

The Change of Upper Limbs PVI in Spinal Block (The Comparison in High Spinal Block and Non-High Spinal Block).

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Background

PVI (Pleth Variability Index: Pulse wave change index) calculates a respiratory-related change of PI (Perfusion Index) automatically and expressed it ratio ($(PI_{max}-PI_{min}) / PI_{max} \times 100\%$). It is said that PVI changes with a change of circulation change (BP, CO) under the general anesthesia.^{1) 2)} [Purpose] We examined how PVI changed in spinal block (SAB).

Methods

The cases (Caesarean procedures, TUR-P, inguinal hernia repaired) under SAB were planned. We attached PI & PVI sensor (Masimo Radical-7) to upper limbs and PI sensor (Masimo Radical-7) to lower limbs at the time of entering a room. We recorded parameters (PI & PVI of upper limbs/PI of lower limbs) as previous values. SAB was performed by L2/3 or L3/4 and injected 0.5% bupivacaine (2.0-2.3ml). We recorded (PI&PVI/PI) as immediate post-SAB values. (PI&PVI/PI) were subsequently recorded every 2 minutes. Simultaneously, blood pressure (BP) was measured. We divided into 2 Groups (high-SAB and non-high SAB). High SAB group is anesthetic level reached C-area. Non-high SAB group is its level did not reached the C-area.

Results

At high SAB group, BP decreased, PI of lower limbs increased, PI of upper limbs increased and PVI of upper limbs decreased. On the other hand, at non-high SAB group, PI of lower limbs increased, but BP, PI & PVI of upper limbs hardly changed.

Discussion

It is reported that PVI decreased with increasing of BP₁₎ and CO₂₎ under Trendelenburg position. This mechanism is that Trendelenburg position increase of venous return. Increasing of venous return increases CO. Increasing CO increases peripheral arterial blood flow. Increase in peripheral arterial blood flow increases PI. Increasing PI minimize the respiratory changes of PI ($=PI_{max}-PI_{min}$). For that reason, we think that PVI ($(PI_{max}-PI_{min}) / PI_{max} \times 100\%$) decreased. In our study, BP (CO) decreased, but PI increased and PVI decreased of upper limbs at high SAB group. High SAB dilates vessels and increases blood flow of upper limbs. Getting better blood flow to upper-limbs increases PI. As a result, we think that PVI decreased. It is shown that PVI changes by a different mechanism with general anesthesia and SAB.

References: 1) Canesson, MD et. al. *Aneth & Analg* 2,008, It is 1189-94 106. 2) Keller et.al. *Critical Care* 2,008, 12:00 R37