Case Report

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Anesthetic Management in a Patient with Recurrent Pituitary Macroadenoma

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Abstract

Introduction: Tumours of the pituitary gland and sellar region represent 10-15% of all brain tumours. Pituitary macroadenoma is the most common suprasellar mass in adults and is the commonest indication for transnasal trans-sphenoidal hypophysectomy.

Case Report: A 41-year-old patient presented with right-sided loss of vision and right-sided headache for 3 months and posted for the Transnasal Trans-sphenoidalhypophysectomy. The patient previously underwent a similar surgery for an invasive non-functioning pituitary adenoma 2.5 years back. He is a known hypothyroid, with normal vitals and class III Mallampati. The possibility of a difficult airway was considered because of the enlarged tongue. Other system examinations were normal. The hemogram and biochemistry measurements were normal. MRI brain showed a mass lesion measuring 5.2 x 5.6 x 4.7 cm in the sellar, supra, and parasellar regions. We were prepared for all the intraoperative complications of pituitary macroadenoma that can happen.

Difficult airway cart was made available. 18-gauge IV cannula secured. Pre-oxygenated and premedicated with IV Glycopyrrolate 0.01mg/Kg and IV Fentanyl 2 mcg/Kg. Induced with Propofol 2mg/Kg, checked ventilation and Vecuronium 0.1mg/Kg was administered. Intubated with 8.5 mm cuffed endotracheal tube using Video laryngoscope. Right Subclavian vein cannulated and Invasive BP monitored through Radial artery cannulation. Anesthesia was maintained with Oxygen-Nitrous oxide, Isoflurane, Vecuronium, and Dexmedetomidine infusion. The patient was hemodynamically stable throughout the procedure. At the end of the procedure, reversal was given and extubated after ensuring adequate recovery.

Conclusion: Appropriate assessment before anesthesia and perioperative adequate monitoring and preparation are important in the management of anesthesia of patients with pituitary macroadenoma.

Keywords: Anesthetic concerns in pituitary adenoma, Neurosurgical Anesthesia, Pituitary Tumours, Pituitary Macroadenomas.

Key Messages: Patients coming for recurrent pituitary macroadenoma need appropriate preoperative assessment and perioperative anesthesia management. This surgery requires a multidisciplinary team that includes an anesthesiologist, an endocrinologist, a neurosurgeon and a radiologist for better patient care and outcome. We are presenting a case report of recurrent pituitary macroadenoma and its successful management.

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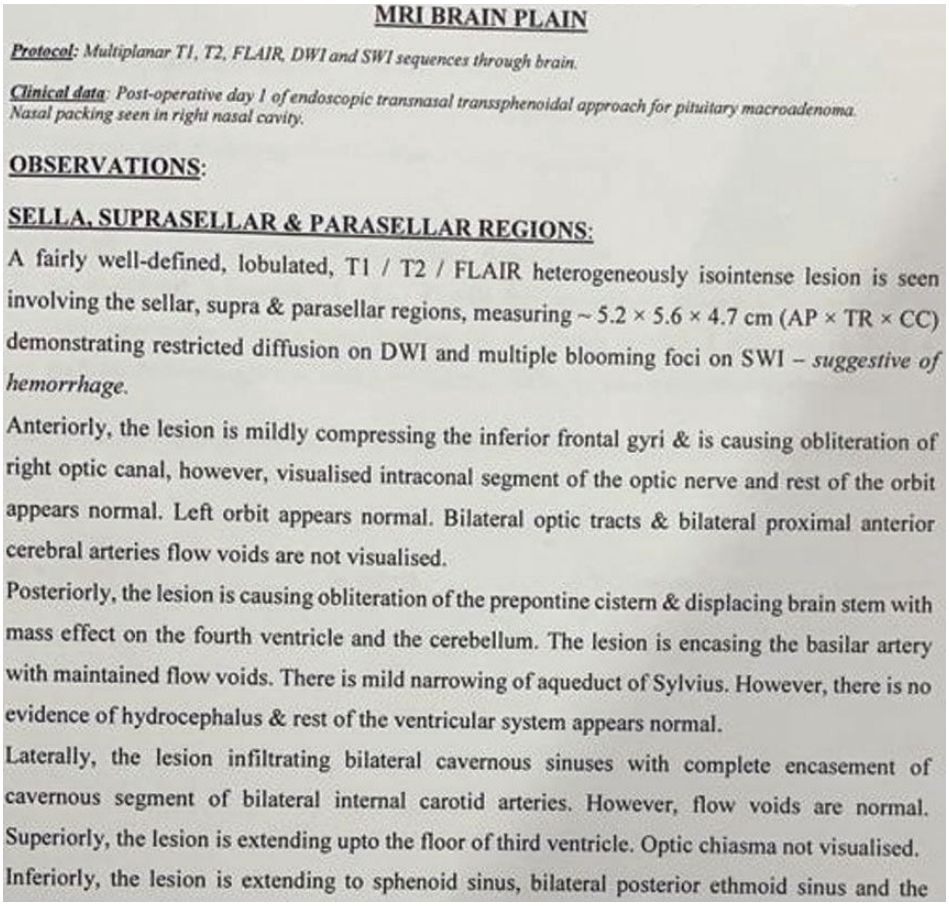
Introduction

