

NSA Concurrent Oral Session 2: Energy and Metabolism

Resting energy expenditure in female children with cystic fibrosis - effect of puberty

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Background- The female gender has been shown to be one of the contributing factors to elevated resting energy expenditure (REE) in children with cystic fibrosis (CF), but it is not known if this effect is influenced by pubertal development.

Objective- The aim of this study was to determine the effect of puberty on REE, in females with CF.

Design- Children with CF were recruited from the CF clinic at the Children's Hospital at Westmead and controls were recruited through families and friends of hospital staff. All children were aged 5-18 years and were generally well. REE, anthropometry and self-reported pubertal staging were measured in 38 children with CF (27 pre-menarche, 11 post-menarche) and 63 controls (42 pre-menarche, 21 post-menarche) in an outpatient setting. The post-menarche group were all measured in the follicular stage of their menstrual cycle.

Outcomes- Females with CF had a higher REE than controls ($108.4 \pm 11.1\%$ of predicted from controls $P < 0.001$). However this increase in REE was only significant for pre-menarche females ($109.7 \pm 12.1\%$ of predicted from controls, $P < 0.005$) compared with a median 104.0% ($92.1, 116.6\%$) of predicted from control data ($P = 0.06$) for post-menarche females. There was no significant difference in REE (% predicted from controls) between pre- and post-menarche children with CF ($P = 0.12$).

Conclusions- Pre-menarche females with CF had raised REE in contrast with post-menarche females but this finding must be confirmed with further numbers of post-menarche females. This study implies that young females with CF may need more intensive dietary management, due to raised REE, in order to maintain growth, nutritional status and possibly improve survival.

Effect of bariatric surgery on adipose tissue regulatory peptides and growth hormone secretion

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Background - Obesity is associated with hyperinsulinaemia, hyperleptinaemia, suppressed levels of ghrelin and growth hormone (GH), and conflicting observations for IGF-1 levels.

Objective - To examine the effects of massive weight loss following bariatric surgery on the serum levels of adipose tissue regulatory peptides in obese humans.

Design - Serum ghrelin, growth hormone, IGF-1, insulin and leptin levels were analysed in 12 male and 54 female subjects with mean age 39 years (range 24-50), mean weight 127kg (range 96-195) and mean BMI 45 kg/m^2 (range 33-64) prior to and after Roux-en-Y gastric bypass (RYGBP) surgery at 6 and 12 months. All differences shown in Outcomes are significant at $P < 0.05$.

Outcomes - RYGBP resulted in 22% and 30% weight loss at 6 and 12 months, respectively. Ghrelin increased from 55 (25-81) fmol/ml to 75 (27-132) fmol/ml (40%) at 6 months and 85 (30-156) fmol/ml (58%) at 12 months after surgery. GH also increased significantly from 0.6 (0.1-2.8) to 1.8 (0.4-8.9) mU/l (69%) at 6 months and 1.9 (0.4-9.2) mU/l (69%) at 12 months IGF-1 levels increased significantly from 155 (102-208) to 165 (108-222) $\mu\text{g/l}$ (5.5%) at 6 months and to 173 (117-229) $\mu\text{g/l}$ (10%) at 12 months. Insulin and leptin decreased at 6 months by 57% and 62% respectively, and at 12 months by 60% and 64%. The changes were all related to the reduction in BMI, except for IGF-1. Ghrelin and insulin were inversely correlated at all time-points, as were their changes at 12 months, independent of the BMI change.

Conclusion - RYGBP surgery was associated with marked changes in ghrelin, GH, IGF-1, insulin and leptin towards their normal ranges, as well as a large reduction in weight. The profound changes in these adipose tissue regulatory peptides reflect the new state of energy balance achieved. The close inverse association between ghrelin and insulin supports an important role for ghrelin in glucose homeostasis.