

Newer therapies in the operative management of pheochromocytoma

Sir,

The catecholamine-secreting pheochromocytoma has always been a big challenge for the peri-operative physicians and anesthesiologists.^[1] The surgical morbidity and mortality is directly influenced by size of the tumor and pre-operative management. Numerous drugs and techniques have been developed from time to time for optimizing the pathophysiological status.

Among calcium channel blockers (CCB), diltiazem and nifedipine have been commonly used. Clevidipine butyrate is a new intravenous (IV) third-generation dihydropyridine CCB that has been approved by the FDA in 2008 for the management of acute hypertension.^[2] As this drug is available in oil base, it should not be administered to patients with allergy to soy products and eggs.^[3] On IV administration, clevidipine has onset and offset of action in 2-4 and 5-15 min, respectively, metabolized by esterases with a plasma half-life of 1 min because of rapid clearance by the kidneys.^[4] The initial dose for control of hypertension should be set at 1-2 mg/h, which can be increased in an incremental manner as per the requirement to a maximum dose of 32 mg/h.^[3] Clevidipine is considered superior to nitroprusside, nitroglycerine, and nicardipine; it acts by selectively inhibiting the calcium influx, causing arterial vasodilatation, and decreasing peripheral vascular resistance, causing increase in cardiac output by decreasing the afterload and left-ventricular filling pressures. Clevidipine exerts a “tight” hemodynamic control during peri-op period by maintaining the blood pressure stable within a narrow range known to improve the surgical outcome.^[5]

Besides hypertensive crisis, management of hypotensive crisis during pheochromocytoma resection is almost equally challenging. Sudden cessation of influx of catecholamines from the tumor as a result of vascular ligation can lead to sudden hypotension.^[6] A larger size of the functional tumor, higher amount of pre-operative catecholamine secretion, and presence of co-morbidities are the predominant factors that cause a greater fall of blood pressure during intra-operative and post-operative period, which is sometimes refractory even to aggressive management.^[6]

Arginine vasopressin (AVP), a naturally occurring nonapeptide hormone, secreted from posterior pituitary in response to increase in plasma osmolality, volume depletion, and hypotension can be a possible answer to these clinical scenarios.^[7] It mainly exerts its clinico-pharmacological action by re-absorption of water at the collecting ducts of the kidneys and exhibits a vasoconstrictor mechanism. It causes selective systemic vasoconstriction and minimal coronary, cerebral, and pulmonary vasoconstriction, which can improve the surgical outcome in cardiac patients by improving right heart failure.^[7]

Besides exerting its clinically beneficial effect in managing refractory hypotension, it can also be used to manage severe hypotension in other clinical conditions such as anaphylactic shock, circulatory shock, blockade of angiotensin, cardiac operative procedures, and hepatic transplantation.^[7] The mechanism of action of vasopressin is independent of adrenergic receptors and hence can be used in patients with depletion of catecholamines, as the latter is associated with refractory hypotension.

In future, it is hoped that more drugs will be available to manage pheochromocytoma, which will help in the long run to improve the surgical outcome.

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