Relative Hypotension in the Beach-Chair Position: Effects on Middle Cerebral Artery Blood Velocity.

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When anaesthetising for arthroscopic shoulder surgery, it is common practice to sit patients in the beach-chair position and to optimise arthroscopy by allowing relative hypotension. There is little published information regarding the cerebral haemodynamic effects of hypotension in the sitting position during general anaesthesia.

In this study, 19 patients scheduled for shoulder surgery were anaesthetised with desflurane. Phenylephrine and/or remifentanil were used to control blood pressure. Cerebral haemodynamics were assessed by monitoring middle cerebral artery blood velocity (Vmca) with transcranial Doppler, and by invasive arterial pressure monitoring with the transducer kept level with the external auditory meatus. Pressure and velocity waveforms were analysed to calculate apparent zero flow pressure (aZFP) and resistance area product (RAP). Cerebral haemodynamics while anaesthetized supine at the pre-induction blood pressure were compared with haemodynamics while seated at 45 degrees with hypotension. According to our routine practice, blood pressure management was guided by non-invasive measurement of systolic pressure using an arm cuff.

Changing from supine/normotensive to sitting/hypotensive caused mean arterial pressure at the auditory meatus to decrease 47 \pm 7 \% and Vmca to decrease 22 \pm 7 \%. In the beach-chair position, systolic pressure was 96 \pm 10 mm Hg in the arm and 76 \pm 10 mm Hg at the auditory meatus (p < 0.0001). Both RAP and aZFP decreased, suggesting decreases in cerebrovascular resistance and critical closing pressure.

Although there was some evidence of an autoregulatory response, Vmca decreased when relative hypotension was induced in patients anaesthetized with desflurane in the beach-chair position.