1 INTRODUCTION

• Patients with residual or no kidney function often present electrolyte disturbances. Oftentimes, these patients display an increase of extracellular serum K⁺ levels, a clinically silent medical condition known as hyperkalemia [1-3].

• Hyperkalemia can cause life-threatening arrhythmias and cardiopulmonary arrest and, thus, its early detection is essential to save lives [1-2], [4].

• This study aimed to find an unobstructive method to detect electrolyte disturbances early and remotely, particularly serum K⁺ fluctuations. For that, we investigated which ECG parameters are sensitive to fluctuations by comparing ECGs before and after haemodialysis (HD) morphological and T-wave model-based features.

2 DATA

• 3 leads short term ECGs (~1 min) were acquired before and after HD using the CARRE Multimetricar body composition scale [5].

• Data set: 33 patients (17 males, 16 females, average age 55.9±15.92 years)

3 SIGNAL PROCESSING

• The highest quality ECG was chosen using the Signal Quality Index (SQI) proposed by [6].

• Pre-processing:

4 MODEL-BASED T WAVE FEATURES

• Model-based parametrization are more robust to noise:

5 MORPHOLOGICAL ECG FEATURES

• T wave delineation was performed using the proposed method in [9]. Only positive waves were considered.

6 RESULTS

• 22 ECGs before and 23 ECGs after HD passed SQI test;

7 CONCLUSIONS

• 5 ECG features can be detectors of electrolyte fluctuations (3 lognormal-based features and 2 morphological features):

8 FUTURE DEVELOPMENTS

• This study is limited by the fact that no blood tests were made before and after HD. It doesn't ascertain if the patients were in a hyperkalemia state or not. Future developments require improvement of this limitation.

• Perform blood tests to make the exact electrolyte levels in the blood and construct a personalized estimator of serum K⁺ levels.

• Evaluate other type of parameters such as HRV and other fitting functions.