

1 Summary

Hemodynamic monitoring is a fundamental part of perioperative care. This thesis deals with hemodynamic changes due to the prone position under physiological, awake state and under general anesthesia during spondylosurgical procedures and to assess the influence of the patient's body support. The next goal was to evaluate the effect of extended non-invasive hemodynamic monitoring on perioperative circulatory stability, used hemodynamic interventions, and the occurrence of postoperative complications. This work consists of two separate studies.

In the study „**Hemodynamic changes in prone position - a non-invasive physiological study**“ 12 healthy volunteers older than 18 years were included. Non-invasive hemodynamic measurement was initiated using ClearSight/EV 1000 system in supine position (S position). Cardiac index (CI), stroke volume index (SVI), stroke volume variation (SVV), systemic vascular resistance index (SVRI) and mean arterial pressure (MAP) were recorded. Following parameters were measured using ultrasound at predefined sites: expiratory area of v. cephalica (sVCe), v. saphena (sVSe), v. jugularis interna (sVJe), expiratory and inspiratory area (sVCle a sVCIi), and maximum and minimum diameter (dVCI_{max} a dVCI_{min}) of v. cava inferior and index of collapsibility (VCI CI) were calculated. Corrected carotid flow time (ccFT) was measured using a Doppler ultrasound. All measurements were repeated in unsupported (P1 position) and supported (P2 position) prone positions with supported chest and pelvic regions. There were no differences in CI, SVI, SVV and ccFT values between positions. Significantly different values of MAP and VCI CI were observed between positions. Higher SVRI in P1 position in comparison with S position, higher sVJe in prone positions and lower dVCI_{min} in P2 position in comparison with P1 position were recorded. No differences in cardiac output and preload were detected after proning in unsedated healthy volunteers. Prone position was associated with changes of systemic vascular resistance, blood stagnation in jugular catchment area and, in unsupported prone position, increased collapsibility of inferior vena cava.

In the study „**The Impact of Individualized Hemodynamic Management on Intraoperative Fluid Balance and Hemodynamic Interventions during Spine Surgery in the Prone Position: A Prospective Randomized Trial**“, fifty adult patients ASA I-III who underwent spinal procedures in the prone position were included. In the intervention group, individualized hemodynamic management followed a goal-directed protocol based on continuously non-invasively measured blood pressure, heart rate HR, cardiac output CI, systemic vascular resistance SVRI, and stroke volume variation SVV. In the control group, patients were monitored using intermittent non-invasive blood pressure monitoring, and the choice of hemodynamic intervention was left to the discretion of the attending anesthesiologist. The prone position was associated with a lower CI, stroke volume and mean arterial pressure compared to both post-induction and baseline values. HR, SVV, SVRI remained unchanged after prone positioning compared with baseline values and values after induction of general anesthesia. During the procedure, the use of individualized hemodynamic management led to more frequent recognition of hypotension and was associated with more interventions, specifically with an overall higher fluid intake and more frequent use of ephedrine.