Managementul pacientului cu tumori selare

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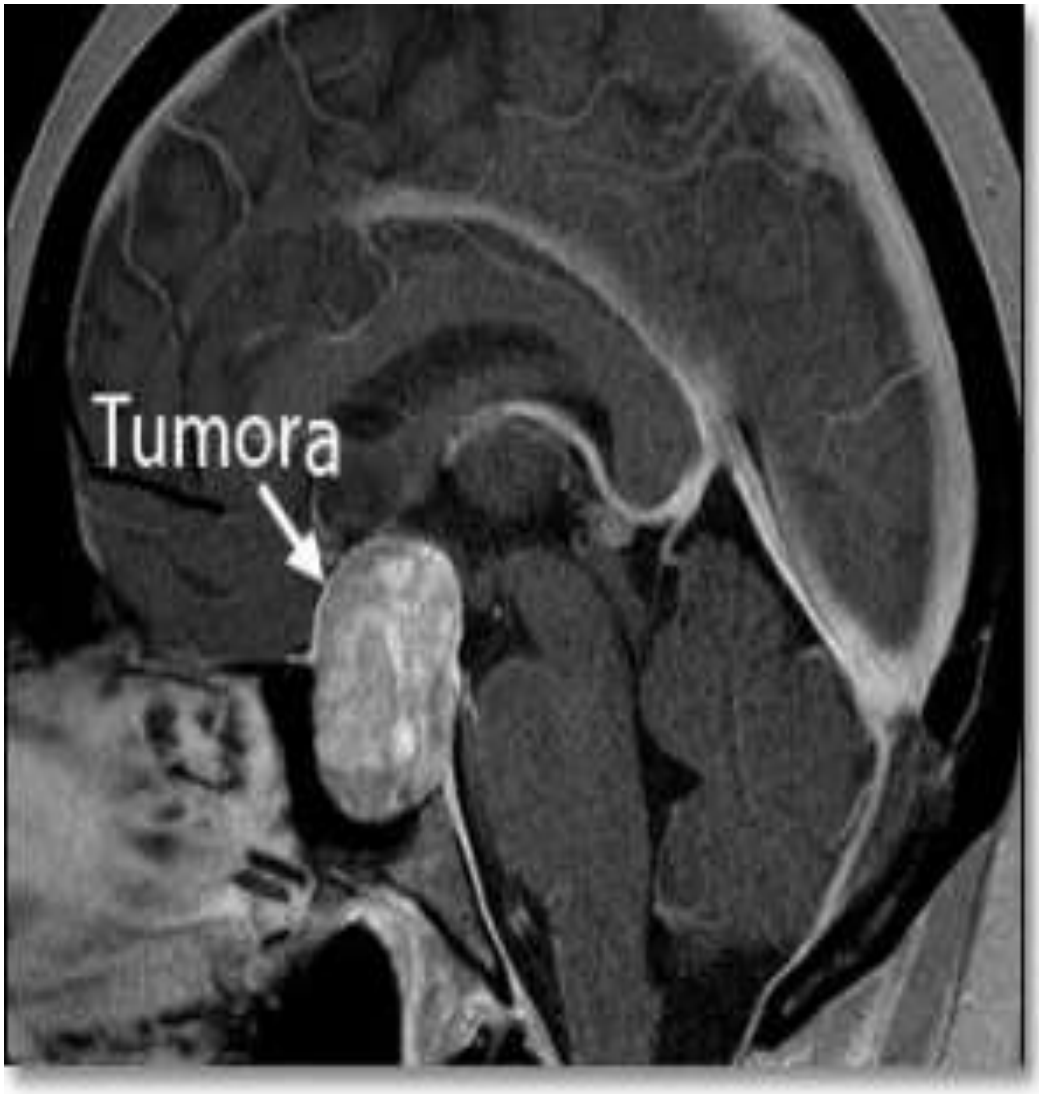
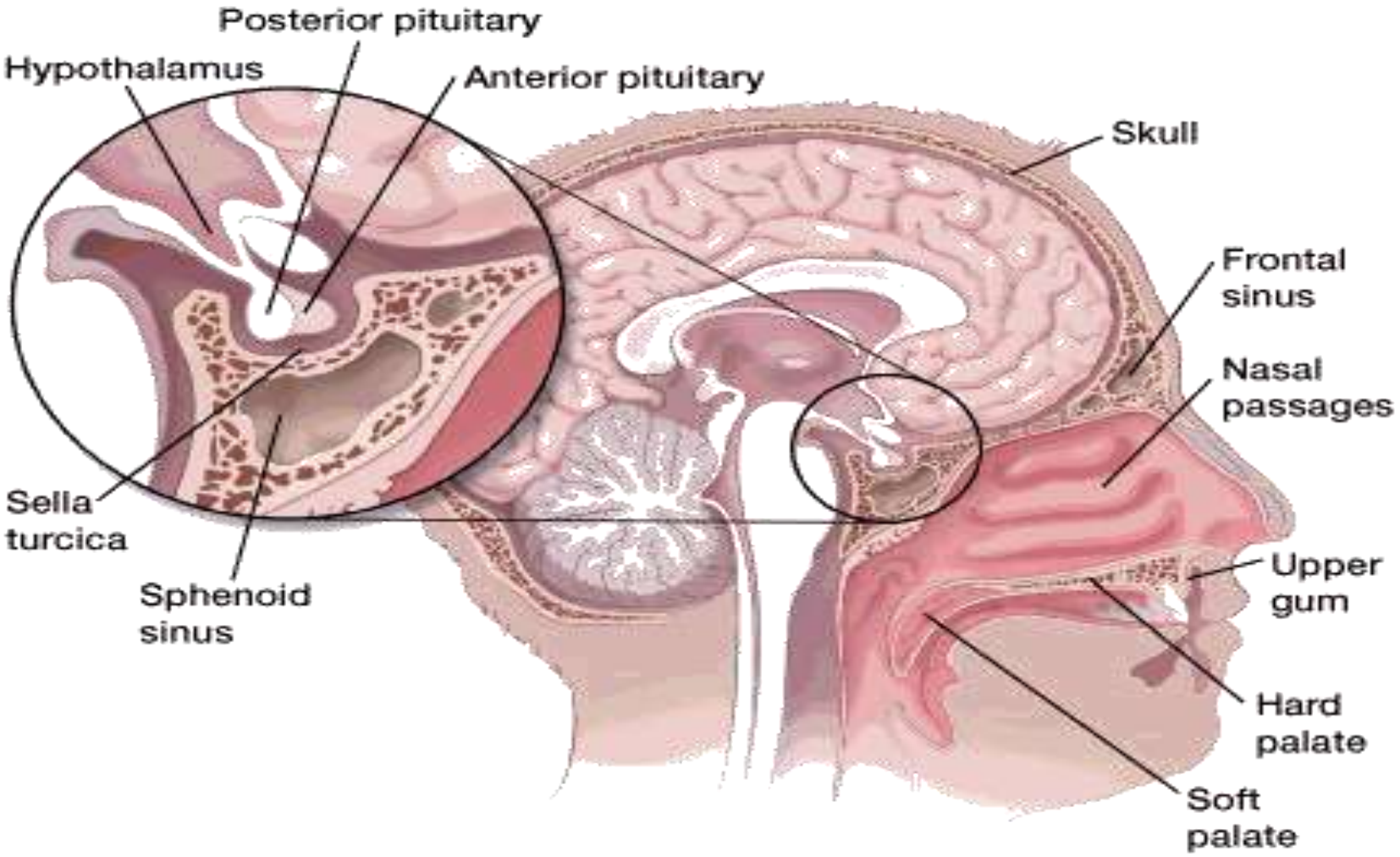
INSTITUTUL DE NEUROLOGIE ȘI NEUROCHIRURGIE

