Comparison of anesthetic induction with and without beat-to-beat invasive arterial pressure monitoring.

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Goal of Study: There is evidence that hemodynamic fluctuations have some relation to morbidity. Low mean blood pressure (BP) or dramatic decrease of mean BP during surgery correlate with cardiac adverse events. Thereby, rapid correction of BP and its maintenance in normal limits is crucial. We decided to test whether applying of invasive arterial BP monitoring before induction of anesthesia could improve hemodynamic fluctuations during induction of anesthesia.

Materials and Methods: Radial artery was cannulated in all patients. Noninvasive BP measurement applied at the other hand and were performed every minute. Capture of data was accomplished by VitalSignsCapture program via RS232 port. Frequency of data capturing was 5 sec, so we obtained a gross sample size for each patient. Next step patients were randomized into 2 groups. In the first group (NIBP) invasive BP measurement was hidden from anesthesiologist, so physician performed induction of anesthesia using only noninvasive BP measurement (n=21). In the second group (INV) both invasive and noninvasive BP data were uncovered for physician (n=16). Data were capture from the beginning of the induction until 5 min after intubation.

A total of 37 patients undergoing cardiovascular and thoracic surgery were included. There were no difference between the groups in demographic data and comorbidities. All data present in median [interquartile range].

Results: Time before intubation was significant longer in INV group compared to NIBP group: 605 sec [540;700] and 497,5 sec [370;632,5], respectively ($p=0,04$); possibly, because anesthesiologist tried to control pressure before intubation.

In NIBP group there were 4 cases (25%) of critical hypotension (defined as mean BP < 55 mmHg), compared to 0 in INV group ($p=0,028$). Duration of hypotension was 30 sec, 1 min 20 sec, 1 min 35 sec and 3 min 45 sec. Although difference between groups with respect to heart rate, systolic, diastolic, mean BP and ST segment changes were insignificant.

We conducted Bland-Altman comparing of invasive and non-invasive BP in each case and revealed that non-invasive BP measurement overestimated invasive BP in low ranges and underestimated it in high ranges even if measurement was performed every minute.

Conclusion: Invasive arterial BP monitoring improves hemodynamic fluctuations during anesthesia induction and prevents from critical hypotension.