Long-Term Characterization of Arterial Blood Pressure Series

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OBJECTIVE: To study how arterial pressure values increases and decreases during the so-call till test, which is the tool universally used to evaluate people with faint episodes. Not only what is happening but how, that is calculating the angle of the pressures ramps. This is achieved from smoothed versions of systolic pressure series.

METHODS: Ten-minute segments of arterial blood pressure recorded during tilt test procedures were selected. Those studies were done to fifty subjects (33 females and 17 males) at Fernandez Hospital using a non invasive continuous blood pressure monitor at the radial artery.A method is used to detect systolic points from continuous arterial blood pressure. Depending on test results, they are classified as positives or negatives. Those from healthy subjects are controls. A five order Butterworth low pass filter is applied to time series. The inflection points that have different sign in their slopes are the endpoints of the segments and we call them breakpoints. If they are link together, a simpler representation of the original series can be obtained. To this simplified version of the original time series we can apply different computations to extract some parameters which can serve as discrimination factors. For each record four parameters were extracted: the maximum pressure (MP) difference and the maximum angle (MA) between breakpoints for both signs.

RESULTS: MP+ was 14.56 $\pm$ 5.78 mmHg. in controls, vs. 17.93 $\pm$ 10.39 mmHg and 17.86 $\pm$13.26 mm Hg in positives and negatives respectively. MP- was -13.53 $\pm$ 6.12 mmHg in controls, vs. -17.71 $\pm$ 6.50 mmHg and -15.67 $\pm$ 9.61 mmHg in positives and negatives respectively. MA+ was 27.52 $\pm$ 10.86 degrees in controls vs. 30.44$\pm$11.84 degrees and 33.63 $\pm$ 17.41 degrees in positives and negatives respectively. MA- was -23.36 $\pm$ 8.54 degrees in controls versus -31.58 $\pm$11.50 degrees and -31.87 $\pm$18.58 degrees in positives and negatives respectively. In all the cases controls have lower values and lower standard deviations, but due to the greater dispersion in positives and negatives, significant differences cannot be reached.

CONCLUSION: These parameters were preliminary chosen for their simplicity. Although they are not significantly different, many others can be tested starting from this approach.