THE VALUE OF A NEW PARAMETER THE HYPOTENSION PROBABILITY INDICATOR (HPI) TO PREDICT AND TREAT HYPOTENSION DURING SPINAL ANESTHESIA

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Background and Goal of Study: Hypotension (HP) is the most common side effect of spinal anesthesia (SA) (1). The Hypotension Probability indicator (HPI), is a new parameter that has been recently developed to determine the risk of a patient trending to show cardiovascular instability, that is to have a hypotensive event, defined as mean arterial pressure (MAP) < 65mmHg for at least one minute. HPI is based on a mathematical algorithm which uses the waveform from a FloTrac IQTM sensor and displays the calculated value as numeric % over the range 0 to 100%, where the first warning occurs when HPI exceeds 85%. The aim of the present investigation was to test whether values of HPI above 85% (HPI >85%) may predict cardiovascular instability, that is HP with two known definitions of this entity (1,2)

Materials and Methods: After IRB approval and written informed consent, 30 consecutives patients ASA III-IV with known cardiovascular disease, that received SA were prospectively studied. Bupivacaine 0,5% was used to block at L3-4. SAP, MAP, HR, CI, SVRI and HPI were continuously measured through an artery line, connected to a Flo TracIQTM sensor (Edwards LifeSciences, Irvine CA). HP was defined and treated when SAP>25% from its baseline value (Threshold>25%baseline) in 20 patients (1). While in other 10 patients, HP was defined to a decrease of SAP< 100mmHg (Threshold<100) (2). ROC curve analysis and sensitivity/specificity and the area under the curve (AUC) of the HPI >85% was used to predict the definition of HP and the need of treatment as the final outcome, at treated time (TT), that is at both definitions of HP, and at 1, 2, and 5 minutes before.

Results and Discussion: The main results are displayed in figure 1. HPI >85% predicted both definitions of HP at TT, with a sensitivity of 86,7% and AUC of 0.928 for Threshold>25%baseline, and 100% and 0.997 respectively for Threshold<100 . It is interesting to note that this prediction was present 2 min before treatment with a Threshold<25%baseline, sensitivity of 54,7% and AUC .877. While with Threshold<100 the same was true and even much better but during 5min before, sensitivity of 77% and AUC 0.949. Our results demonstrate that HPI >85% predicts HP and more importantly its treatment with almost 2 min in advance when a baseline threshold is used and with 5 min when an absolute value one.

Fig 1. Main hemodynamic results of the study

Conclusion(s): The present study strongly suggest that HPI predicts cardiovascular instability during SA, stated by two different definitions of HP. Moreover, it also suggest that HPI>85% values can be used as a goal of HP treatment in the future. However, more patients, other HP thresholds and the effets of heart rate as markers of cardiovascular SA instability are needed to be tested to confirm our results.

References: 1) Green N, Burll SL, Baltimore;1992; 2) Burns SM, anes-thesis 56,794; 2001

Fig 2. Example of a patient treated when SAP>25% from its baseline value (GroupThreshold>25%baseline= 20 patients)

Fig 3. Example of a patient treated when SAP<100mmHg from its baseline value (GroupThreshold<100= 10 patients)