**Abstract poster Endo meeting Boston 2016**

**Short-Term Effects of an Ad-Libitum Low-Carbohydrate Non-Ketogenic Diet Coupled with Metformin on Liver Enzymes**

Weight loss was shown to be associated with improvements in liver enzymes and improvements of nonalcoholic fatty liver disease (1). Improvements in liver histology by improving insulin sensitivity with the use of metformin have been documented; however several of these findings are still controversial (2). Few studies have reported on the short-term effects of a dietary intervention on liver enzymes, albeit on the effect of an ad-libitum, low carbohydrate non-ketogenic high-protein diet coupled with metformin. Evidence has also shown that liver enzymes may transiently increase immediately after weight loss with a very low calorie diet (1).

The aim of this study is to investigate the short-term effect of an ad-libitum, low carbohydrate non-ketogenic high-protein diet on liver enzymes; particularly aspartate aminotransferase (AST or SGOT) and alanine aminotransferase (ALT or SGPT) coupled with metformin. Patients were instructed on the diet and placed on metformin (average of 1945.6±51.8 mg/day). 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. In this post hoc analysis of an existing database, only 48 non-diabetic patients who attended our clinics without known hepatic disease had blood tests done after 2 months of initial consultation. The following data were collected: weight, fasting blood sugar, fasting insulin, cholesterol, triglycerides, HDL- and LDL- cholesterol, SGOT, SGPT; HOMA-IR and BMI were calculated.

Compared to baseline, data emanating from these 48 patients (37 men and 11 women; 8 overweight and 40 obese), average age of 35.2±1.5 years, revealed the following: a significant decrease in weight (109.8±3.3 vs 101.9±2.8 kg; p<0.001), BMI (36.0±0.9 vs. 33.4±0.7 kg/m2; p<0.001), fasting insulin (20.0±2.2 vs. 12.3±0.9 µIU/ml; p<0.001), HOMA-IR (4.8±0.5 vs. 3.0±0.2; p<0.05), cholesterol (212.9±6.2 vs. 201.6±6.1 mg/dl; p<0.05), triglycerides (201.5±15.9 vs. 155.8±20.7 mg/dl; p<0.05), SGOT (41.0±2.8 vs. 27.2±1.6 µIU/ml; p<0.001), and SGPT (66.1±3.8 vs. 43.5±2.9 IU/L; p<0.001). No significant changes in fasting blood sugar, HDL, or LDL were observed. A linear regression analysis conducted while controlling for age and gender revealed that the change in weight was not a predictor of the change in SGOT (CI: -0.65, 3.27; p=0.18) or SGPT (CI: -0.88, 3.93; p=0.21).

The diet coupled with metformin has led to a significant and immediate decrease in SGOT and SGPT; in addition to significant decrease in weight. Neither weight change nor gender or age were predictors of these changes in SGOT or SGPT. We therefore conclude that our dietary intervention, which included a carbohydrate restriction of no more than 130-150g of carbohydrate per day and an ad-libitum intake of protein with metformin, enhances hepatic lipid mobilization, and hence liver enzymes.

**Sources of Research Support: References:**

1. Gasteyger C, Larsen TM, Vercruysse F, Astrup A. Effect of a dietary-induced weight loss on liver enzymes in obese subjects. Am J Clin Nutr 2008, 87:1141-7.
2. Papandreou D, Andreou E. Role of diet on non-alcoholic fatty liver disease: An updated narrative review. World J Hepatol 2015, 7:575-82.