BLOOD PRESSURE ASSESSMENT DURING STANDARD CLINICAL MANOEUVRES: A NON-INVASIVE PPT BASED APPROACH

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Introduction:

Continuous and reliable blood pressure (BP) monitoring during standard clinical manoeuvres provides important information about the cardiovascular system condition. Common invasive methods are accurate but denote increased risk. An alternative approach is based on changes in pulse transit time (PTT) defined as the time delay between the R-wave of the electrocardiogram (ECG) and the peak value of the photoplethysmogram (PPG) signal at the same cardiac cycle.

Objective:

The main goal of this work is to estimate BP variations derived from PTT changes during typical clinical autonomic manoeuvers associated with BP variations (e.g. lower limb elevation, orthostatic changes, and Valsalva). Furthermore, the validation of these blood pressure variations was also addressed.

Methods:

Using the commercial equipment BIOPAC MP35, a set of ECG and PPG signals were acquired from healthy individuals during the manoeuvers, and PTT is calculated. Afterwards, the variations of BP were computed using a mathematical relationship and a blood pressure variation curve was obtained.

Results:

To validate the accuracy of this method, BP curves derived from PTT were compared with well-known pressure variation changes associated with the autonomic manoeuvres, from which the pressure profile is well documented in physiological studies. BP variations behave accordingly to responses from feedback mechanisms to maintain homeostasis.

Conclusions:

This work establishes a diverse approach to assess BP changes, which proved to be reliable and accurate. The use of this methodology is an alternative to invasive and uncomfortable methods.

Descriptors: Blood Pressure, Pulse Transit Time, Clinical autonomic manoeuvres.