



Anaesthetic management of a patient with extreme Gigantism for endoscopic transsphenoidal removal of pituitary adenoma

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Abstract:

The anaesthetic management of patients undergoing pituitary surgery requires a thorough understanding of the various neuroendocrine manifestations of pituitary tumours. Pituitary giants pose several challenges to the anaesthetists, neurosurgeons, endocrinologists and intensivists, mandating a careful, coordinated multidisciplinary approach for a successful surgical outcome. An emphasis is required on a thorough preoperative evaluation of airway, neurological and endocrine status so as to formulate a suitable perioperative management plan which should include practical considerations in the management of these huge patients. Endoscopic transsphenoidal approach to removal of pituitary tumours is being increasingly used now due to its benefits such as increased exposure of the pituitary gland, the tumour, surrounding neurovascular structures, combined with the absence of brain retraction and cranial nerve dissection. We present a case of anaesthetic management of a patient with extreme gigantism undergoing endoscopic transsphenoidal removal of pituitary adenoma.

Key words: gigantism, transsphenoid, pituitary tumours,

Introduction:

True gigantism is a rare endocrine disorder caused by excessive secretion of growth hormone from an anterior pituitary tumour before pubertal closure of epiphyses [1]. This results in exaggerated yet proportional bone growth and an abnormal increase in height.

Acromegaly has the same origin but occurs after puberty and is associated with disproportionate

enlargement of the face and acral parts of the hands and feet.

Transsphenoidal pituitary surgery has become a commonly performed neurosurgical procedure with unique challenges for the anaesthesiologist due to the distinct medical comorbidities associated with various adenomas [2].

While the microsurgical transsphenoidal route has historically been the favoured approach to

these lesions, endoscopic approach may often provide maximal visualization of the tumor, the pituitary gland, and the surrounding neurovascular structures [3].

Although there are case reports of anaesthetic management of acromegaly patients undergoing pituitary surgery, there are not many case reports of pituitary giants undergoing endoscopic removal of pituitary adenoma [1]. We report the anaesthetic management of a patient with extreme gigantism undergoing endoscopic transsphenoidal removal of pituitary adenoma.

Case Report:

The patient was an extremely large 32-year old male, weighing 123 Kg and 7 feet 2 inches tall. He occupied two hospital beds that had to be joined together in the ward to accommodate his large body frame.

He initially presented with severe headache, breathlessness on exertion, with very high blood sugar levels. He was started on insulin intravenous (IV) infusion as advised by endocrinologist to control his blood sugar levels. He was a known hypertensive, on regular amlodipine started two months ago.

He had limited exercise tolerance due to his huge body mass. He had no history of obstructive sleep apnoea.

The classical features of a pituitary giant were evident. [figure 1].



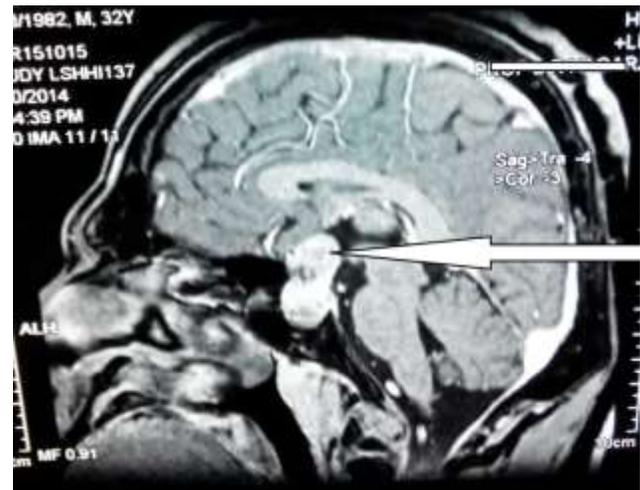
Respiratory and cardiovascular systems were normal on examination. Airway examination revealed adequate mouth opening and normal neck movements. There was macroglossia with some

hypertrophy of the soft tissues of the mouth, nose and tongue.

Initial investigations such as haematocrit, chest X ray, arterial blood gas (ABG) analysis, electrocardiogram (ECG) and echocardiography were normal.

Endocrine studies revealed a very high concentration of growth hormone which was 52ng/ml [normal < 10ng/ml] and high serum prolactin levels of 183.2ng/ml [normal<15.2 ng/ml].

Magnetic resonance imaging (MRI) of the brain showed a solid cystic lesion in the sella and suprasellar regions with extensions and mass effect suggestive of a pituitary macro adenoma [figure 2].



Patient was diagnosed as gigantism with a growth hormone secreting pituitary macroadenoma.

After adequate control of blood sugar level and optimization of chest with regular chest physiotherapy and salbutamol nebulization, patient was posted for endoscopic transsphenoidal removal of pituitary adenoma.

Premedication consisted of tablet ranitidine 150 mg on the night before surgery and morning of surgery. Salbutamol nebulization was given on morning of surgery.