Incidence

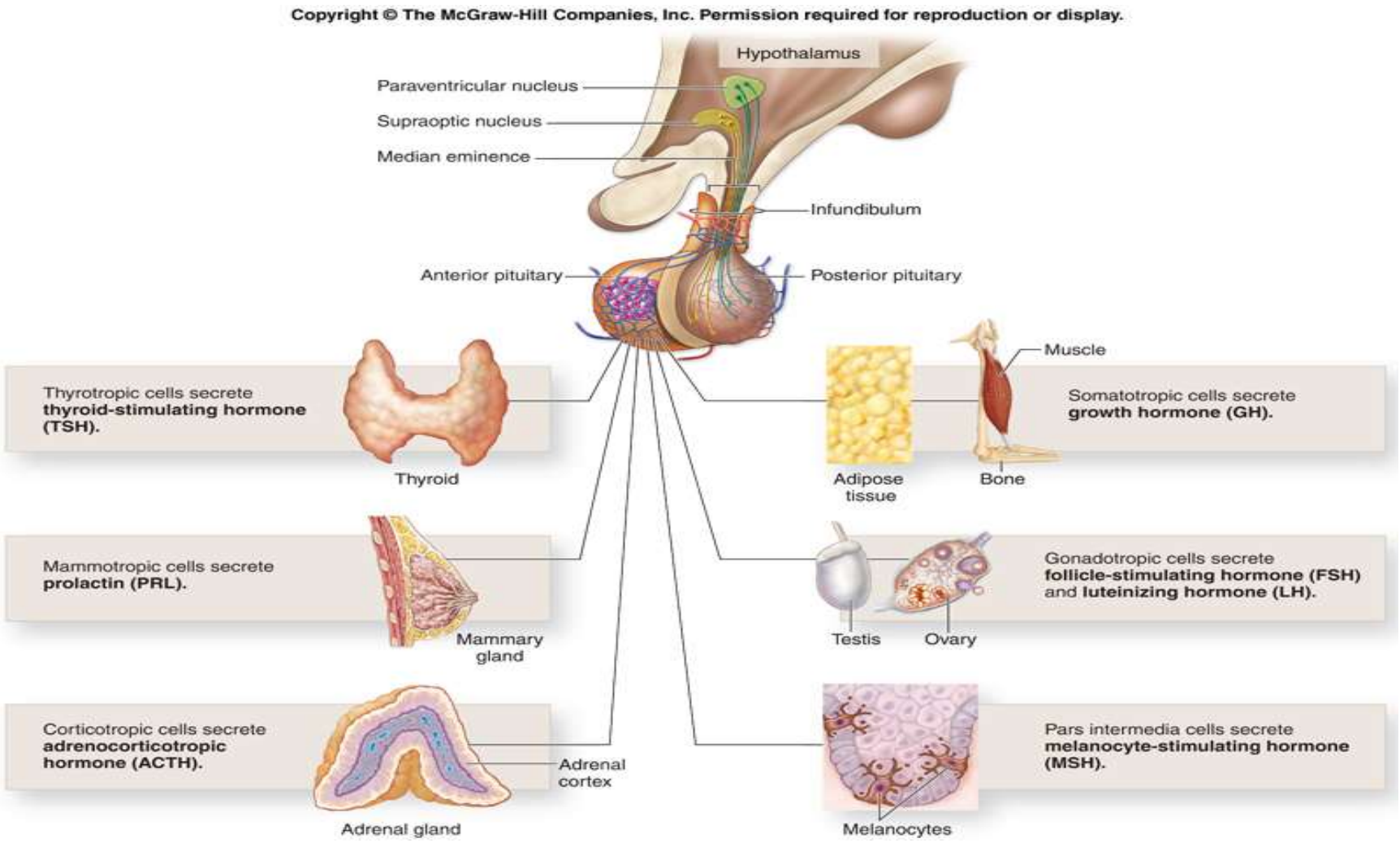
Transsphenoidal resection of pituitary brain tumours may account for as much as 20% of all intracranial operations performed for primary brain tumours



Anatomy


Posterior pituitary
Hypothalamus
Anterior pituitary
Skull
Frontal sinus
Nasal passages
Sella turcica
Sphenoid sinus
Upper gum
Hard palate
Soft palate

