**Abstract poster Endo meeting Orlando 2016**

**Short-Term Effect of Metformin Treatment Coupled with a Low Carbohydrate Diet in Non-Diabetic Overweight and Obese Adolescents**

Childhood obesity prevalence is rising and new therapeutic approaches are needed. Metformin is likely beneficial in obese and/or insulin-resistant children/adolescents, but its role in this setting is still unclear (1). Combined metformin treatment and low-calorie diet has shown a significant anti-obesity effect in hyperinsulinemic obese adolescents compared to a low-calorie diet alone (2).

The aim of this study is to investigate the short-term effect of an ad-libitum, low carbohydrate non-ketogenic high-protein diet coupled with Metformin on weight loss and insulin resistance in nondiabetic overweight/obese adolescents (BMI=33.1±0.5kg/m2). In this post hoc analysis of an existing database, the following data were collected before and three months after the dietary intervention: weight, fasting blood sugar, fasting insulin, cholesterol, triglycerides, HDL- and LDL-cholesterol and calculated HOMA-IR. Safety outcome measures were renal and hepatic function tests (SGOT, SGPT, creatinine, BUN, uric acid) which were collected at baseline and following treatment.

Data emanating from 82 patients (33 males and 49 females), average age of 15.8± 0.2 years, who attended our clinics between 2012 and 2015 were included in this study. Patients were instructed on the diet and placed on metformin (average of 1800.0±70.0 mg/day) in an increasing dosage regimen. No restrictions on use, amount, or type of fat were made, although the use of canola and olive oils was recommended. The diet provided 130-150g of carbohydrate per day to prevent ketosis.

Compared to baseline, the diet led to a significant decrease in weight (94.4±2.1 vs. 87.2±2.0 kg, p<0.001), BMI (33.1±0.5 vs. 30.4±0.5 kg/m2; p<0.001), fasting insulin (21.3±1.5 vs. 13.8±0.8 µIU/ml; p=0.001), triglycerides (111.4±7.3 vs. 89.4±5.3 mg/dl; p<0.001), SGOT (25.9±1.7 vs. 21.0±1.1 µIU/ml; p<0.001), SGPT (33.6±3.1 vs. 25.5±1.8 µIU/ml; p=0.001), and HOMA-IR (4.8±0.3 vs. 3.1±0.2; p<0.001). A weight loss of greater than 5% was observed in 73% of our subjects; moreover, a weight loss of greater than 10% was observed in 22% of our subjects. An almost significant decrease was observed in fasting blood sugar. No significant decrease in total cholesterol and LDL and no significant change in HDL, creatinine, BUN, and uric acid was observed. Side effects observed at the beginning of the treatment with metformin were mostly GI-related, and were resolved within weeks.

The short-term effect of metformin coupled with this diet in non-diabetic obese/overweight adolescents resulted in a safe and tolerable immediate and noteworthy improvement in insulin resistance, with significant changes in several metabolic variables, weight and BMI.

**References**:
(1) Marques et al., International Journal of Adolescent Medicine and Health. 2016; (2)Kay et al., Metabolism 2001