

Clinical experience with perioperative non-invasive beat-to-beat arterial blood pressure monitoring

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Increasing age and preexisting comorbidities like hypertension and diabetes characterize the current population of patients undergoing anesthesia and surgery. Among others, this may increase the risk for hemodynamic instability and the development of complications in the perioperative period. Consequently, a shift in focus has been observed from intraoperative care towards preoperative risk assessment and postoperative monitoring in these patients.

The increasing attention for preoperative risk assessment, diagnosis of hemodynamic abnormalities and early detection of postoperative complications in the general surgical population warrants non-invasive hemodynamic monitoring techniques that allow evaluation of the cardiopulmonary condition of the patient. In particular, indices like pulse pressure variation and pulse contour-derived cardiac output require beat-to-beat blood pressure measurements, which are not provided by routine blood pressure manometers. Moreover, most beat-to-beat blood pressure measurement methods are limited by their invasive nature, and thus restricted to patients with an intra-arterial entrance like patients admitted to an intensive care unit.

We here present our clinical experience with a non-invasive, beat-to-beat arterial blood pressure monitoring device (Nexfin HD) during preoperative risk assessment and intraoperative and postoperative hemodynamic monitoring. Using a finger blood pressure cuff, this device enables arterial blood pressure measurements in adults and potentially children. Moreover, Nexfin HD allows derivation of dynamic preload variables like the pulse pressure variation and cardiac output, which may be useful to evaluate the perioperative circulatory state of surgical patients.

Data will be shown with regard to the reproducibility of non-invasive arterial blood pressure measurements and the comparability with invasive arterial blood pressure measurements in adults and children. Additionally, cardiac output monitoring by Nexfin HD and echo-Doppler is compared, and its application in pulse pressure variation monitoring will be presented. Finally, data will be shown with regard to Nexfin HD non-invasive arterial blood pressure measurements during preoperative evaluation of autonomic function, postoperative monitoring of cardiopulmonary interactions and intraoperative monitoring of blood pressure and cardiac output.

Our clinical experience with Nexfin HD provides a rationale for non-invasive, beat-to-beat arterial blood pressure measurements as valuable alternative for hemodynamic monitoring in the perioperative period in the general surgical population.