Anesthesia for Pituitary Surgery

Anesthesia Guidelines
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Overview

Anatomy of Pituitary Space

Floor = roof of sphenoid sinus, roof = diaphragm sella (fold of dura with central opening for pituitary stalk, above diaphragm sella are optic nerves and tracts, hypothalamus), walls = cavernous sinus and intercavernous sinuses (containing carotids, cranial nerves III, IV, VI).

Pathophysiology

Most common tumor (2/3 cases) is pituitary adenoma. Two-thirds of these are functional with symptoms of headache, visual loss, hypopituitarism, acromegaly, galactorrhea, and rarely increased ICP (usually only with suprasellar extension).

Diagnostic steps

CT scan or MRI, carotid angiography, pneumoencephalography (rarely used these days), and functional studies. The anterior lobe of the pituitary (adenohypophysis) secretes growth hormone, prolactin, ACTH, TSH, LH, and FSH. The posterior lobe (neurohypophysis) releases ADH-vasopressin, and oxytocin.

Preoperative Considerations

Careful assessment of airway: Patients with acromegaly may have both cartilaginous and soft tissue hypertrophy of larynx. Consider ENT consult to evaluate. In one series, 6 of 94 acromegalic required use of a fiberoptic bronchoscope for intubation.

Careful assessment of radial artery: Five of ten patients with acromegaly had impaired Allen’s Test.

Careful assessment of endocrine status: Most common concern is adequate thyroid and steroid replacement therapy.
The Procedure

Premedication

Premedicate lightly: Use no premedication, or midazolam 1-2 mg I.V. in preoperative holding as tolerated by patient's condition.

Preparation for the Procedure

Monitoring and I.V.'s

Use routine monitoring (arterial line optional; required if elective hypotension is requested by neurosurgeon). EEG monitoring (4-channel CSA) may be useful during controlled hypotension but is not required. For hypotension, place I.V. and T-connector for fluid administration and infusion of hypotensive drug such as nitroprusside, trimethaphan, or nitroglycerin. Or may use high doses of inhalational anesthetic as hypotensive agent. Not required to start A-line prior to induction. Start I.V. and A-line in arm closest to anesthesia machine (usually the left arm). Visual evoked responses may some day be used to monitor pressure on optic nerves. Monitor urine output intraoperatively as patients are at high risk for development of diabetes insipidus due to acute loss of ADH.

Induction Phase

Propofol, and remifentanil or fentanyl with preoxygenation. Rocuronium, cis-atracurium or vecuronium. Intravenous lidocaine, then intubate. May prefer succinylcholine. Intubate with REA tube or short E-T tube with right angle connector and goose neck. Tape both at left corner of mouth. Make it secure – head will be covered with drapes. No oral airway (use soft bite block instead). You may need fiberoptic bronchoscope to intubate patients with acromegaly. Use Tegaderm or equivalent to cover eyes after applying lubricant.

Maintenance Phase

1) Controlled ventilation to maintain PaCO₂ 33-35 torr. Lower if patient has increased ICP.

2) Inhalational anesthetic can be used unless monitoring visual evoked potentials or concerned about ICP. If monitoring evoked potentials or concerned about ICP, use TIVA with propofol plus narcotic (i.e. fentanyl, sufentanil, or remifentanil).

3) Patient is in 10 degree head up position with head frequently manipulated from side to side during operation. Up to 10% incidence of air embolism reported for pituitary surgery in patients in semi-sitting position. We, however, presently do not use semi-sitting position and hence do not monitor for air embolism.

4) If requested by surgeon, maintain MAP = 70 mmHg using either deep general anesthesia or vasoactive drugs (see above) during both ENT procedure and tumor resection.

5) Sometimes neurosurgeons request placement of a subarachnoid needle and injection of gas into the subarachnoid space as a mean to define suprasellar expansion of a
pituitary tumor. May also request large tidal volume or jugular vein compression to push tumor into operative field.

6) **Be sure throat pack is removed prior to extubation!** Visualize pharynx and remove blood clots. Some recommend giving I.V. lidocaine 1.5 mg/kg 90 sec prior to extubation. Extubate quite light (when swallowing), or awake. Avoid mask pressure on nose. Place in 15-20 degree head-up position in recovery room.

**References**


