

Intraoperative Hypertension: Key Points in Prevention and Treatment

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Abstract

Nearly one-third of adult patients arriving for noncardiac operations and two-thirds of those receiving coronary revascularization had hypertension as a previous condition [1].

Acute intraoperative elevations in systemic blood pressure (BP) are more likely to occur in persistently hypertensive patients compared with normotensive patients [2, 3]. When possible, causes should be predicted and treated as soon as possible

Key words: systemic blood pressure; revascularization had hypertension

Introduction

Nearly one-third of adult patients arriving for noncardiac operations and two-thirds of those receiving coronary revascularization had hypertension as a previous condition [1].

Acute intraoperative elevations in systemic blood pressure (BP) are more likely to occur in persistently hypertensive patients compared with normotensive patients [2, 3]. When possible, causes should be predicted and treated as soon as possible.

Initial treatment - If there is no reversible or curable cause of high blood pressure, or if an acute hypertensive episode is severe or lasts more than a few minutes after treatment, an intravenous (IV) antihypertensive drug is given [2, 3]. To minimize overtreatment and subsequent hypotension, short-acting medicines are usually recommended. Bolus doses of a beta blocker (eg, esmolol 10 to 50 mg, labetalol 5 to 25 mg, metoprolol 1 to 5 mg) and/or a vasodilator, such as the ultra-short-acting calcium channel blocker clevidipine [4] administered as a continuous infusion, nicardipine (eg, 100 to 500 mcg) administered in bolus doses or by continuous infusion, or nitroglycerin administered in bolus (eg, 10 to 40 mcg) doses or by continuous infusion, are all examples [2].

Causes and management of intraoperative hypertension

Laryngoscopy and endotracheal intubation - In normotensive patients, sympathetic reactions to laryngoscopy and endotracheal intubation often elevate systemic BP by 20 to 25 mmHg [5, 6]. In hypertensive patients, this rise might be significantly larger. An appropriate dosage of a short-acting hypnotic (eg, propofol 1 mg/kg, with additional boluses of 0.5 mg/kg as needed) is given, together with supplementary IV anesthetic drugs (eg, fentanyl 1 to 3 mcg/kg, lidocaine 1 to 2 mg/kg) or a potent inhalation anesthetic such as sevoflurane, to block sympathetic reactions and prevent an acute hypertensive crisis. Furthermore, an antihypertensive medication such as esmolol 10 to 20 mg or clonidine 1 mcg/kg may be given as a preventive strategy [7, 8].

Surgical stimulation - Increases in blood pressure are frequently caused by insufficient anesthetic depth during painful surgical stimulation or other treatments, which can be exaggerated in a patient with chronic hypertension. Increased intraoperative blood pressure can be effectively reduced by increasing anesthesia depth [9].

Hypoxemia and/or hypercarbia - Due to sympathetic activation, hypoxemia and/or hypercarbia can produce hypertension and tachycardia. Treatment may involve giving a larger fraction of inspired oxygen (FiO₂) and/or delivering or enhancing aided or controlled ventilation to enhance minute ventilation and lower arterial carbon dioxide levels (CO₂) [10, 11].



Hypervolemia - In patients with long-term hypertension, determining hypervolemia might be challenging. If an intra-arterial catheter is present, intravascular volume status is best assessed by respirophasic variations in the arterial pressure waveform, or by qualitative evaluation of left ventricular cavity size using point-of-care ultrasonography [12].

Hypervolemia should be suspected in patients with chronic hypertension who take a diuretic and is more likely if a preoperative morning diuretic dose was missed. If a substantial amount of irrigation solution is utilized during some operations, hypervolemia might result (eg, transurethral resection of the prostate, hysteroscopy). In such circumstances, an intraoperative dosage of 5 to 10 mg IV furosemide or 0.5 to 1 mg bumetanide is given [13, 14].

Antihypertensive medication withdrawal - When possible, if the patient's antihypertensive routine was disrupted on the day of surgery, persistent intraoperative hypertension should be treated with an IV equivalent of the missing medicine. This is especially critical if the skipped medication was a beta blocker or clonidine [15, 16]

Emergence and tracheal extubation - During emergence, sympathetic activation from pain and emerging excitement may generate an excessive reaction to airway reflex stimulation during suctioning and tracheal extubation, resulting in hypertension and tachycardia. Prior to emergence, sufficient analgesia is frequently used to moderate these hemodynamic alterations [17].

Other causes - A previously undetected pheochromocytoma can induce severe hypertension, which is often accompanied by tachycardia, arrhythmias, and/or cardiovascular collapse [18].

Management of hypertensive emergencies - Acute end-organ damage is rare in people with severe asymptomatic hypertension (systolic BP 180 mmHg and/or diastolic BP 120 mmHg). Patients with a hypertensive emergency have a considerably high blood pressure and indications or symptoms of immediate ongoing target-organ damage [19-21]

If there is evidence of an acute cardiovascular emergency (eg, acute coronary syndrome, acute decompensated heart failure), neurologic signs or symptoms (eg, agitation, delirium, stupor, visual disturbances, seizures, stroke), acute renal failure, or a postoperative complication that is exacerbated by the elevated BP, immediate treatment of severe perioperative hypertension is required (eg, hemorrhage, increased ICP.) In these cases, IV antihypertensive agent(s) should be given right away while more testing is done [2-4, 22]

Acute postoperative development of severe hypertension with a systolic BP of 160 mmHg or a diastolic BP of 110 mmHg in a pregnant or postpartum woman is a hypertensive emergency if these elevated BP values are correctly determined and continue for more than 15 minutes [23]. The National Partnership for Maternal Safety (NPMS) consensus bundle suggests IV labetalol 20 mg (40 mg if not effective within 10 minutes, then 80 mg every 10 minutes to a maximum total dose of 300 mg in the first hour) or hydralazine 5 to 10 mg IV every 20 minutes as first-line agents for treatment (to a maximum total dose of 20 mg in the first hour) [24, 25].

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