A 3-month low fat diet leads to significant lipid profile improvement in obese T2DM Saudi subjects, without substantial weight loss, and the capacity to manage a damaging high fat meal challenge more appropriately post intervention

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Background

Current evidence highlights that dietary cholesterol, trans-fatty acids and saturated fatty acids (SFAs) are all known to increase the levels of systemic atherogenic lipoproteins and cardiovascular disease. The aim of this study was to observe the direct effect of dietary change, via a calorie-restricted diet on (1) cardio-metabolic profile and (2) a high-fat meal challenge pre- and post 3-month intervention.

Methods

T2DM subjects (Saudi female, age:41.50 ± 6.2yrs, BMI:35.24 ± 7.67kg/m^2, n=50) were given a high-fat meal pre- and post- calorie restricted diet (3 months; 500 kcal deficit/day, balanced diet with complex carbohydrate). Baseline (0 hr) and post-prandial sera (1-4 hr) were taken from subjects, anthropometric and biochemical data was collated at both time points.

Results

On baseline comparison of pre- and post-diet interventions, there were modest reductions in anthropometric data, BMI ($p<0.05$), waist ($p<0.001$) and waist to hip ratio (WHR; $p<0.001$). Baseline HDL-cholesterol increased significantly ($p<0.001$) whilst LDL- and total cholesterol were significantly reduced (pre-total cholesterol: 5.16 ± 0.04 vs post-total cholesterol: 4.74 ± 0.75; pre-LDL cholesterol: 3.85 ± 1.07 vs post-LDL cholesterol: 3.44 ± 0.81, $p<0.05$). The findings also showed significant changes in the effects of high fat meal intake on the metabolic profile pre- and post-diet intervention. At 4hr post-prandially, post-dietary intervention, HDL-cholesterol was 5.6% higher than pre-diet, whilst LDL- and total cholesterol were 12.7% and 9.3% lower, respectively, than at the 4hr equivalent pre-diet ($p<0.01$).

Table 1. Subject s' Characteristics at Pre- and Post Intervention

N		50
Age (years)		41.50 ± 6.23
DM Duration (years)		2.04 (0-9)
	Baseline	**Post-Intervention**
BMI (kg/m^2)	35.24 ± 7.67	35.04 ± 8.07*
Waist (cm)	112.3 ± 13.43	109.21 ± 12.71 **
Hip (cm)	117.11 ± 11.59	116.7 ± 13.18 **
WHR	0.96 ± 0.07	0.93 ± 0.06 **
Glucose (mmol/l)	7.69 ± 2.45	6.84 ± 1.84 **
Triglycerides (mmol/l)	1.79 ± 0.89	1.54 ± 0.82 **
Total Cholesterol (mmol/l)	5.16 ± 1.04	4.74 ± 0.85 *
HDL-Cholesterol (mmol/l)	0.94 ± 0.21	1.06 ± 0.22 **
LDL-Cholesterol (mmol/)	3.85 ± 1.07	3.44 ± 0.81*

Note: Data presented as mean $\pm$ SD; * denotes significance at 0.05 level; ** denotes significance at 0.01 level

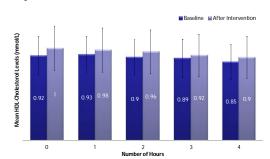**Figure 1**. Mean HDL-Cholesterol Levels Pre- and Post Intervention

Figure 2. Mean LDL-Cholesterol Levels Pre- and Post Intervention
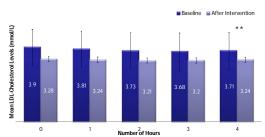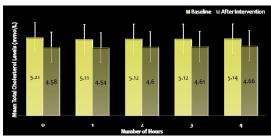

Figure 3. Mean Total Cholesterol Levels Pre- and Post Intervention

Note: ** denotes significance at 0.01 level

Conclusion

Caloric restriction has been observed to be beneficial among T2DM patients in terms of weight loss, and improved cardiometabolic profile [1-3]. These findings suggest that lipid mediators associated with increased cardiometabolic risk can be quickly reversed as a result of a balanced diet, in T2DM subjects without substantial weight loss. As a result, the body is able to cope with the occasional high-fat meal insult, whilst still maintaining a reduced long-term CVD risk. As such, this is a diet that patients with T2DM may be able to adhere to more successfully, longer-term.

References

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