

Guest Editorial

Anesthetic Management of Pheochromocytoma

The prevalence of pheochromocytoma, a rare catecholamine-secreting tumor, is not precisely known. Among the general population of the United States of America, pheochromocytoma occurs in about 1 to 2 per 100,000 adults per year.¹ In countries other than the United States, a lesser incidence has been noted.² Encounters with pheochromocytoma may occur in anesthetizing suspected cases for invasive radiologic procedures, proven cases for surgical removal, or, most dangerous of all, in anesthetizing unsuspected cases.^{3,4} From the time pheochromocytoma was first successfully resected in 1926 until the early 1950s, the operative mortality was at least 26%.⁵ This was changed in 1956 when Priestley and colleagues⁶ from the Mayo Clinic reported a series of 51 patients from whom 61 pheochromocytomas were removed without mortality. This remarkable result was possible mainly because of their routine use of α -adrenergic blocker phentolamine and norepinephrine to treat hypotension.⁶ Subsequently, the role of hypovolemia was also recognized and preoperative volume expansion was advocated to prevent shock after pheochromocytoma resection.⁷ Excess catecholamine causes vasoconstriction that leads to hypertension and also hypovolemia. The sudden withdrawal of catecholamine, when the pheochromocytoma is resected, leads to vasodilatation, which in the presence of hypovolemia leads to hypotension and shock.



Due to their neural crest origin, almost all pheochromocytomas secrete an excess of catecholamines and/or catecholamine breakdown products that can be caused of severe hypertension and other systemic disturbances. The symptoms that may accompany hypertensive crises are headache, palpitations, sweating, tremor, pallor or flushing. Prolonged exposure to increased concentration of circulating catecholamine may result in form of dilated cardiomyopathy linked with ventricular failure in about one-third of patients.⁸⁻⁹ The perioperative management of pheochromocytoma remains a complicated anesthesia challenge requiring intensive preoperative preparation, vigilant intraoperative and postoperative care. No single technique for anesthetic management of excision of pheochromocytoma has gained universal acceptance. The vast majority of anesthetic and surgical literature for pheochromocytoma is derived from case reports and relatively small case series; thus, class 1 evidence from randomized prospective controlled trials is limited. Many institutions have “in-house” approaches to anesthesia for pheochromocytoma and practice patterns, therefore vary significantly. Since the publication of last review on anesthetic management of pheochromocytoma about 10 years back by Prys-Roberts,¹⁰ a number of new developments have occurred in the form of newer diagnostic tools, better monitoring equipments, newer anesthetic and cardiovascular drugs, and introduction of laparoscopic surgical techniques.

Despite recent developments in technology, monitoring and pharmacology, perioperative management of pheochromocytoma remains a highly stressful situation for the anesthesiologists.¹² Anesthetic management should be carefully directed with the aim of minimizing the indirect release of catecholamines, prevention of stress, and also to support therapy of hemodynamic crisis.¹¹ Appropriate preoperative medical management dramatically decreases morbidity and mortality during the operative management of this tumor.¹³ Urinary free norepinephrine and epinephrine are the two major metabolites of catecholamines, metanephrines (normetanephrines and metanephrines), and vanillylmandelic acid (VMA) are commonly assayed to detect the presence of a pheochromocytoma. Urinary VMA assays, by comparison, are only 64% sensitive in adults.¹⁴ The current recommendations are for patients to be tested for fractionated elevations of catecholamine breakdown products—metanephrine and normetanephrine, rather than their parent catecholamines—in plasma, urine, or both if available. Testing in this manner has nearly 100% sensitivity.¹⁴⁻¹⁶ Perioperative use of magnesium,¹⁷⁻¹⁹ calcium channel blockers²⁰ and dexmedetomidine^{19,21} has received increasing amounts of attention in the recent years. They have been used in patients intolerant to phenoxybenzamine, and in predominantly normotensive patients because they do not cause the hypotension seen with α -adrenoreceptor blockade.

In this issue of journal, Woodrum and Kheterpal have published a review on anesthetic management for pheochromocytoma covering preoperative preparation, monitoring and intraoperative anesthetic management of pheochromocytoma in the light of recent advances. I sincerely feel that the article would be of great interest to the practicing anesthesiologist for better understanding of the anesthetic management in patients with pheochromocytoma.

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