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Review

Evidence based guideline on perioperative optimization of hypertensive patients booked for elective surgery at a low-income country

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ABSTRACT

Hypertension is a major clinical challenge and public health problem. The number of surgical cases with pre-existing hypertension is dramatically increased and the most common medical reason for deferring surgery. Although there is little evidence, chronic or newly diagnosed elevated blood pressure is a risk factor for perioperative cardiovascular and cerebrovascular events. Evidences on perioperative optimization, which patients should be postponed and for how long, and management strategies for reducing cancellation are limited, particularly in low-income countries such as Ethiopia. These guidelines provide a strategy to manage and reduce cancelation of surgery in patients with chronic or newly diagnosed hypertension. Senior anaesthetist, with input from department of internal medicine and surgery, were responsible to develop this clinical guideline to promote best evidence-based, effective, affordable, and safer perioperative management of adult patients with pre-existing or newly diagnosed hypertension scheduled for elective surgical procedures. As part of the guideline development process, a systematic review of studies published in peer-review journals was employed on varies aspects related to treatment, assessment and risk stratification, and reduction strategies for postponing surgery in patients with elevated blood pressure. After a comprehensive searching of electronic sources and a review of the evidence, the authors (working as senior anaesthetist and researcher) formulated recommendations that addressed various aspects of perioperative optimization of hypertensive patients, considering setups with limited recourse. We found that defer surgery on the ground of elevated blood pressure in patients with stage 1 or 2 hypertension is not necessary. Although we identified numerous gaps between studies, we recommend that delay surgery in patients with stage 3 hypertension, who do not have high cardiovascular risk, is not necessary.

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1. Introduction

Hypertension is a common chronic medical disease and its prevalence have been increased dramatically in the last two decades in developing countries. Patients with pre-existing hypertension (controlled or uncontrolled) or with immediate preoperative hypertension are commonly encountered in the operation theater for varies ranges of surgical procedure.

1.1. Definition

Blood pressure is defined as a measure of a force that the heart is requiring to pump blood to the body. Systolic blood pressure measures the force of the blood against the artery walls. Diastolic blood pressure measures the pressure of the blood when the heart starts to relax. According to 2015 evidence based guidelines of the Taiwan Society of Cardiology and the Taiwan Hypertension Society, hypertension is defined as values ≥ 140 mmHg in SBP, and ≥ 90 mmHg in DBP and for patients with diabetes, CHD, chronic kidney disease (CKD), SBP ≥ 130 mmHg and a DBP ≥ 80 mmHg were considered as high blood pressures [1]. Table 1 shows the most common methods of classifications of blood pressure measurement.

1.2. General considerations

During anesthesia, monitoring of adequate tissue perfusion is very important and to do this the practice is monitoring the hemodynamics using blood pressure and heart rate. So as anaesthetist monitoring blood pressure is a key factor because adverse effects were associated with raised hypertension [3]. In non-cardiac surgery hypertension is an independent predictive factor for cardiac adverse events [4]. Uncontrolled hypertension and pre-operative hypertension with other cardiovascular risk factors increase peri-operative morbidity and mortality [5].

Managing hypertension pre-operatively is a matter of balancing the risks of anesthesia, treatment and delay for the individual patient [2]. Cancellations and postponements of elective surgical procedures on the ground of high arterial blood pressure (particularly on arrival in the operating theater) have been a major and long-standing problem for every healthcare workers and the patients around in low-income countries [6–8].

Table 1
Categorization of the stages of hypertension based on Anaesthetists of Great Britain and Ireland(AAGBI) and the British Hypertension Society(BHS) guideline [2].IA.

Category	Systolic blood pressure (mmHg)	Diastolic blood pressure (mmHg)
Stage 1	140–159	90–99
Stage 2	160–179	100–109
Stage 3	180–209	110–119
Stage 4	≥ 210	≥ 120

Considering the prevalence of hypertension, the anesthetists have two broad focuses in the hypertensive patients who scheduled for surgery. The first is recognizing the effect of chronic hypertension on the individual's peri-operative and long-term cardiovascular risk. The second is consider the blood pressure measured in the pre-operative period is associated with adverse peri-operative events and to decide whether this should be reduced before surgery [2].

The relationship between hypertension and perioperative complications was first reported in the 1950s and myocardial ischemia was associated with a raised systolic blood pressures above 180 mmHg and diastolic blood pressures in excess of 110 mmHg [2]. On the other hand, well treated and controlled preoperative hypertension not seem to be an important risk factor of intraoperative and/or postoperative myocardial ischemia [9,10].

At least 25% of hypertensive patients (systolic ≥ 170 mmHg and diastolic ≥ 110 mmHg) who undergo non cardiac surgery develop myocardial ischemia associated with the induction of anesthesia or during the intraoperative or early post-anesthesia period [11,12]. The level of risk depends on the severity of hypertension [13].

Some studies and guidelines have recommended that, If the blood pressure is above 180 mmHg systolic or 110 mmHg diastolic, patients should return to their health care providers for rechecking and management of their blood pressure [1]. If the blood pressure is above 140 mmHg systolic or 90 mmHg diastolic, but below 180 mmHg systolic and below 110 mmHg diastolic, elective surgery should not be postponed [2]. However, the association between immediate preoperative hypertension and intra/post-operative cardiovascular complication has not been clearly established.

1.3. End organ damage secondary to arterial hypertension

End organ damage secondary to high arterial blood pressure reflects hypertensive patients overall cardiovascular risk and associated with perioperative morbidity and mortality. Diagnostic criteria is: ECG: left ventricular hypertrophy (≥ 125 g/m² for men and ≥ 110 g/m² for women); ultrasound examination for arterial wall thickening(intima-media thickness [IMT] > 0.9 mm or arterio-sclerotic plaque); pulse wave velocity > 10 – 12 m/sec(depending on the device used); ankle Brachial Index < 0.9 ; serum creatinine elevated[Men 1.3–1.5 mg/dL (115–133 μ mol/L), Women 1.2–1.4 mg/dL (107–124 μ mol/L)]; elevated albumin excretion (micro albuminuria 30–300 mg/24 h, albumin-creatinine ratio: men ≥ 22 , women ≥ 31 mg/g); creatinine: normal up to a value of 10 mg/g, men ≥ 2.5 , and women ≥ 3.5 mg/mmol). Calculated glomerular filtration rate (< 60 mL/min/1.73 m²) or creatinine clearance < 60 mL/min [14].

The objective of this evidence-based guideline is to improve care provision and minimize postponing of surgery in hypertensive patients during perioperative period.

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