

## ADULT

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#### HORMONAL, ECG AND EEG CHANGES DURING RELATIVE HYPOGLYCEMIA IN UNCONTROLLED TYPE 2 DIABETES MELLITUS PATIENTS: A PILOT STUDY

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#### INTRODUCTION

Counter-regulatory mechanisms lead to autonomic and neuroglycopenic symptoms in response to hypoglycaemia. Elevated cortisol, glucagon and epinephrine affect heart and brain activities. The effect of relative hypoglycemia is not known. Our aim was to evaluate cortisol, glucagon and epinephrine levels and determine EEG and ECG changes during relative hypoglycemia in patients with uncontrolled type 2 diabetes (T2D).

#### METHODOLOGY

Fifteen patients with uncontrolled T2D were started on Actrapid® infusion at a rate of 0.05 unit/kg/hour. The rate was titrated by 1 unit/hour every 10 minutes until the onset of hypoglycemic symptoms. Blood glucose was monitored at five minute intervals. Blood glucose, cortisol, glucagon, epinephrine, EEG and ECG were assessed at baseline and repeated during relative hypoglycemia.

#### RESULTS

The patients had a mean age of  $47.2 \pm 9.59$  years and median diabetes duration of 5 years. Mean weight, body mass index, HbA1c and fasting blood glucose were  $76.67 \pm 12.19$  kg,  $30.2 \pm 4.29$  kg/m<sup>2</sup>,  $10.4 \pm 1.4\%$  and  $11.25 \pm 3.58$  mmol/L, respectively. Mean pre-procedure blood glucose was  $9.69 \pm 2.25$  mmol/L, while median glucose during relative hypoglycemia was 6.70 mmol/L. Thirteen (86.7%) patients experienced autonomic symptoms, mainly hunger, sweating and palpitations. Mean baseline glucagon level was significantly higher than relative hypoglycemia (4842.93 versus 4300.13 ng/L,  $p=0.041$ ). There were no statistically significant differences in cortisol and epinephrine levels during relative hypoglycemia compared to baseline (296.87 versus 254.2 nmol/L and 1028.0 versus 1324.0 pmol/L, respectively). Eight (53.3%) patients showed generalized background attenuation in EEG during relative hypoglycemia. None of the patients had ECG changes.

#### CONCLUSION

High baseline glucagon levels were seen in the patients with T2D. Anxiety during relative hypoglycemia leads to high epinephrine levels and EEG changes. ECG changes were not seen possibly because these would be observed with lower plasma glucose.