The most frequent suprasellar mass in adults is pituitary macroadenomas. Pituitary macroadenomas are twice as common as Pituitary microadenomas and are characterised as Pituitary adenomas larger than 10 mm in size. The most usually done procedure is transnasal transsphenoidal pituitary surgery, which is caused by increased or decreased hormone output. A case of pituitary macroadenoma with subjective visual disturbance and a difficult airway was presented for transnasal transsphenoidal tumour removal.

Case Report

A 41-year-old man presented with a right-sided headache and vision loss on the right side. He has been diagnosed as hypothyroid and is receiving treatment on a regular basis. The vital signs were in the usual range. A check of the airway revealed normal teeth and an enlarged tongue. Mallampati was in the third grade. The results of systemic checks and routine blood tests were normal. Hormonal testing revealed adequate levels of growth hormone and other pituitary hormones. The X-ray of the chest was normal. The ECG showed a sinus rhythm. The ejection fraction on an echocardiogram was normal. In the sellar, suprasellar, and parasellar regions of the brain, an MRI (fig. 1 & 2) revealed a mass lesion measuring 5.2 x 5.6 x 4.7 cm. Opinions were sought from cardiology, pulmonology, endocrinology, and ophthalmology, among other disciplines.

The patient was scheduled for elective transnasal transsphenoidal tumour excision under American Society of Anesthesiologists (ASA) physical status 3 after a preoperative workup. General anesthesia with controlled breathing and intensive monitoring was the anesthetic plan. Informed consent, as well as consent for invasive lines and postoperative ventilation, was obtained. Fasting recommendations, as well as anti-aspiration and anticonvulsant prophylaxis, were followed prior to surgical procedure. A big bore 18G intravenous line was secured in the pre-operative room on the day of operation. Intravascular (IV) Glycopyrrolate 0.01 mg/kg was used to premedicate the patient. The patient was moved into the operating room and pre-induction monitors such as ECG, Non-Invasive Blood Pressure, and SpO_2 were connected. 100% oxygen was administered. Analgesia was augmented with 2 mcg/kg IV Fentany.[1]



MRI BRAIN PLAIN

***Protocol**: Multiplanar T1, T2, FLAIR, DWI and SWI sequences through brain.*

***Clinical data**: Post-operative day 1 of endoscopic transnasal transsphenoidal approach for pituitary macroadenoma. Nasal packing seen in right nasal cavity.*

OBSERVATIONS:

SELLA, SUPRASELLAR & PARASELLAR REGIONS:

