The burden of perioperative hypertension/hypotension: a systematic review

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Background: Hypertension/hypotension in the perioperative setting may result in a high economic burden for healthcare systems and patients affected in terms of clinical outcomes. Although previous systematic reviews have shown IV antihypertensive treatments to be highly effective, there is currently a clear gap in the literature regarding a review on the implications of acute hypertensive/hypertensive episodes.

Purpose: Our goal is to review the outcomes of acute hypertensive/hypotensive episodes from articles published in the past 10 years that assessed the short- and long-term impact of acute hypertensive/hypotensive episodes in the perioperative setting.

Methods: We conducted a systematic peer-review based upon PROSPERO and Cochrane Handbook protocols. The following study characteristics were collected: study type, author, year, population, sample size, definition of acute hypertension, hypotension or other measures, and outcomes (probabilities, odds ratio, hazard ratio, and relative risk) and the p-values. Quality of the studies was graded with the Scottish Intercollegiate Guidelines Network.

Results: A total of 4,197 articles were identified and 47 articles satisfied criteria for data extraction. We present evidence on outcomes associated with acute hypertension/hypotension distinguishing cardiac from non-cardiac surgeries. For the perioperative setting, the number of articles varies by outcome: 17 mortality, 11 renal outcomes, 3 stroke, 6 delirium, and 21 others. Hypotension was reported to be associated with mortality (OR 1.02-20.826) as well as changes from blood pressure patient’s baseline (OR 1.02-1.36); hypotension had also a role in the development of acute kidney injury (OR 1.03-14.11). Postsurgical delirium was found in relation with lability (OR 1.018-1.038) and intra- and postsurgical hypotension (OR 1.05-1.22), and hypertension (OR 1.44-2.34).

However, no statistically significant result was found for the relation between hypotension and stroke, and no study investigating hypertension influence over stroke was found. There was a wide range of additional diverse outcomes related to hypo-, hypertension and blood pressure liability, for example myocardial damage related to a 50% decrease in systolic blood pressure (SBP) (OR 4.4), increased odds 9.6 for new onset of atrial fibrillation associated with intraoperative SBP below 80 mmHg for 15 min or more; myocardial injury, length of stay in hospital, hematoma, or anastomotic leakage were also found to be related to hypertension.

Conclusions: The perioperative management of blood pressure influences short- and long-term effects of surgical procedures. These findings support the burden of blood pressure fluctuations in this setting. It sounds pertinent to further investigate the role of newer antihypertensive agents with favourable pharmacodynamic and pharmacokinetic properties to guarantee the fine-tuning of blood pressure and an individualised therapy for patients.