Xylometazoline nasal drops were applied 15 minutes before induction of anaesthesia in order to prepare the nasal mucosa with the objective of minimizing blood loss during surgery.

Upon arrival of the patient to the operating theatre, he was shifted to a specially modified operating table [figure 3].

Standard monitors such as electrocardiogram (ECG), non-invasive blood pressure (NIBP), heart rate (HR), end tidal carbon di oxide (EtCO₂) and pulse oximetry were attached. After pre-oxygenation,

anaesthesia was induced with propofol 200mg slow IV and fentanyl 150 mcg.

Figure 3:



Vecuronium 10 mg IV was given to facilitate endotracheal intubation. Reinforced size 9 oral endotracheal tube was inserted without difficulty.

Invasive monitoring was with an arterial line inserted to left radial artery to monitor arterial blood pressure (ABP) and a central venous pressure (CVP) line inserted into the right subclavian vein.

Two large bore (16 gauge) peripheral IV cannulae were inserted and a foley catheter was inserted to monitor urine output.

A throat pack was inserted and labeled. Anaesthesia was maintained with isoflurane along with oxygen and air. Analgesia was with fentanyl IV given intermittently and paracetamol 1g IV.

Patient was positioned supine with the upper torso and head elevated, so as to position the operative field above the level of the heart, to optimize venous drainage and reduce bleeding.

The surgery lasted for nearly three hours, during which patient remained haemodynamically stable. Heart rate was maintained between 70 to 88 beats/minute, systolic blood pressure between 100 to 120 mmhg, pulse oximeter oxygen saturation [Spo₂] between 98 to 100% and Etco₂ between 30 to 32mmhg.

Total blood loss was estimated at 300 mls and urine output was 400 mls. Total intraoperative IV fluids given were two litres of crystalloids. Intraoperative blood sugar level was 103 mgs/100ml.

After completion of surgery, patient was extubated fully awake after removing throat pack in the operating theatre. Then he was shifted to neurosurgical intensive care unit (NICU), observed for 48 hours and later shifted to the ward.

Post operative fasting blood sugar levels were maintained between 93 to 103 mgs/100ml without requiring any medications and growth hormone (GH) level had dropped to 16.3 ng/ml.

Patient made a good recovery and was successfully discharged from the hospital on the 7th post-operative day.

Discussion:

Patients presenting for pituitary surgery can present a host of challenges to the anaesthetist. Difficulty in airway management can be anticipated in patients with gigantism due to hypertrophy of the soft tissues of the nose, tongue, turbinates and epiglottis following increased release of growth hormone [4]. Patients may have coarse facial features and prognathism [5].

Thyroid goiter may be present in Acromegaly patients causing tracheal compression [6].

The incidence of difficult intubation in patients with acromegaly is about four to five times higher than the rates of about 2.5% in those without acromegaly [7]. These difficulties have been managed by various measures from tracheostomy to awake fiberoptic intubation [7].

Southwick and Katz defined four grades of airway involvement: [1]

- (1) No involvement
- (2) Nasal or pharyngeal mucosal hypertrophy
- (3) Glottic stenosis
- (4) Combination of 2 and 3.

Elective tracheostomy or awake fiberoptic intubation is recommended for grade 3 and 4 patients.

Our patient had macroglossia with some hypertrophy of the soft tissues of the mouth, nose and tongue. There was no hoarseness of voice or history of snoring. Hence no serious difficulty in airway management was anticipated.

Pre-anaesthetic assessment should note any symptoms and signs of airway involvement such as exertional dyspnoea, hoarseness, stridor, and macroglossia or oropharyngeal mucosal hypertrophy [1]. An airway management plan should be made accordingly.

Other problems which may be encountered in the acromegalic patient are hypertension, an idiopathic cardiomyopathy and diabetes mellitus [1,8]. Our patient had hypertension and diabetes mellitus, both of which were adequately controlled with medications before proceeding to surgery.

Another significant finding in acromegalics is the high incidence of obstructive sleep apnea [OSA] which can increase the incidence of postoperative respiratory obstruction and compromise [9]. Our patient did not have a history suggestive of OSA.

A practical problem in the management of our patient was in transporting and positioning of such a large patient on the operating table. We modified our operating table with suitable accessories to accommodate extra length and width of the patient [figure 3].

Surgery on the pituitary gland is being increasingly performed endoscopically. The increased exposure, magnification and flexibility of the endoscope combined with the absence of skin incisions, brain retraction and cranial nerve dissection is an advantage of the endoscopic transsphenoidal approach [10].

Conclusion

Pituitary surgery on giants poses several challenges to the anaesthesiologist, including airway management, neuroendocrine abnormalities, existing co-morbidities and practical problems of transporting and positioning such huge patients.

A thorough preoperative assessment of the patient, including assessment of the airway and neuro-endocrinological status should be done to make a perioperative plan which should include suitable practical considerations in the management of these huge patients.

A multidisciplinary coordinated approach among the anesthesiologist, intensivist, neurosurgeon and endocrinologist is all that is required for the smooth and successful management of such cases.

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