Long term outcomes after hospital based, life-style weight loss intervention during childhood

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OBJECTIVES

- Obesity is a global public health problem affecting children and adults of all ages.
- Modification of diet and physical activities are recommended as the first line treatment for childhood obesity.
- A minimum of 0.25 reduction in body mass index Standard Deviation Score (BMI-SDS) after short term interventions have been shown to improve adiposity and metabolic health in children [1].
- Longer term BMI and health information from adults who received obesity interventions in childhood is lacking
- We undertook a feasibility study to investigate the metabolic outcomes of young adults who have received lifestyle interventions during adolescence for early onset obesity.

METHODS

- We planned to recruit 30 young adults aged 16-25 years of age who had received intervention in our weight management clinic for childhood obesity
- All patients had BMI >98th centile before the age of 18 years at the beginning of intervention

Weight management interventions included:
- A general health assessment, auxiological monitoring and metabolic screening for obesity-related co-morbidity
- 4-monthly follow up for a minimum of 1 year
- Life-style advice by members of the multidisciplinary team (paediatrician, dietician, exercise specialist and psychological input if indicated)

Metabolic screening included the following:
- Blood pressure (BP)
- Total body and truncal fat percentages measured by Tanita® bioimpedance segmental body composition analyser
- Fasting lipid profile , alanine transaminase (ALT), and oral glucose tolerance tests (OGTT)
- Insulin sensitivity was defined by the whole body composite-insulin-sensitivity-index (ISI_{comp})

Results of the metabolic outcomes from the beginning of interventions and reassessment were compared using Mann Witney U tests with 5% significance.

RESULTS

- Total of 25 cases (male =10) for analysis - 5 cases were excluded as they received weight loss intervention for <1 year.
- There were 21 Caucasian, 2 South Asian, 2 mix Caucasian/Black of median ages 14.1 (9.5-17.6) years at the beginning of intervention and 18.2 (16.1-24.8) years at re-assessment.
- With lifestyle interventions, after 3.5 (1.4-14.1) years, 28% (7/25) had BMI-Z score reduction of >0.25 from baseline (referred to as “responders”).
- Responders demonstrated a significant reduction in BMI-SDS, total fat%, systolic BP and glucose area-under-the-curve from OGTT at re-assessment compared with baseline.
- Non-responders showed significant increases in total fat% and trunk fat %.
- At re-assessment, responders compared with non-responders showed significant lower BMI-SDS, total fat%, trunk fat %, insulin at 120 minutes from OGTT and ALT, as well as higher ISI_{comp} , but there were no group differences in diastolic BP, TG, HDL and HDL.
- There were no patients with impaired glucose tolerance or diabetes in either group at baseline or reassessment.

Metabolic markers of a) responder baseline vs reassessment b) Responders vs non-responders at reassessment
(NA= not available, * statistical significance indicating clinical improvement , ** statistical significance, indicating clinical deterioration)

	Responders at Baseline (n=7) median (range)	Responders at Reassessment (n=7) median (range)	Responders Baseline vs reassessment p- value	Non-responders at Baseline (n=18) median (range)	Non-responders (n=18) at reassessment median (range)	Non responders baseline vs reassessment p- value	Responders vs non-responders at reassessment p-value
BMI-SDS	3.36 (2.96-3.66)	2.98 (2.30-3.26)	0.017 *	3.0 (2.25-4.23)	3.34 (2.25-4.48)	0.08	0.034 *
Systolic BP mmHg	136 (130-147)	115 (108-138)	0.007*	128 (101-148)	114 (90-145)	0.11	0.70
Fat %	46.2 (35.8-49.1)	35.1 (26.8-43.7)	0.03*	40.2 (34.0-50.5)	65.3 (48.3-77.0)	0.03 **	0.001*
Trunk %	38.5 (23.0-44.5)	34.2 (28.8-42.5)	0.27	33.7 (26.6-45.4)	47.2 (33.8-54.5)	0.003**	0.005
Insulin 120 min at OGTT (mU/L)	78 (43-196)	16 (5.8-117)	0.18	95.8 (29-307)	92.4 (12-312)	0.80	0.029*
Glucose AUC at OGTT	14.2 (11.7-18.4)	11.7 (9.2-13.4)	0.008*	13.2 (10.5-19.4)	13.0 (9.8-18.5)	0.96	0.06
ISI_{comp}	NA	3.81 (2.24-7.45)	NA	NA	1.73 (0.76-7.13)	NA	0.021*
ALT (U/L)	24 (18-33)	26 (15-35)	1.0	30.5 (18-95)	34 (22-102)	0.47	0.041*

CONCLUSIONS

- Results of this study suggested that slightly over 1 in 4 obese adolescents may benefit in the longer term after lifestyle modification interventions with associated improvements in body composition and metabolic parameters in young adulthood.
- Although the BMI-SDS of all subjects in this cohort has remained in the obese range at re-assessment, those who achieved and maintained weight loss after intervention still benefit from improved metabolic outcomes in early adulthood.
- Further studies are needed to assess the overall cost effectiveness of weight loss interventions implemented in obese children

References

1. What reduction in BMI SDS is required in obese adolescents to improve body composition and cardiometabolic health?
Ford AL, Hunt LP, Cooper A, Shield JP. Arch Dis Child. 2010 Apr;95(4):256-61. doi:10.1136/adc.2009.165340. Epub 2009 Dec 4
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