Role of phenoxybenzamine in perioperative clinical practice

The Editor,

Phenoxybenzamine (PBZ) is a long-acting α-adrenergic receptor blocking drug.[1] It is a haloalkylamine derivative, chemically related to nitrogen mustard, and the molecular configuration responsible for the blockade is a highly reactive carbonium ion formed on cleavage of the tertiary amine ring.

PBZ is recommended for the treatment of malignant hypertension in situations such as pheochromocytoma. Preoperatively, PBZ aids in the control of blood pressure, permits correction of the contracted plasma volume, and protects against catecholamine-induced cardiac damage.[2] The use of PBZ is now limited by shorter acting alpha blocking drugs. Subsequently, PBZ was used with promising better improvement of systemic oxygen delivery and balancing the pulmonary to systemic blood flow by reducing the systemic vascular resistance in hypoplastic left heart syndrome undergoing Norwood procedure.[3] This is still practiced by many centers. The uses of PBZ have further extended to hypotensive anesthesia, prevent spasm in radial artery before grafting in coronary artery bypass surgery, causalgia, Raynaud's phenomenon, and autonomic hyperreflexia.[4,5] However, prolonged hypotension and reflex tachycardia from PBZ created dilemma in the minds of physicians.

The use of PBZ during pediatric cardiac surgery facilitates higher pump flow during cardiopulmonary bypass (CPB) and is associated with less metabolic acidosis postoperatively.[6,7] In addition, PBZ was found to be more effective than sodium nitroprusside in improving tissue perfusion after CPB.[8] The neonatal heart is more susceptible to exogenous catecholamine-induced cardiotoxicity.[9] Hence, vasodilatory therapy can play a key role in improving cardiac output by decreasing afterload without affecting the contractility. A combination of PBZ and NTG is a low-cost alternative for perioperative control of pulmonary arterial pressure by reducing the pulmonary blood flow from vasodilation thereby decreasing the right ventricular load.[10] In authors' institution, PBZ is used in perioperative hemodynamic management of neonatal, congenital, and conditions with increased Qp cardiac surgical patients with better outcome.[7,10,11]

Hypotension and tachycardia due to PBZ can be managed with adequate preload, proper dosing, and alternative vasoconstrictor. When exogenous sympathomimetics are administered after α blockade from PBZ, their vasoconstrictive effect is inhibited resulting in exaggerated vasodilatory effect. This is most commonly found with the use of adrenaline/epinephrine after PBZ. Epinephrine administration cause severe hypotension, low cardiac output, and tachycardia because of the refractory α-receptor blockade and unopposed ß-receptor activity.[1] The recommended treatment of PBZ-induced hypotension is norepinephrine infusion because some of the receptors remain free of the drug. Vasopressin is an effective antidote for PBZ-induced vasodilation. Vasopressin acts on smooth muscle V1 receptors and is able to overcome its effect.[12]

In summary, PBZ has a therapeutic role for the treatment of hypertension in pheochromocytoma, control of systemic vascular resistance in congenital heart surgery, and balancing the pulmonary to systemic blood flow in severe pulmonary hypertension. It offers convenient and versatile dosing because of the oral and parenteral administration. The intraoperative, postoperative, and intensive care setting use is safe with continuous hemodynamic monitoring and delivers the best results with excellent outcome in specific conditions. The potent hypotensive effects alarm the judicious and titrated use of PBZ.

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Conflicts of interest

There are no conflicts of interest.

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