Effects of compression stocking on cerebral oxygen saturation in patients undergoing surgery in beach-chair position

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Background

- Catastrophic neurologic complications related with shoulder surgery in the beach chair position have been reported.
- Cerebral oximetry has recently gained popularity as a noninvasive means of estimating cerebral perfusion through the measurement of cerebral oxygenation.
- We aimed to investigate the effects of applying the thigh-high compression stocking on cerebral oxygen saturation trying to reduce cerebral desaturation events in adults undergoing surgeries in the beach chair position.

Materials and methods

- Patients were assigned randomly to either
 - 1) the control group (n=15)
 - 2) thigh-high compression stocking group (n=14)
- All patients were placed in the supine position and sensors for Near-infrared spectroscopy (NIRS) and BIS were placed.
- General anesthesia
- Beach-chair position tilting up to 40°
- Measurements
 - ✓ Non-invasive blood pressure (the level of arm)
 - ✓ Invasive arterial blood pressure (the level of the external auditory meatus)
 - ✓ Regional cerebral tissue oxygen saturation (rSO₂)
- Time points
 - ✓ after anesthesia induction
 - ✓ 3 minutes after the beach-chair position
 - ✓ 5 minutes after the beach-chair position
 - ✓ 1 hour after the beach-chair position
 - ✓ 5 minutes after the supine position
- Definition of cerebral desaturation events
 - ✓ Decrease in the rSO₂ of 20% or greater from the preoperative baseline or ≤55%
- Treatment if cerebral desaturation events occur
 - ✓ Check blood pressure, depth of anesthesia, end-tidal carbon dioxide tension, and hemoglobin
 - ✓ Intravascular fluid and/or ephedrine 5 mg iv

Results

- Patient characteristics, including age, sex, height, weight, preoperative hemoglobin values and medical condition such as hypertension and diabetes were similar between two groups. There was no significant differences observed between groups in the type of surgery, the duration of beach chair position, crystalloid administration and blood loss.
- The incidence of hypotension was 41.2% in the control group and 7.1% in the compression stocking group (P=0.038). There was no significant difference in the incidence of cerebral desaturation events between groups.

Conclusion

This study showed that overall patients showed a decrease of the value of blood pressure and rSO₂ after the beach chair position. The thigh-high compression stocking reduced the incidence of hypotension but could not contribute to prevent cerebral desaturation events.