



Vasopressor Mephentermine-Induced Anaphylactic Reaction in a Neurosurgical Patient

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Anesthesiologists are well familiar with perioperative allergic reactions to agents such as muscle relaxants, local anesthetics, intravenous (IV) anesthetics, protamine, latex, antibiotics, colloids, contrast media, and so forth. But allergic reaction to vasopressor drug mephentermine is very uncommon. A case of possible anaphylactic reaction to mephentermine which developed in a patient undergoing transnasal excision of pituitary adenoma is reported here.

A 54-year-old man, 65 kg, American Society of Anesthesiologists (ASA) physical status II, was to undergo transnasal excision of pituitary adenoma. He had a history of hypothyroidism and was taking eltroxin tablet. He did not have any other endocrine dysfunction. Routine preoperative tests showed no abnormal findings. Upon arrival in the operating room, standard monitoring of ECG, pulse oximetry, and noninvasive blood pressure was established. Anesthesia was induced with 1 mg midazolam, fentanyl 50 µg, propofol titrated to loss of verbal commands needing a total dose of 120 mg, and atracurium 0.5 mg per kg of body weight. The patient was intubated and maintained on sevoflurane-air in oxygen along with atracurium infusion, titrated with train of four (TOF) monitoring. Hydrocortisone 100 mg was given prophylactically to prevent postoperative adrenocortical insufficiency. Left radial artery was cannulated for continuous monitoring of blood pressure after induction of anesthesia. Additional doses of fentanyl 50 µg and propofol 80 mg were given to attenuate hemodynamic response to the application of Mayfield clamp. During the time lag between the application of Mayfield clamp and the start of surgery, blood pressure started dropping to 86/58 mm Hg and further down, possibly because of anesthetic drugs and absence of surgical stimulus. Heart rate did not change significantly and remained at 65 to 70 per minute. When blood pressure dropped to 78 mm Hg systolic, mephentermine 3 mg bolus was given. Blood pressure did not rise but continued to drop. With additional 3 mg, blood pressure still kept coming down and touched a low of 28/19 mm Hg. Anaphylactic reaction to mephentermine was suspected based on clinical judgment and intravenous adrenaline 50 µg and antihistaminic pheniramine 25 mg were administered. Hydrocortisone 100 mg had already been administered earlier. Blood pressure climbed to

185/107 mm Hg. Heart rate came down to 52/minute reflecting baroreceptor response to raised blood pressure but there after was at 60 to 70 per minute. After waiting for 20 minutes, blood pressure stabilized at 111/67 mm Hg. As the patient remained stable, decision was taken to continue with the surgery. Surgery was completed uneventfully and the patient was reversed with 2.5 mg of neostigmine and 0.4 mg of glycopyrrolate. The patient was kept in the intensive care unit for 24 hours. He remained stable during next few days in the hospital and was discharged.

Perioperative period is a unique time when a patient is exposed to multiple foreign pharmaceutical agents which can induce allergic reactions. Mephentermine is a drug which is quite often used by many anesthesiologists during surgery. It is a sympathomimetic drug used to treat hypotension from various causes like postspinal anesthesia, anesthetic drugs, hypovolemia, and so forth. It works in two ways—first, by increasing the force of heart contraction and, second, by causing peripheral vasoconstriction. Commercially available mephentermine contains preservatives methylparaben (0.18% v/v) and propylparaben (0.02% v/v). These preservatives act as bacteriostatic agents and are also added to many commercially available products like pharmaceuticals, cosmetics, and food products.

Allergic reactions have been reported with contrast media¹ and local anesthetics due to presence of methylparaben in these agents.^{2,3}

Samanta et al⁴ reported a case of mephentermine-triggered anaphylaxis in a patient who underwent transurethral resection of prostate under spinal anesthesia. Post spinal anesthesia, the patient developed hypotension for which he was given intravenous mephentermine 6 mg. Immediately following injection, the patient developed itching in hand, urticaria, breathlessness, and hypotension. The patient was administered IV hydrocortisone, promethasone, ranitidine, and nebulization with salbutamol.

My patient had hypotension after the application of head clamp and before the start of surgery, for which mephentermine was used twice to stabilize the blood pressure but it continued to drop to critical levels. It was presumed to be an anaphylactic reaction to mephentermine and further



treatment was initiated along the recommended lines of anaphylactic reaction management using adrenaline as first line of treatment. Adrenaline has α and β sympathomimetic actions resulting in peripheral vasoconstriction and increased cardiac output along with bronchodilation. It also inhibits further release of inflammatory mediators from mast cells.⁵

In amended criteria for diagnosis of anaphylaxis 2019, acute onset of hypotension is also considered to be diagnostic of anaphylaxis in a patient known to have exposure to allergen even in the absence of dermatological or respiratory manifestations.⁶ The patient in this case also presented anaphylactic reaction to mephentermine in the form of unresponsive hypotension without respiratory and cutaneous manifestations.

Anaphylaxis is an immunoglobulin E (IgE)-mediated life-threatening systemic allergic reaction leading to activation of mast cells and basophil cells and release of preformed mediators that include histamine, tryptase, carboxypeptidase A, and proteoglycans. These are responsible for different manifestations of anaphylaxis in the form of dermatologic, respiratory, cardiovascular, and neurologic symptoms.⁷ Certain laboratory tests can be performed to confirm the diagnosis of anaphylaxis like skin tests and blood tests for eosinophilia, and to measure levels of immunoglobulin IgE, mast cells, and basophil mediators like enzyme tryptase and histamine. Unfortunately, these tests could not be done in this case and, thus, is a limitation here.

To conclude, the patient had a possible anaphylactic reaction to mephentermine manifesting as hypotension which could be attributed to its constituents mephentermine sulfate and/or to presence of parabens, methylparaben, and

propylparaben. Since there is no pre-emptive strategy to know about these unexpected allergic reactions in majority of patients, all necessary equipment and life-saving drugs should always be kept handy.

Conflict of Interest

None declared.

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