The effects of the sitting position on the cardiac output during spinal anesthesia

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Introduction:
The choice of the sitting position (STP) and its maintenance for short periods of time, when a spinal (SA) anesthesia is used, is a common practice for certain surgical procedures. Hypotension (HP) is frequently associated to SA and cardiac output (CO) plays a capital role in its aetiology (1). However, to date there is no data on the effects on CO of that position during and after SA.

Material and Methods
After IRB approval, 30 ASA I-III patients scheduled to SA were prospectively studied. Bupivacaine 0,5% (9-15mg) was used to block patients at L2-3-4 space in the STP. Blood systolic pressure (BSP), heart rate (HR), stroke volume index (SVI), cardiac index (CI) and systemic vascular resistance index (SVRI) were continuously measured using a finger volume clamp device, that measures noninvasively CO. Data were collected after 5min in every step, in the supine position (SUP) (step 1), then there were placed in the STP before SA (step2), and reminded there during another 5min after SA (step 3), the patients were replaced to the SUP (step 4). Sensory block height (SBH) was determine by pin pick, during every step after SA. Data were statistically analysed with t-Test (p>0,05).

Results: The age = 64+/-12 y, height =169+/-9 cm and weight =82+/-15 Kg. The STP produced a decrease the preload to the heart, as the fall of the 13% of both SVI and of 11% in CI shows (Table1). On the other hand, SBP was well maintained due to an increase in SVRI (%â³, =17%). SA causes a fall in SBP and SVRI in both positions, although replacement of SUP re-established SVI and CI to SUP values in spite of the block (Table 1).

Discussion: Gravity as a result of the effect of the STP induced a decrease in venous return to the heart, which was compensated by a vasopressor barorrorceptor mediated response that maintained SBP (2). Hypotension due to SA is caused by a decrease in SVR when the SBH is below T8, although the decrease of CO as long as SBH rises above there takes responsibility in that entity, being the major determinant at T4, as we have recently reported (1). Thus, the aetiology of HP goes on the opposite direction to the defensive physiologic body response to STP. Our data suggest that the maintenance of STP under SA longer than 5 min and/or in patients with compromised cardiovascular reserve, may put them at risk of developed severe cardiovascular collapse.

References: 1) G. Solares et al. Do we really know what cause hypotension after spinal anesthesia?.Euro J of Anesthesiology 34;55S,2017; 2) W. Ganon, Review of Medical physiology,1991