds ratio. Serum 25-OHD concentrations were determined by RIA-method; VD deficiency was defined as <20ng/ml and insufficiency as 20 to <30ng/ml. Associations were assessed with ANOVA and multiple and logistic regression models with standardized coefficients [range:95%CI], adjusting by sex, Tanner stage, age, and seasons.

Results: 25% of children had obesity (BMI>2SD); 15.2% had VD deficiency and 43% VD insufficiency. Percent fat based on BIA (zFat-%-BIA), and the 3C model, were inversely associated with VD (=-0.24 [-0.32 -0.16], =-0.10 [-0.15 -0.05]), respectively, while BMI and skinfolds were unrelated (=-0.58 [-0.13 +0.01], =-0.03, [-0.11 +0.04], respectively). Children with high fat % by BIA (p75) had more than three times the risk of low VD (OR=3.36 [2.0 - 5.6] deficient/insufficiency) than children with <p75. Central adiposity indicators were not significantly associated with VD (WC: =0.06 [-0.13 +0.13]; WC/height: =-0.05 [-0.01 +0.01]) except for the trunk/limbs skinfolds ratio (=-0.09 [-0.16 -0.001].

Conclusion: These results are consistent with a potential differential sequestration of VD by adipose tissue (central and total), and also indicate that BMI may not be a good indicator to evaluate the effect of adiposity on VD concentrations in children aged 9-11y.

Funding: FONDECYT grants #1120326 and 1110085

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FULL TEXT PUBLICATIONS OF ABSTRACTS PRESENTED AT ANNUAL MEETINGS OF THE LATIN AMERICAN SOCIETY FOR PEDIATRIC RESEARCH (SLAIP)

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Objective: To estimate the number of abstracts presented at the SLAIP annual meetings which achieved full publication in scientific journals.

Methods: Descriptive study, including all the abstracts presented at the SLAIP annual meetings from 2005 to 2009, identified from each meeting proceedings. In each case, an investigator was contacted by e-mail and invited to participate of a self-administered and closed survey, asking about the abstract achieved full publication or the reason for not achieving that goal.

Results: In the period analyzed, 325 abstract were presented, being able to contact 263 authors (80.9%) and receiving 232 answers (71.4%). The origin of these was: Argentina (40.8%); Chile (24.8%); Brazil (11.9%); Peru (14.7 %); Paraguay (3.7%); México (3.7%) and Bolivia (0.5%). Full publication was achieved in 58.6 % (IC95%: 52–65) (136/232), 2/3 of them (90/132) in Medline indexed journals. Reports from investigations which had funding (40.0%) were more likely to achieve publication (p=0.003; OR: 2.2 IC95% 1.2–3.9). Of the 96 abstracts which had not achieved publication, authors of 66 informed us that reasons involved "not having enough time", the most common response (n=35).

Conclusion: Publication rate of abstracts presented at SLAIP meetings was similar to other international societies, and greater than those of the Region.

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RIBEIRÃO PRETO BIRTH COHORT 2010: METHODOLOGY AND MAIN FINDINGS

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Objectives: To describe the study methodology of a 2010 population birth cohort in Ribeirão Preto, and present the main findings.

Methods: 7704 mothers and their 7799 newborns were evaluated in 8 maternities in Ribeirão Preto, in 2010. The study included all mothers who delivered at Ribeirão Preto hospitals and agreed to participate. Data were collected from surveys and medical records, after childbirth.

Results: The average maternal age was 27 years old (SD=6.2) and 9.8 years of education (SD=2.3), whereas 76.6% had 9 or more years of education. 13.7% of mothers had no partner, and 1.4% did not receive prenatal care. 12.6% had hypertension and 6% had gestational diabetes. 22.8% of mothers consumed alcoholic beverages, 11.8% smoked and 66.8% consumed coffee during pregnancy. 12.6% were obese and 24.2% overweight. The mean gestational age was 270 days (SD=18.1). The rate of cesarean was 58.6% and 0.6% had stillbirth. 7799 children were born, being 92 twins and 3 triplets. The mean of birth weight was 3119 grams (SD=574): 10% low birth weight, 25% underweight and 4% high weight.15% of the newborn were preterm and 1.2% had congenital defect.

Conclusions: Mothers of this cohort showed a high level of education and overweight/obesity. Prenatal care rate was wide and there was high frequency of premature newborns and cesarean.

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EFFICACIES OF PARACETAMOL AND GLUCOSE IN PAIN REDUCTION IN NEWBORNS: A RANDOMIZED, CONTROLLED AND SINGLE BLIND STUDY

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Objective: To determine the effect of glucose and paracetamol use in pain sensation caused by heel prick in the newborn.

Methodology: Randomized controlled clinical trial, single-blind, including neonates undergoing heel prick. Vital signs, time to stop crying and pain scales (NIPS and PIPP) were recorded at baseline and at the moment of the puncture.

