

Anesthetic and hemodynamic management in patients with different approaches for multiple neurological pathologies. case report

Abstract

A 54-year-old female presented with complaints of progressive visual loss and severe headaches for the past two months. The patient had a history of high blood pressure and was on medication for the same. On physical examination, she had a loss of peripheral vision and a visual acuity of 20/200 in her left eye. An urgent MRI scan was performed which revealed a 2 cm x 1.5 cm sellamass with suprasellar extension and a concomitant incidental aneurysm in the left internal carotid artery ophthalmic segment. Further evaluation with hormonal profile revealed elevated levels of insulin-like growth factor 1 (IGF-1), which was suggestive of growth hormone-producing pituitary adenoma. A cerebral angiogram confirmed the presence of the incidental aneurysm in the left internal carotid artery ophthalmic segment.

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Case report

Anesthetic management:

Noninvasive monitoring was started with noninvasive blood pressure, electrocardiogram, pulse oximetry, and anesthetic depth monitoring with Patient Status Index with Sedline®.

Anesthetic induction: total intravenous anesthesia was used based on fentanyl Target Controlled Infusion (TCI) (Marsh II site effect) at 3.5 ng/ml, Propofol TCI (Elefeld site effect) 3 mcg/ml, 2% simple lidocaine 1 mg/kg, hysteresis is given, a bolus of 50 mg rocuronium is administered, video laryngoscopy blade 3, 100% of the glottic ring is visualized, an armed tube #7.5 with a balloon and 3 cc of pneumotamponade are used, it was verified clinically and by capnography tube placement is connected to a ventilator with parameters adjusted to predicted weight, height, and sex.

Multimodal anesthesia: 12-point scalp block with 200 mg of 0.75% ropivacaine, at points: supraorbital, supratrochlear, auriculotemporal, posterior or greater auricular, greater occipital, lesser occipital, bilateral.

Vascular access: high flow peripheral venous line (14 gaus) in the right thoracic limb, 20 gaus caliber right radial invasive arterial line, and ultrasound-guided right internal jugular central venous catheter on the first attempt.

Post-induction: management with tranexamic acid was started at a bolus rate calculated at 10 mg/kg for 30 minutes, later perfusion was maintained at 1 mg/kg throughout the surgical procedure.

Maintenance: fentanyl (TCI) (Marsh II site effect) at 2.0 to 3.5 ng/mL, Propofol TCI (Elefeld site effect) 1-3 mcg/mL, 2% lidocaine simple 15-45 mcg/kg/min, guided by Patient Status Index, maintaining mean perfused arterial pressures.

Adjuvants: paracetamol 1 g, ceftriaxone 1 gram, ketoprofen 100 mg, ondansetron 8 mg intravenously.

The patient was scheduled for a two-stage surgery.

The first stage involved aneurysm clipping by a neurosurgeon to prevent the aneurysm from rupturing during the second stage of surgery. The second stage was an endoscopic transnasal resection of the growth hormone-producing pituitary adenoma by an ENT surgeon.

The patient was closely monitored during the two-stage surgery with intraoperative imaging and neurophysiological monitoring to prevent any complications.

At the end of the surgery, emersion began, secretion aspiration was performed, as well as gastric content aspiration and lavage until verification of no blood content in the stomach, spontaneous ventilation began with airway protective reflexes and recovery of State Index parameters of the patient with anesthetic depth emersion, the endotracheal tube is removed and spontaneous ventilation is assisted with a face mask. She was discharged from the operating room with spontaneous ventilation, supplemental oxygen through nasal prongs, and isotonic pupils with rass -2. She was transferred to the post-anesthetic care unit, with vital signs within normal parameters, with norepinephrine infusion to maintain a target arterial mean > 85 mm/hg.

Outcome:

The patient's visual symptoms improved after the surgery, and the follow-up MRI scan showed complete resection of the pituitary adenoma. The patient was started on hormone replacement therapy for the hormonal deficiencies that resulted from the removal of the pituitary adenoma. The patient had no complications during the surgery or the postoperative period.

Discussion

Two-stage surgery involving aneurysm clipping and endoscopic transnasal resection of producing pituitary adenoma in a young female with growth hormone-producing pituitary adenoma and incidental

aneurysm in the internal carotid artery ophthalmic segment can be an effective treatment strategy. The success of the procedure is attributed to the multidisciplinary approach and careful preoperative planning to ensure the safety of the patient.

The aneurysm clipping procedure was performed to prevent the risk of rupture, which is associated with a high risk of morbidity and mortality. The endoscopic transnasal resection of the producing pituitary adenoma provided effective removal of the tumor while minimizing the risk of complications and improving the patient's quality of life.

According to the literature, this two-stage approach has been successfully used in the treatment of complex cases involving both aneurysms and pituitary adenomas. A study by Hasan et al.¹ reported that the two-stage approach provided successful outcomes in patients with complex vascular and pituitary pathologies. Another study by Hinojosa et al.² reported that the two-stage approach provided better outcomes compared to single-stage procedures.

The postoperative recovery of the patient was uneventful, and she had no major complications. The patient's symptoms related to the pituitary adenoma improved, and there was no evidence of aneurysm recurrence during the follow-up period.

Regarding the regional scalp block, it allows excellent control of intraoperative pain, decreases the neuroendocrine response to trauma, minimizes the side effects of general anesthesia, as well as provides adequate postoperative analgesia. Since the mid-1990s, Pinoski has demonstrated the efficacy of this technique compared to a placebo.

Proper pain management is a fundamental pillar in the perioperative period of neurosurgical patients, it reduces morbidity and mortality. According to the International Association for the Study of Pain (I.A.S.P.) pain is an unpleasant sensory and emotional experience associated with existing tissue damage. It is known that the encephalic matter lacks nerve endings that emit any painful sensation; this type of innervation is provided by the meninges, extracranial muscles, and fascia. In the field of Anesthesia for neurological surgery, the use of regional anesthesia as a complement to general anesthesia is widely based due to the extensive use of the Mayfield fixator, to reduce the cascade of sympathetic activation, attenuation of hemodynamic changes, as well as reduce the total amount of opioid used, thereby limiting possible side effects, faster emergence and achieving immediate post-surgical neurological evaluation as well as offering post-surgical analgesia to the patient. ERAS is an aspect that is being increasingly investigated in various surgical specialties.¹ Neurosurgery is no exception, The protocol of "Improved recovery strategies after surgery for elective craniotomy" despite being a relatively new concept in the field of intracranial neurology surgery, despite this is gaining much importance recently.³⁻¹⁸

It considers within its implementation, the management of regional anesthesia with the scalp block with excellent results, improving post-surgical pain, the need for the use of opioids in post-surgery, increases patient compliance, and accelerated recovery decreased hospital stay, at a low cost and with a wide margin of safety.

Conclusion

Two-stage surgery involving clipping of the aneurysm and endoscopic transnasal resection of the producing pituitary adenoma in a young woman with growth hormone-producing pituitary adenoma and incidental aneurysm in the ophthalmic segment of the internal carotid artery is an option of viable treatment that can provide successful results with a low risk of complications.

Careful preoperative planning and a multidisciplinary approach require continuous and efficient communication between neurosurgeon and neuroanesthesiologist, this is essential and essential to carry out preanesthetic planning considering the different pathophysiology of each entity as well as its anesthetic considerations, and achieve a successful result.

Acknowledgments

None.

Conflicts of Interest

None.

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