A fairly well-defined, lobulated, T1 / T2 / FLAIR heterogeneously isointense lesion is seen involving the sellar, supra & parasellar regions, measuring ~ 5.2 × 5.6 × 4.7 cm (AP × TR × CC) demonstrating restricted diffusion on DWI and multiple blooming foci on SWI – *suggestive of hemorrhage.*

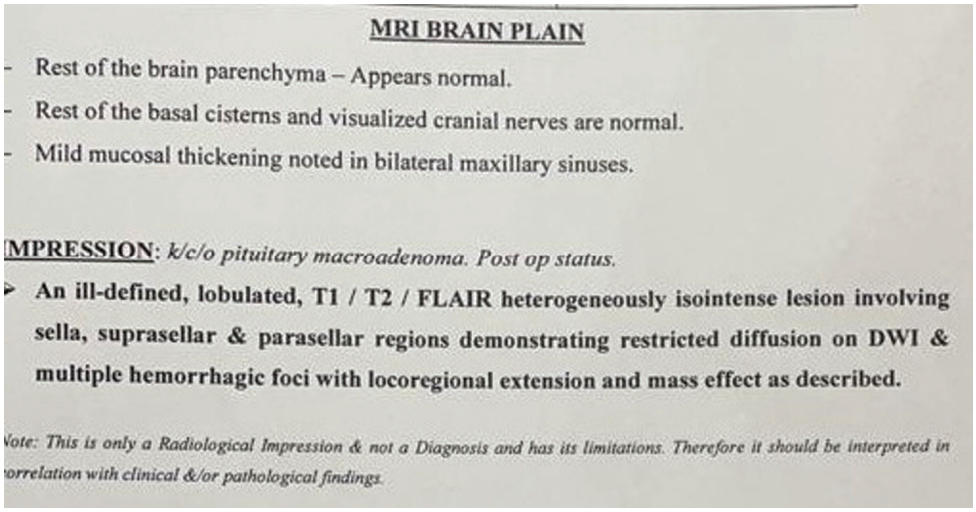
Anteriorly, the lesion is mildly compressing the inferior frontal gyri & is causing obliteration of right optic canal, however, visualised intraconal segment of the optic nerve and rest of the orbit appears normal. Left orbit appears normal. Bilateral optic tracts & bilateral proximal anterior cerebral arteries flow voids are not visualised.

Posteriorly, the lesion is causing obliteration of the prepontine cistern & displacing brain stem with mass effect on the fourth ventricle and the cerebellum. The lesion is encasing the basilar artery with maintained flow voids. There is mild narrowing of aqueduct of Sylvius. However, there is no evidence of hydrocephalus & rest of the ventricular system appears normal.

Laterally, the lesion infiltrating bilateral cavernous sinuses with complete encasement of cavernous segment of bilateral internal carotid arteries. However, flow voids are normal.

Superiorly, the lesion is extending upto the floor of third ventricle. Optic chiasma not visualised.

Inferiorly, the lesion is extending to sphenoid sinus, bilateral posterior ethmoid sinus and the



MRI BRAIN PLAIN

- Rest of the brain parenchyma – Appears normal.
- Rest of the basal cisterns and visualized cranial nerves are normal.
- Mild mucosal thickening noted in bilateral maxillary sinuses.

MPRESSION: *k/c/o pituitary macroadenoma. Post op status.*

- **An ill-defined, lobulated, T1 / T2 / FLAIR heterogeneously isointense lesion involving sella, suprasellar & parasellar regions demonstrating restricted diffusion on DWI & multiple hemorrhagic foci with locoregional extension and mass effect as described.**

Note: This is only a Radiological Impression & not a Diagnosis and has its limitations. Therefore it should be interpreted in correlation with clinical &/or pathological findings.

