

Anesthetic Considerations for the Acromegalic Patient Undergoing Transsphenoidal Hypophysectomy

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What is Acromegaly?

- Excess growth hormone (GH) production by the anterior pituitary
- Adenoma within the anterior lobe
 - Secreting
 - Prolactinomas are most common
 - GH adenoma → Acromegaly in adults
 - Nonsecreting

Incidence of Acromegaly

- 3-8 new cases per million annually
- Incidence of pituitary tumors
 - 200 per million in general population
 - Most common causes hyperprolactinemia
 - Found in 27% of random autopsies
 - Most asymptomatic

(McGoldrick, 2006)

What is Acromegaly?

QuickTime™ and a
decompressor
are needed to see this picture.

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Ted Cassidy as Lurch
Adam's Family

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Richard Kiel
Jaws in James Bond Movies

Case Presentation

- 36 year old male
- Weight: 128 kg
- Height: 185 cm
- BMI: 37
- Recently moved to the U.S. from Mexico
- NKDA
- PMH: Acromegaly
- PSH: None
- Medication: None

Assessment

- ASA 3
- Enlarged hands and feet
- Hypertrophy of facial and cranial bones
- No history of headaches or visual changes
- No physical limitations
- Denied chest pain or dyspnea with exertion
- No numbness or paresthesia in extremities
- VSS: BP 147/87, HR 72, RR 18, T 36.3, SaO₂ 99% on RA

Assessment

- Airway
 - Teeth intact with good mouth opening
 - Mallampati Score I
 - Thyromental distance >6 cm
 - No limitations in neck ROM or TMJ
 - Significant prognathism
 - Macroglossia
 - Deep voice without hoarseness

Preoperative Care

- 4% lidocaine nebulized treatment
- Glycopyrrolate 0.2 mg IV
- Midazolam 2 mg IV
- Hydrocortisone 100 mg IV

Induction

- Midazolam 4 mg IV
- Fentanyl 100 mcg
- Preoxygenation for 5 minutes
- Fiberoptic Intubation with 8.0 ETT
 - Good visualization of glottis
 - No resistance with ETT advancement
 - Propofol 200 mg IV
 - Vecuronium 12 mg IV
 - ETT secured at 24 cm at the lip

Maintenance

- Isoflurane with oxygen and nitrous oxide
- Cefazolin 1 gm
- Fentanyl 100 mcg prior to the start of surgery
- Vecuronium as needed based on peripheral nerve stimulation
- Ondansetron 4 mg IV
- Duration of surgery: 65 minutes

Emergence

- Neostigmine 5 mg IV
- Glycopyrrolate 1 mg IV
- Extubated awake with intact reflexes
- Transported to PACU with oxygen
- Foley catheter remained in place

Acromegaly

- Effects of Tumor
 - ↑Growth Hormone
 - Stimulates Insulin-Like Growth Factor I from liver
 - Direct Action on target organs
 - Bone and Cartilage growth
 - Protein Synthesis
 - Lipolysis
 - Reduced Insulin sensitivity
 - Sodium retention
 - Extension of Anterior Pituitary
 - Impingement on adjacent structures (outside sella turcica)
 - Mass effect on pituitary tissue

(McGoldrick, 2006)

QuickTime™ and a decompressor are needed to see this picture.

Saggital View

Coronal View

(Lechan & Toni, 2004)

Pituitary Gland

- Located in the sella turcica of the sphenoid bone
- Controls growth, metabolism, & reproduction
- Anterior Lobe
 - Secretes 6 hormones [Prolactin, Adrenocorticotropin (ACTH), Somatotropin (GH), Gonadotropin (GH), Follicle Stimulating Hormone (FSH), Lutinizing Hormone (LH), Thyroid Stimulating Hormone (TSH)]
 - Connected to hyypothalamus via the hypophyseal portal veins
 - Ant. Lobe hormones modulate activity of the hypothalamus and anterior pituitary

(Hesselink, n.d.)

Pituitary Gland

- Posterior Lobe

- Extension of the hypothalamus
- Hypothalamus produces substances that are transported via axonal flow to the posterior lobe for storage
 - Vasopressin (ADH)
 - Oxytocin
- Osmoreceptors in hypothalamus signal release of ADH

(Hesselink, n.d.)

Manifestations of Acromegaly

- Excess Growth Hormone
 - Prognathism
 - Osteoarthritis
 - Osteoporosis
 - Macroglossia
 - Vocal cord thickening with hoarseness
 - Subglottic narrowing
 - Sleep apnea (75%)
 - Enlarged epiglottis

(McGoldrick, 2006; Stoelting & Diefdorf, 2002)

Manifestations of Acromegaly

- Excess Growth Hormone
 - Recurrent Laryngeal Nerve paralysis
 - Peripheral Neuropathy
 - Glucose intolerance
 - Skeletal Muscle weakness
 - Hypertension (46%)-volume overload
 - Cardiomegaly
 - Dysrhythmias (40%)
 - LV Dysfunction
 - CHF

(McGoldrick, 2006; Stoelting & Diefdorf, 2002)

Significance to Anesthesia

- Incidence of difficult intubations:
 - Acromegalic population: 10-43%
 - General population: 3.6%
- Airway assessment tools do not accurately predict difficulty in intubating
 - 20% difficulty in Mallampati class I and II
- If direct laryngoscopy is difficult, fiberoptic intubation can also be challenging

(Nemergut, Dumont, Barry, & Laws, 2005)

(Hassan, Matz, Lawrence, Collins, 1976)

Other Anesthetic Considerations

- Preoperative Assessment
 - Chest X-ray
 - EKG
 - Echocardiogram
 - Lateral neck radiograph
 - Neck CT
- Induction
 - Smaller ETT may be needed
 - Larger face mask may be required
 - Consider fiberoptic intubation or have available
 - Intubating LMA has been used successfully

Other Anesthetic Considerations

- Maintenance

- Rapid recovery at end of surgery is desired
 - Propofol, Sevoflurane, & Remifentanyl are good choices

- Emergence

- Extubate awake with intact reflexes
- Do not disrupt nasal packing or stents with extubation

Other Anesthetic Considerations

- Recovery Room

- Postoperative Complications

- Anterior Pituitary Insufficiency (19.4%)
- Diabetes Insipidus (maintain foley catheter) (17.8%)
- Sinusitis (8.5%)
- Septum Perforation (6.7%)
- CSF Leak (3.9%)
- Loss of Vision (1.8%)
- Meningitis (1.5%)

- Will have hormone replacement with tapered cortisol dosing

- DI rarely develops at conclusion of surgery and usually resolves in a few days

(Sakamoto, Shuer, & Chang, 2004)

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