**Abstract poster Endo 2010**

**Elevated Glucagon levels in obese prediabetic hyperinsulinemic patients**

**Introduction:** Fasting Glucagon (FG) levels are documented to be elevated in Type 2 diabetics. The objective of the present study is to investigate Glucagon levels in the pre-diabetic state.  
  
**Methodology:** 113 patients coming for weight reduction were randomly selected for determination of Fasting Glucagon. Of these 74 were further selected by inclusion criteria (healthy, on no medications). Patients were divided into 3 groups according to Glucagon levels: Group1 with FG <100pg/ml (n=29), Group2 had FG http://www.marathonmultimedia.com/graphics/alphabet/ge.jpg100 and <200pg/ml (n=31), Group3 with FG http://www.marathonmultimedia.com/graphics/alphabet/ge.jpg200pg/ml (n=14). The following measurements were obtained: weight, age, Insulin, Glucose, total Cholesterol, Triglycerides, SGOT, SGPT, and BMI and HOMA-IR were calculated.   
  
**Results**: The 3 groups were compared using non-parametric statistical methods due to small sample size. 18.9% of these patients had frank hyperglucagonemia, with FG levels > 200pg/ml.Variables that were significantly different between group 1 and 3 were Fasting Insulin levels (11.70http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg11.00 vs. 14.55http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg6.49, p=0.011), and HOMA 2 index (2.78http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg3.16 vs. 3.28http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg1.26, p=0.018),

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| Frequencies & descriptives of Glucagon Group1 & Group3 | | | | |
| Variable | | Glucagon <100 (n=29) | Glucagon ≥ 200 | P-value |
| Age (yrs) | | 40.87http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg13.08 | 37.36http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg14.19 | NS |
| Gender,n (%) | Male | 10 (34.5) | 6 (42.9) | NS |
|  | Female | 19 (65.5) | 8 (57.1) | NS |
| Weight (kg) | | 85.20http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg15.61 | 97.86http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg24.42 | NS |
| BMI (kg/m2) | | 30.42http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg4.61 | 32.02http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg4.40 | NS |
| Fasting Glucagon (pg/ml) | | 66.46http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg22.73 | 354.36http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg173.84 | <0.001 |
| Fasting Insulin (uUI/ml) | | 11.70http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg11.00 | 14.55http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg6.49 | 0.011 |
| Fasting Glucose (mg/dl) | | 95.52http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg8.98 | 92.86http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg9.65 | NS |
| HOMA-IR | | 2.78http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg3.16 | 3.28http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg1.26 | 0.018 |
| Total cholesterol (mg/dl) | | 197.07http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg27.85 | 190.85http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg41.03 | NS |
| Triglycerides (mg/dl) | | 139.38http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg95.60 | 138.38http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg65.60 | NS |
| SGOT (IU/l) | | 23.79http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg11.53 | 20.18http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg4.75 | NS |
| SGPT (IU/l) | | 31.76http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg23.63 | 3.67http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpg20.20 | NS |

All values are means http://www.marathonmultimedia.com/graphics/alphabet/plusmn.jpgSD unless otherwise indicated. NS: not significant.. P-values between groups by non-parametric tests.  
  
  
**Conclusion:** This study demonstrates that Glucagon levels may be elevated even in the pre-diabetic state, and that it is associated to hyperinsulinemia and decreased insulin sensitivity. The clinical significance of these findings is yet to be elucidated. Further studies that measure GLP-1 and DPP-IV in this subcategory of obese non-diabetic hyperinsulinemic subjects need to be performed in order to shed light on the cause of this hyperglucagonemia.