The appropriate way to measure blood pressure for sedated colonoscopy

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CORRESPONDENCE

Measurement of blood pressure for sedated colonoscopy. Comment on *Br J Anaesth* 2022; 128: 610–22

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Keywords: arterial pressure; colonoscopy; hypotension; monitoring; propofol; sedation

Editor—Sneyd and colleagues[1] reported that 35% (333/939) of colonoscopies were associated with episodes of hypotension, with 28% (107/939) of patients having systolic arterial BP <90 mm Hg for >5 min. Hypotension is concerning because it is associated with postoperative morbidity and mortality.[2] The authors do not specify whether oscillometric pressures were recorded from the upper or dependent arm. The distinction matters because pressures recorded from the non-dependent arm underestimate aortic pressure and may account for some of the reported hypotension. Thus it is important to provide additional details about arterial pressure measurement methods.

Declarations of interest

There are no conflicts of interest.

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Measurement of blood pressure for sedated colonoscopy. Response to *Br J Anaesth* 2022; 129: e25

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Editor—Colonoscopy is typically performed with the patient in the lateral position. Han and colleagues[1] helpfully remind us that the choice of arm (dependent *vs* non-dependent) for noninvasive recording of arterial BP might influence the values recorded.

How could cuff position influence recorded measurements? Vertical separation of the dependent and non-dependent arms will, through hydrostatic pressure, cause the dependent arm to have a higher BP. In conscious women in the third trimester of pregnancy who lay in the left lateral decubitus position, the difference was 16.4 (15.2–17.5) mm Hg, mean (95% confidence interval).[2] However, even in the supine position there may be differences in BP between arms. In patients who had suffered strokes and were turned side-to-side, the difference between the same arm in dependent and non-dependent positions was between 11.4 (1.3) and 17.6 (1.0) mm Hg, mean (standard deviation) after multilevel modelling to adjust for covariates.[3] Other studies confirm these observations using varied methodologies.[3]

Might cuff position have influenced our findings?[4] Could we tell if it had? The pooled analysis that we reported included five RCTs[5–9] and a retrospective cohort study.[10] None of these specified where the cuff was placed. One specified that the cuff was on the opposite arm to the infusion.[8] Another required the infusion to be in the non-dominant arm.[9] Our key result, illustrated in Figure 1, showed a high proportion of patients experiencing substantial and prolonged periods of systolic hypotension. Because these data were presented as percentage change from baseline they would not be affected by cuff location. Our calculations of systolic BP <90 mm Hg, minimum BP and area under the curve, might have been affected if cuff placement was disproportionately on the non-dependent limb with lower pressures recorded. As the relevant data describing cuff positions do not exist, any correction must remain a thought experiment. Our key result, that propofol sedation for colonoscopy is associated with frequent, profound, and prolonged hypotension, stands entirely.

Our meta-analysis examined comparisons of propofol with other sedatives. Although the cuff positions in the many individual studies remain obscure, the crucial factor is that they were randomised trials. Unless the choice of sedative systematically biased cuff position, then the relative rates of hypotension in the treatment groups should be unchanged. The observation that hypotension is much more frequent with propofol than with any other agent except dexmedetomidine stands.

We thank Han and colleagues[1] for their interesting comment. Although not impacting our key findings and recommendations, it provides some useful critical thinking. Future studies of patients in the lateral position should specify cuff position in the protocol and consider it in the analysis of data.

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Declarations of interest

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Postoperative anaemia and disability-free survival in older cardiac surgery patients

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Keywords: anaemia; cardiac surgery; disability; elderly; health-related quality of life

Editor—Postoperative anaemia after cardiac surgery occurs in 80–90% of patients owing to blood loss, haemodilution, inflammation-blunted erythropoiesis, and pre-existing anaemia.[1,2] Currently, the default treatment of postoperative anaemia is allogenic blood transfusion. However, restrictive transfusion thresholds have led to more patients being discharged with low haemoglobin (Hb) levels.[3] Anaemic patients often suffer from fatigue, lethargy, and dyspnoea and are at higher risk for postoperative complications.[4] Patients with anaemia also have diminished physical performance and lower muscle strength compared with patients without anaemia.[5] Older patients tolerate anaemia poorly and are at increased risk for poor functional outcome owing to frailty and multimorbidity[3,6]; anaemia could impair postsurgical recovery and health-related quality of life (HRQL) in these patients. We evaluated the association between postoperative nadir Hb and functional outcome in older (≥70 yr) cardiac surgery patients.

For the current analysis, we used data from the Anaesthesia Geriatric Evaluation (AGE) cohort. The AGE study was a two-centre prospective observational cohort study on the association between preoperative frailty and change in HRQL and disability after elective cardiac surgery in patients aged ≥70 yr.[7] Ethical approval was provided by the Medical Ethics Research Committees United (MEC-U) in the Netherlands (R15.039). The study was registered at clinicaltrials.gov (NCT02535728) and performed in accordance with the Declaration of Helsinki. Perioperative care for all patients was according to standardised operating procedures.

Postoperative nadir Hb was defined as the lowest Hb level within 72 h after surgery. A patient was excluded from the analysis if death occurred within this period. Hb levels were tested routinely on ICU arrival and on the first postoperative morning. On the ward, Hb levels were tested at least once every 2 days. We divided patients by their nadir Hb levels into three groups according to the WHO criteria for anaemia (Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity. WHO/NMH/NHD/ MNM/11.1. http://www.who.int/vmnis/indicators/haemoglobin.pdf): mild, Hb 110-130 g L^{-1}; 6.9-8.1 mM (120 g L^{-1}; 7.5 mM for women); moderate, Hb 80-109 g L^{-1}; 5.0-6.9 mM; and severe anaemia, Hb <80 g L^{-1}; 5.0 mM .

Primary outcome was a composite of disability or death after 3 months. Disability was defined as a score ≥25% on the 36-item WHO Disability Assessment Schedule 2.0 (WHODAS 2.0) self-assessment scale. The secondary outcome was HRQL at 3 months as assessed by the 36-item self-assessment Short-Form Health Survey (SF-36). A score of 0 point was assigned to death, with higher scores representing increasing HRQL. Confounding factors were *a priori* selected and included European System for Cardiac Operative Risk Evaluation (EuroSCORE) II, red blood cell (RBC) transfusions within 72 h after surgery, severe postoperative bleeding complications (defined as any haemorrhage that required surgery), preoperative Hb level, and frailty. For the AGE study, routine preoperative evaluation was supplemented with a comprehensive frailty assessment for physical, mental, and social frailty. Frailty was defined by at least one positive test in each domain.[7]

We used Poisson regression analyses with robust standard errors to analyse the association of nadir Hb level with disability or death. Effects were expressed as relative risk (RR) with 95% confidence intervals (95% CI). For regression analyses, the inverse value of Hb level was used. The association between nadir Hb level and change in HRQL over 3 months was