Results: 129 infants completed the protocol, divided into 3 groups: paracetamol group (n = 42), placebo (n = 40) and dextrose group (n=47). The PUP score was lower in the dextrose group than the other 2 groups (p=0.001), the NIPS score was lower than the other groups (p=0.0001). The cessation of crying was faster in the group receiving dextrose (30.5 sec.), than the control group (79.89 sec.) and the paracetamol group (79.31 sec.). No adverse events were reported at all.

Conclusions: The administration of 25% glucose solution appears to decrease the pain sensation in neonates undergoing heel prick.

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MOLECULAR IDENTIFICATION OF GLUCOSE-6-PHOSPHATE DEHYDROGENASE (G6PD) DETECTED IN NEONATAL SCREENING

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Objective: To present the strategy of identifying molecular variants of G6PD detected in neonatal screening (NS).

Methods: We present a series of incident cases of newborns with G6PD deficiency detected during NS. G6PD variants (G202A, A376G, T968C and C563T) were investigated from nuclear DNA using real-time PCR.

Results: From 21,619 neonates screened, in 41 cases G6PD deficiency was identified (rate: 189.6/100,000), and in 34 cases the molecular variant of G6PD was confirmed (rate: 157.3/100,000). The most frequent allele combination identified was G202A/A376G (G6PD ratio and median activity were 0.460 and 1.72 ± 0.35 U/gHb, respectively), followed by G202A (0.170 and 1.74 ± 0.27 U/gHb), and A376G/T968C (0.150 and 1.10 ± 0.44 U/gHb). The T968C allelic variant showed lower enzyme activity than the others (1.1 ± 0.4, p 0.02). Two female newborns were detected with G6PD deficiency with G202A/A376G and G202A variants.

Conclusion: This strategy allowed us the identification of molecular variants involved in 80% of cases. African alleles were prevalent in neonatal screening.

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TRANSIENT NEONATAL ELEVATION OF THYROID STIMULATING HORMONE: A RISK FACTOR FOR DEVELOPING SUBCLINICAL HYPOTHYROIDISM IN CHILDHOOD

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Background: Transient neonatal elevation of TSH (TNE-TSH) is defined as an abnormality in thyroid function (TF) which reverses in confirmatory test. The risk of developing subclinical hypothyroidism (SH) later in childhood has not been sufficiently studied.

Objective: To test the hypothesis that the TNE-TSH increases the relative risk (RR) for SH in childhood.

Methods: Prospective cohort study. Infants born between 2005–2006 screened for hypothyroidism at our hospital were included and re-examined six years later. We excluded premature infants, <2500g, Down syndrome, children born from mothers with immune thyroiditis, major malformations, heart, kidney, liver or metabolic diseases and those receiving steroids or dopamine. Variables: TSH, T3, T4, FT4, sex, height, developmental test (PEDS).

Study was approved by the Institutional Ethics Committee.

Results: Of 5,040 newborns, 301 (5.9%; CI95%: 5 to 6.3) had TSH 28.9 mIU/L (TNE-TSH). Six years later, 65 children in TNE-TSH cohort and 185 controls were randomly re-examined. In TNETSH cohort we found 6/65 children (9.2%; 95%CI: 7–11.4) with SH (TSH 6.4 mIU/L), and only 3/185 (1.6%; 95%CI: 0.3–4.7) in controls (RR: 5.7; 95%CI: 1.5–22.1; p=0.01). The TSH and T3 were higher in TNE-TSH cohort (4.7 ± 1.3 mIU/L vs. 2.1 ± 0.5 mIU/L, p <0.0001 and 7.3 ± 0.7 pmol/L vs. 4.1 ± 0.9 pmol/L, p <0.0001, respectively).

Conclusions: Newborns with TNE-TSH showed increased risk of SH in childhood, with no impact on linear growth or psychomotor development.

Funding: CONICET grant.

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NECK CIRCUMFERENCE: ANTHROPOMETRIC INDICATOR OF AEROBIC CAPACITY IN SCHOOL?

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Background: Aerobic capacity, an important aspect of physical fitness, could affect health, regardless of nutritional status. Because direct measuring (calorimetry) is difficult and expensive, it is important to identify a simple and low cost predictor.

Objective: To evaluate the association between aerobic capacity and neck circumference (NC) in school age children.

Methods: Cross-sectional study including both genders school age children (fifth degree) from two municipal schools in the commune of Ñuñoa. In all cases NC, weight, height, and aerobic capacity were measured. The NC was measured using an inextensible tape at thyroid cartilage height (twice). Spearman regression was performed between the VO2max/NC and between VO2max/BMI. A p<0.05 value was considered significant.

Results: 27 subjects, aged 10.8 years (IQR 0.6), 59% female, were included. Correlation between VO2max and NC was significant (r= -0.63, p <0.001), and higher than correlation between VO2max and BMI (r= -0.53, p <0.001). Children with better aerobic capacity had lower NC (27.28 cm vs. 29.94 cm, p <0.001).

Conclusion: This study shows that the NC may be a simple anthropometric associated with aerobic capacity in school.