# Alterations in electric activity in stomach in diabetic patients suffering from nephropathy

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**Abstract: In this study, the alterations of electric activity in stomach in diabetic patients are studied by using electrogastrography recording device. A 30 min. EGG recording was performed to diabetic patients with nephropathy and healthy subjects pre- and postprandially. Preliminary results show that the EGG activity of diabetic patients can be altered compared to healthy volunteers.**

## INTRODUCTION

Motility disorders occur in 20-30 % of diabetic patients. Motility disorders are known to be related to the state of autonomic neuropathy, high blood glucose levels and electric disorders of the stomach.

In this study, electrogastrography (EGG) was recorded in 15 diabetic patients with nephropathy and in 10 normal subjects. The main goal of the study was to find out whether electric disorders correlate with altered motility, the stage of autonomic neuropathy, blood glucose levels and symptoms, as well as to clarify the usefulness of EGG-recording in evaluation of dyspepsia.

## METHODS

The recording system consists of an electrocardiography (ECG) amplifier, a portable computer, measuring board and recording and analysis programs. The whole system is home assembled. A standard Mingocard 7 ECG amplifier with standard ECG limb leads connected to a portable computer equipped with a commercial AD-converter and signal processing software is useful equipment for EGG recording from body surface. The triangular recording connection, which is derived from bipolar limb connections by placing electrodes on appropriate positions on upper abdomen is sufficient for EGG activity recording.

The recordings were performed in supine position. First an EGG sample of 30 minutes was collected after an overnight fast. Then the subjects had a standardized meal and subsequently EGG was registered postprandially for 30 minutes. Three EGG channels were recorded and stored with a sampling frequency of 1 Hz.

The analysis was performed using MATLAB software package. The signals were prefiltered with a band pass filter (lower frequency limit 0.01 Hz, upper frequency limit 0.14 Hz), analyzed using fast Fourier transform technique and presented for visual evaluation as a waterfall plot using 2 min. stripes.

Blood glucose counts were measured during EGG-recordings. The state of autonomic neuropathy was measured by a series of standard clinical tests. The rate of gastric emptying of solid food was measured in 4 patients using a technetium labeled test meal and scintigraphy.

## RESULTS

In healthy subjects, a frequency of about 0.05 Hz (3 cycles per min.) is noticed in EGG, and after the test meal, a significant rise in the power of EGG-signal can be seen. This 0.05 Hz activity was absent in most diabetic patients. After the test meal some of the diabetic patients showed 0.05 Hz activity. In some patients the EGG showed totally blurred noise-like activity.

## CONCLUSION

Preliminary recordings show that the EGG activity of diabetic patients can be seriously altered compared to healthy subjects.

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