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## The Spironolactone Test

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The aim of our study was to assess the favourable effects of spironolactone in patients (pts) with arrhythmias and/or diffuse troubles of repolarization (DTR) on ECG, without cardiac failure. This test is designed for the evaluation and the control of K<sup>+</sup> losses correcting the ionic imbalance at the ill myocardial cell level. *J Clin Basic Cardiol 2002; 5: 103.*

**Key words:** spironolactone, cardiac arrhythmias, ECG alterations

For more than 30 years spironolactone has been successfully used, especially in class III–IV heart failure patients, both for its diuretic effect at the distal renal level, complementary to other diuretics and for controlling potassium loss induced by diuretics thus decreasing digitalis toxicity and the arrhythmias promoted by hypokalaemia. Recently it has been established that spironolactone in low doses controls some harmful aldosterone effects by acting on the cardiac and vascular receptors: myocardial fibrosis and pathologic hypertrophy, decreasing of large artery compliance and of baroreception, facilitating norepinephrine action, ischaemia and arrhythmias [1–4].

### Materials and Methods

This study was inspired by an analysis carried out by two doctors. Patient 1: C. B., male, 67 years of age, with antecedent urinary lithiasis, had presented for four years constant and serious ECG DTR (ST-testosterone segment depression, low or negative T wave), associated with non-characteristic symptoms for ischaemic heart disease, but interpreted as such. Thus, the pt received daily treatment with anti-ischaemic drugs without any signs of improvement of the repeatedly checked ECG. The DTR, being less characteristic to localise topography of coronary artery disease, suggested the possibility of some diselectrolytic changes. Consequently, the K charging test was performed (1 gr CLK/10 kg body weight, *per os*), although the kalaemia was normal (4.1 mEq/l), but this test produced no ECG improvement. On the other hand, the oral administration of spironolactone (50 mg/day) produced a complete normalization of ECG after a week.

The second pt was P. E., a 49 year old woman, also with antecedent urinary lithiasis and presenting atrial and ventricular extrasystoles refractory to various antiarrhythmic drugs for more than two years. The Holter monitoring showed 900 ventricular and 32 supraventricular extrasystoles/24 h after the last antiarrhythmic treatment, but after one week of oral spironolactone treatment (50 mg/24 h) their number decreased to 9, respectively 15/24 h. Her initial kalaemia was 4.2 mEq/l. By using the same method we investigated a group of 20 pts with DTR and/or cardiac arrhythmias (m: 5; w: 15; average age: 56 years, ranging from 35 to 79; average kalaemia: 4.2 mEq/l, between 3.9 and 5.0). Most often the pts showed the following diseases, sometimes associated ones: coronary heart disease (12 pts), – here we would like to mention a case misinterpreted as microvascular angina, but ECG was normalised after the spironolactone test – high blood pressure (7), arrhythmias due to various causes (16), chronic urinary disturbances without severe renal failure (16) – where frequent

night mictions were the most significant symptom. Nycturia is a very important symptom, but, unfortunately, very neglected too in the anamnesis of cardiovascular pts and the treatment of the associated urinary diseases will also be required.

### Results

The results of this new test of spironolactone that we suggested for therapeutical and diagnosis purposes has induced a significant improvement of DTR in 12 pts (60 %), insignificant changes in 4 pts (20 %) and an increase of pathological modifications in 4 pts (20 %). Increased DTR after spironolactone administration are probably due to a different capacity of absorption in K<sup>+</sup> of the normal cell in comparison with the abnormal one. Controlled by Holter monitoring, the antiarrhythmic effects of the spironolactone test were significant ( $p < 0.05$  %) for 75 % of pts with atrial and/or ventricular extrasystoles, which justifies spironolactone being thought of as an antiarrhythmic drug, too.

### Discussion

The cell electrolytic recovery fights against the various harmful influences (organic or functional) which disturb the electrolytic balance of affected cellular membranes. These influences may not always be due to an authentic hiperaldosteronism, as suggested by the normal values of kalaemia. The antiarrhythmic effects of spironolactone, frequently associated with the normalization of DTR, as opposed to other antiarrhythmics producing various ECG alterations, operate within the physiological character of the working mechanism of spironolactone in the repair of the cell. Theoretically, the recovery of sick myocardial cell through the administration of spironolactone in low doses, without diuretic effects, recommends this drug for the possible treatment of some pts with myocardial infarction as well. After the spironolactone treatment pts told us about an improvement in general state, probably due to recovery of the electrolytic balance at the various levels of the body.

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