Anesthetic Management of Pheochromocytoma in a Pediatric Patient Using Dexmedetomidine and Epidural Analgesia

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Introduction

Multiple techniques and adjuncts have been described for the anesthetic management of children with pheochromocytoma. We report the use of a combined general-regional anesthetic technique with dexmedetomidine and epidural analgesia for right adrenalectomy in a pediatric patient with pheochromocytoma.

Case Report

An 11-year-old Hispanic boy (160 cm; 69 kg) with no prior medical history presented for right adrenalectomy. He had initially been referred by his primary care physician for workup of elevated blood pressure (BP) in the 130s/90s and mild complaints of dizziness.

Laboratory studies

Laboratory studies revealed normal renal function (Cr 0.56) and electrolytes, normal thyroid function, slightly elevated renin (4.36 ng/ml/hr, normal 0.2-3.3 ng/ml/hr).

24-hour urine catecholamine levels were elevated (normal values listed in parenthesis).

- Norepinephrine: 546 mcg (5-50 mcg)
- Vanillylmandelic acid: 12.2 mg (< 3.4mg)
- Total metanephrine: 7991 mcg (110-714 mcg)

Anesthetic management

On the day of surgery, the patient’s medications included phenoxybenzamine 40 mg four times daily, propranolol 20 mg twice daily, and amiodipine 5 mg twice daily. Preoperative anxiolysis was achieved with intravenous midazolam (2mg) and dexmedetomidine (1 mcg/kg). A dexmedetomidine infusion (0.5 mcg/kg/hr) was initiated prior to inhalational induction with sevoflurane and oxygen (O2). After induction, an arterial line was placed. To reduce the sympathetic response to laryngoscopy, the depth of anesthesia was increased with lidocaine (60 mg), propofol (150 mg), rocuronium (60 mg), and fentanyl (200 mcg). Endotracheal intubation was performed without any changes in heart rate (HR) or BP. A central venous line and T6-7 thoracic epidural were then placed.

After a bolus of 10 ml of 0.2% ropivacaine was administered through the epidural, an infusion of 0.1% ropivacaine with 5 mcg/ml hydromorphone was initiated at 14 ml/hr. In addition to epidural infusion, anesthesia was maintained with sevoflurane and an O2-air mixture.

BP and HR remained unchanged after surgical incision and remained relatively stable throughout the case. Two boluses of esmolol were used to treat hypertension during tumor manipulation. Occasional episodes of hypotension responded to 50-100 mcg boluses of phenylephrine (300 mcg total). No other vasoactive infusions or anti-hypertensive agents were required. The dexmedetomidine infusion was stopped after tumor removal.

At the end of the procedure, the patient was extubated and taken to the PICU for postoperative care. A vasopressin infusion was required 4 hours after surgery for management of post-resection hypotension. The epidural was removed on postoperative day (POD) day 3 and the patient was discharged home on POD 5.

Discussion

Dexmedetomidine is a selective α2-agonist with sedative, analgesic, and anxiolytic properties. Its actions on pre- and post-synaptic α2-receptors reduce norepinephrine release, resulting in sympatholytic effects. Case reports describe the use of dexmedetomidine as an adjunct with general anesthesia to minimize abrupt BP changes from catecholamine release during pheochromocytoma surgery.

Our case illustrates the excellent hemodynamic control that might be offered by both dexmedetomidine and epidural analgesia through synergistic attenuation of sympathoadrenal responses. More studies are needed to determine the clinical efficacy of this approach compared to others.

References

