Effect of short term erythropoietin therapy on insulin resistance and some appetite neuropeptides in end stage renal disease patients on hemodialysis

Thesis

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Summary

Insulin resistance (IR) is a characteristic feature of uremia. As long as hyperinsulinemia is adequate to overcome insulin resistance, glucose tolerance remains normal. Insulin resistance and the metabolic syndrome are common in patients with CKD and they predict subsequent cardiovascular events and mortality. Insulin resistance results from a combination of genetic and environmental factors, few studies have shown favorable effect of erythropoietin in decreasing insulin resistance,so Insulin resistance, as potentially modifiable cardiovascular risk factor, is currently considered as a therapeutic target in patients of CKD.

Based mainly on experimental data, presence of a negative feedback loop between leptin and NPY secretions seems to be highly likely.As appetite is markedly reduced in uraemic patients but improved in patients on rHuEpo therapy, it was interesting to examine the relationship between plasma leptin and NPY levels in uraemic patients before and during rHuEpo treatment.

The present study is conducted to assess the possible effects of short term treatment with recombinant human erythropoietin (rHuEpo) therapy on the degree of insulin resistance (IR), plasma leptin and neuropeptide Y concentrations in 15 haemodialysed patients (HDP) receiving rHuEpo (Epo group) compared to other 15 HDP not treated with rHuEpo (No-Epo group) .

A total number 30 patients of end stage renal disease on regular three times weakly hemodialysis were divided into two groups;

Group I – Control group (n=15) including patients with ESRD on regular Hemodialysis but these cases are not receiving erythropoietin .

Group II– Study group (n=15) consisted of patients (7 diabetics and 8 non diabetics) with ESRD who are on regular Hemodialysis & are given subcutaneous erythropoietin.

All the patients gave written consent and are thoroughly examined in detail and all basic laboratory investigations are done including Serum fasting insulin levels, HBA1C, Fasting blood sugar, leptin and NPY estimation. Patients were evaluated every month for adherence to treatment, adverse effects and clinical outcome.

In this study, insulin resistance was calculated by HOMA-IR (Homeostasis model assessment), a computer generated model, because of its simplicity and it requires only measurement of the fasting plasma insulin and plasma glucose. Other investigators have also calculated insulin resistance by HOMA-IR

Results

The results of present work **showed** a significant decrease (P-value < 0.05) in the mean values of **fasting insulin** levels as well as **insulin resistance** (calculated by HOMA-IR) in the studied group after three and six months as compared to the base line; on the other hand the control group showed insignificant changes *(tables 3,5 and figures 3,4)* .

The results of present work showed a significant decrease in the mean values of **HA1C** (P- value < 0.05) in the studied group after three and six months as compared to base line; on the other hand, the control group showed insignificant changes as compared to base line *(table 10 and figures 8).*

The results of present work showed *a significant decrease in the mean values of leptin (P- value < 0.05) in the studied group after three and six months as compared to base line; on the other hand, the control group showed insignificant changes as compared to base line* **(table6 and figures 5).**

The results of present work showed *a significant increased in the mean values of* **NPY** *(P- value < 0.05) in the studied group after three and six months as compared to base line; on the other hand, the control group after three and six months showed insignificant changes as compared to base line* **(table 7 and figures 6).**

As shown in this study ***significant correlation*** found between plasma leptin and NPY levels study group; *on the other hand, the control group showed insignificant* correlation.

In conclusion, rHuEpo treatment in haemodialysed patients with chronic renal failure is followed by improvement of appetite and insulin resistance in the studied group in form of a significant decline of HOMA IR, leptinaemia, HA1C and a significant increasing of NPY; on the other hand the control group showed insignificant changes. As appetite is markedly reduced in uraemic patients but improved in patients on rHuEpo therapy, this result is obtained by studying the relationship between plasma leptin and NPY levels in uraemic patients before and during rHuEpo treatment.