[GA1-52] Non-invasive, continuous blood pressure measurement using the CNAP monitor during bariatric surgery in adolescents

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Background: Blood pressure (BP) is one of the most important parameters and continuous BP monitoring is preferable in patients with co-morbid conditions and during major surgeries. However, the placement of an arterial cannula (AL) requires time, is an invasive procedure, and can occasionally result in serious complications. Standard oscillometric BP measurements with a cuff may be difficult in the severely obese surgical population [body mass index (BMI) ≥ 35kg/M2] because of the shape and thickness of the arm. The CNAP™ Monitor (CNSystems AG, Graz, Austria) is a finger-mounted, continuous, non-invasive BP monitoring device, providing beat-to-beat pressure readings. The use of the CNAP™ monitor has been reported in various clinical settings in adults.1,2 However, there are limited data regarding the use of this device in severely obese adolescents undergoing bariatric surgery.3 We prospectively evaluated the accuracy of the CNAP™ device in patients undergoing bariatric intervention.
Methods: Patients undergoing laparoscopic vertical sleeve gastrectomy were eligible for inclusion. The CNAP™ finger cuff was attached on the opposite side of the AL. The arm cuff of the device was placed on the upper arm on the same side of the AL, except for 3 cases where the cuff was placed on the forearm. Systolic (sBP), diastolic (dBP), and mean arterial (MAP) pressure were captured from the AL and CNAP™ device every minute during anesthetic care.
Results: To date, the study has included 10 patients (8 female and 2 male), ranging in age from 14.2 to 22.4 years (17.0 ± 2.4 years) and in weight from 90.6 to 167.8 kg (122.3 ± 21.7 kg) with a BMI from 37.9 to 60 kg/M2 (45.0 ± 7.2 kg/M2). There were a total of 1,242 pairs of sBP, dBP, and MAP values. The absolute differences between the sBP, dBP, and MAP were 14.5 ± 12.6, 10.3 ± 8.5, and 10.6 ± 9.1 mmHg respectively. The correlation coefficient between the AL and the CNAP™ device was 0.53, 0.56 and 0.63 for the sBP, dBP and MAP respectively. The CNAP values (sBP, dBP, MAP) were ≤ 5 mmHg from the AL values in 29.2%, 34.5%, and 34.9% respectively. Using Bland-Altman analysis, the bias and 95% limits of agreements for sBP, dBP and MAP were 3.5 mmHg (-33 to 41 mmHg), 4.1 mmHg (-21 to 29 mmHg) and 4.2 mmHg (-22 to 30 mmHg) respectively.
Conclusion: As noted in previous studies, the sBP measurement was the least accurate when compared to the AL values. In the current cohort of patients, the differences of the BP values did not meet the criteria of the Association for the Advancement of Medical Instrumentation standards for non-invasive BP measurement (ANSI/AAMI SP10), which suggest a mean difference of ± 5 mmHg and a standard deviation of 8 mmHg. In particular, the difference of sBP seems to be beyond the clinically acceptable difference. However, in the absence of an invasive arterial cannula, the device offers significant advantages over conventional intermittent BP monitoring.
Disclosure
No author has a conflict of interest with regard to any device employed in the study. The CNAP™ monitor used for the study was supplied free of charge by the company (CNSystems AG, Graz, Austria).
References
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