Fig. 1: MRI Brain Plan

Propofol 2 mg/kg was used for induction and Vecuronium 0.1 mg/kg was administered. Intubation was performed using Video Laryngoscopy and an 8.5 mm cuffed endotracheal tube (ETT) that was secured. Capnography was used to confirm ETT's position. Packing of the throat was completed. Cannulation of the left radial artery was performed, and invasive blood pressure was measured. Oxygen-nitrous oxide, isoflurane, vecuronium, and dexmedetomidine infusions were used to maintain anesthesia. After intubation, the right subclavian vein was cannulated and the CVP was monitored. Urinary bladder catheterization was performed, and urine production was monitored. Analgesia was augmented with IV paracetamol intraoperatively, the anticonvulsant dose was repeated, and Hydrocortisone 100mg IV injection was given. Throughout the surgery, the patient's hemodynamics remained stable. The throat pack was removed at the end of the surgery, and reversal was administered. After confirming appropriate recovery, the patient was extubated. The patient was observed in the intensive care unit for 48 hours after surgery. On the 12th day, the patient was discharged.

Discussion

Pituitary tumours account for 10% of all intracranial tumors.The pituitary gland is 15 × 10 mm in size and weighs 0.5 to 0.9 grams.[1] The gland is located in the sella turcica, which is located near the base of the skull. The pituitary tumor's clinical appearance can be related to either decreased hormone secretion or bulk effects.

An understanding of neurosurgical elements of anesthesia in general, and pituitary illness in particular, is required for anesthetic management. The pathophysiology of hormonal changes caused by pituitary dysfunction may have a substantial impact on the surgical result. Ananesthesiologist's biggest challenges are peripheral venous access and invasive monitoring.

The goal of anesthesia should be to provide hemodynamic stability, appropriate cerebral oxygenation, and a normal intracranial pressure.[2] Due to their huge tongues, anesthesiologists have trouble with mask breathing, laryngoscopy, and intubation. In acromegaly patients, a comprehensive examination of the airway is required[3]. Prognathism can be caused by coarse facial characteristics and bone enlargement.[4] As a result, fiberoptic intubation is the gold standard for airway securing. Nasal blockage caused by post-procedure nasal packing must be explained to the patient.[5] Persistent CSF rhinorrhea and the possibility of postoperative meningitis, panhypopituitarism, temporary DI, vascular damage, cranial nerve injury, cerebral ischemia, and stroke as a result of vasospasm or thrombosis are all risks associated with the trans sphenoidal technique.[6] Anticonvulsant prophylaxis is required.

Positioning during surgery is crucial, as sitting postures increase the risk of air embolism. Blood pressure must be measured intra-arterially[7]. Permissive hypercapnia with a PaCO2 of 60 mmHg is useful for increasing ICP and allowing the suprasellar component of the tumour to shift into the sella for easier surgical removal[8]. It's also important to keep track of your glucose levels throughout surgery. Unless there is an injury to a major arterial, such as the carotid artery, there is very little blood loss during trans sphenoidal surgery. The cranial nerves II through VI, the optic nerve or chiasma, and the venous sinuses are all

likely to be injured intraoperatively. Anosmia is caused by impairment to the olfactory nerves.

After the tumour removal, the sella is packed with autologous fat to prevent CSF leak and the Valsalva manoeuvre is performed to check for any CSF leak[9]. Intraoperatively and postoperatively, enough analgesia should be supplied. The throat pack must be removed with caution near the end of the surgery. The transition from anesthesia should be painless, with no coughing or bucking. Due to the restricted airway, there is an increased risk of airway compromise after surgery[10]. Consciousness, eye movements, and visual fields must all be evaluated on a regular basis[11]. Neuroendocrine disorders are very prevalent. In all patients, hormone replacement treatment is required. Steroids will be gradually reduced. Endocrinologists must be contacted about the patient's hormonal status, and regular follow-up is required.[12]

Conclusion

Pituitary surgery is performed by a multidisciplinary team that includes an endocrinologist, a neurosurgeon, a radiologist, and an anesthesiologist for better patient care and outcomes. It is necessary to optimise the patient's preoperative condition based on comorbid illnesses. Early neurological examination can reveal major surgical problems, thus a quick recovery from anesthetic is critical. Patients must have long-term follow-up with endocrinologists to assess their hormonal condition.

Conflict of Interest: Nil

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