Anatomy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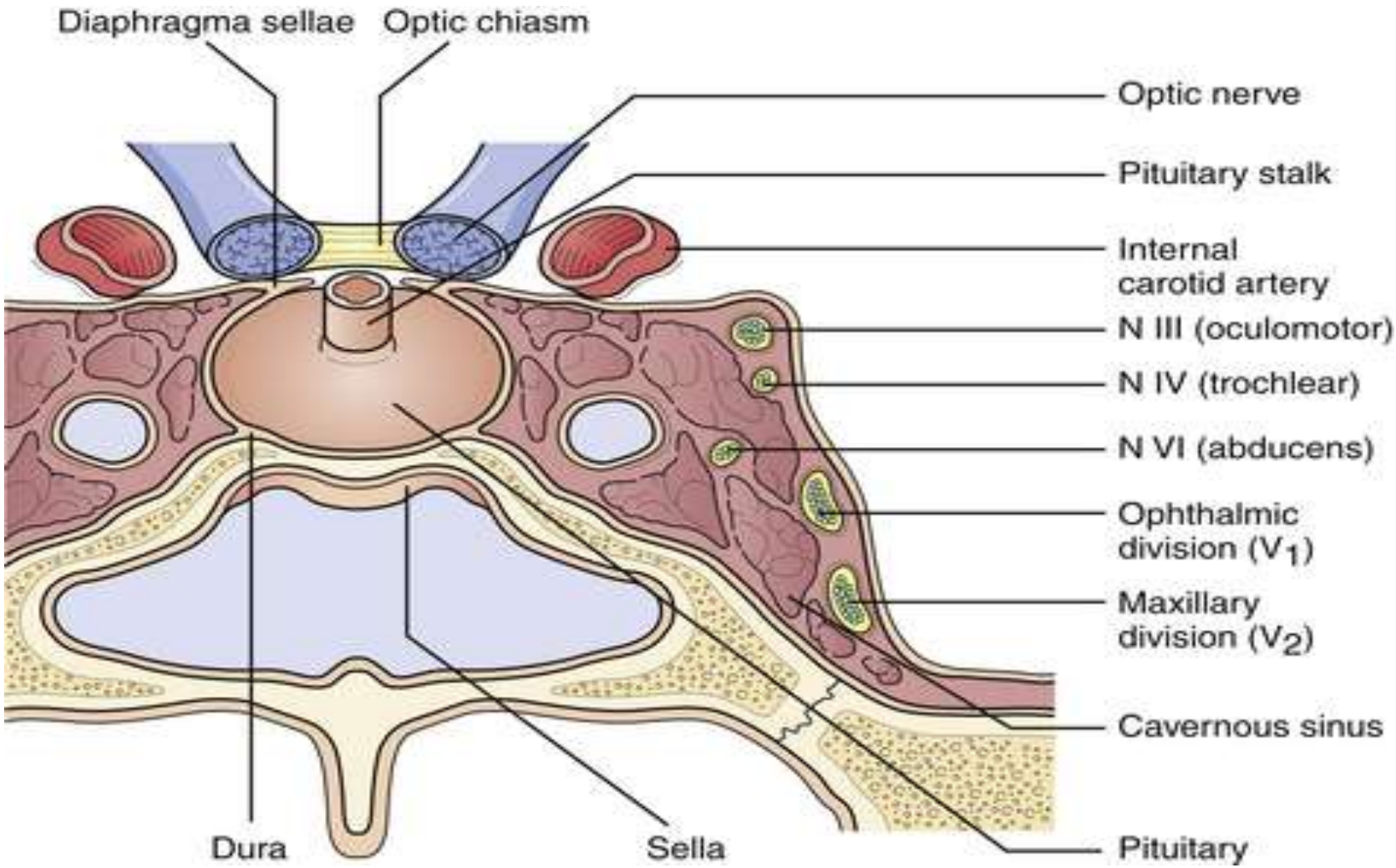
Hypothalamus
Paraventricular nucleus
Supraoptic nucleus
Median eminence
Infundibulum
Anterior pituitary
Posterior pituitary
Thyrotropic cells secrete thyroid-stimulating hormone (TSH).
Thyroid
Somatotropic cells secrete growth hormone (GH).
Muscle
Adipose tissue
Bone
Mammotropic cells secrete prolactin (PRL).
Mammary gland
Gonadotropic cells secrete follicle-stimulating hormone (FSH) and luteinizing hormone (LH).
Testis
Ovary
Corticotropic cells secrete adrenocorticotropic hormone (ACTH).
Adrenal cortex
Adrenal gland
Pars intermedia cells secrete melanocyte-stimulating hormone (MSH).
Melanocytes

Anatomy


Diaphragma sellae
Optic chiasm
Optic nerve
Pituitary stalk
Internal carotid artery
N III (oculomotor)
N IV (trochlear)
N VI (abducens)
Ophthalmic division (V_1)
Maxillary division (V_2)
Cavernous sinus
Pituitary
Dura
Sella

Pituitary adenomas

Microadenomas (<1 cm)

Macroadenomas(>1 cm)

Non functioning tumours

Functioning tumours

Adenomas: Clinical Disease and Medical Therapy

Clinical disease	Hormone produced by tumor	Estimated frequency (%)	Medical therapy
Acromegaly	Growth hormone	5–10	Somatostatin analog (octreotide) Growth hormone receptor blocker
Cushing's disease	ACTH	10–15	Ketoconazole (blocks cortisol synthesis)
Gonadotroph	FSH, LH	5	None
Prolactinoma	Prolactin	20–30	Dopamine agonist (bromocriptine, cabergoline, pergolide)
Null cell	None	20–25	None
Thyrotropic	TSH	<3	Somatostatin analog (octreotide) Propylthiouracil
Other (including mixed cell adenomas)	None	20	None

ACTH = adrenocorticotropic hormone, FHS = follicle-stimulating hormone, LH = luteinizing hormone, TSH = thyroid-stimulating hormone.

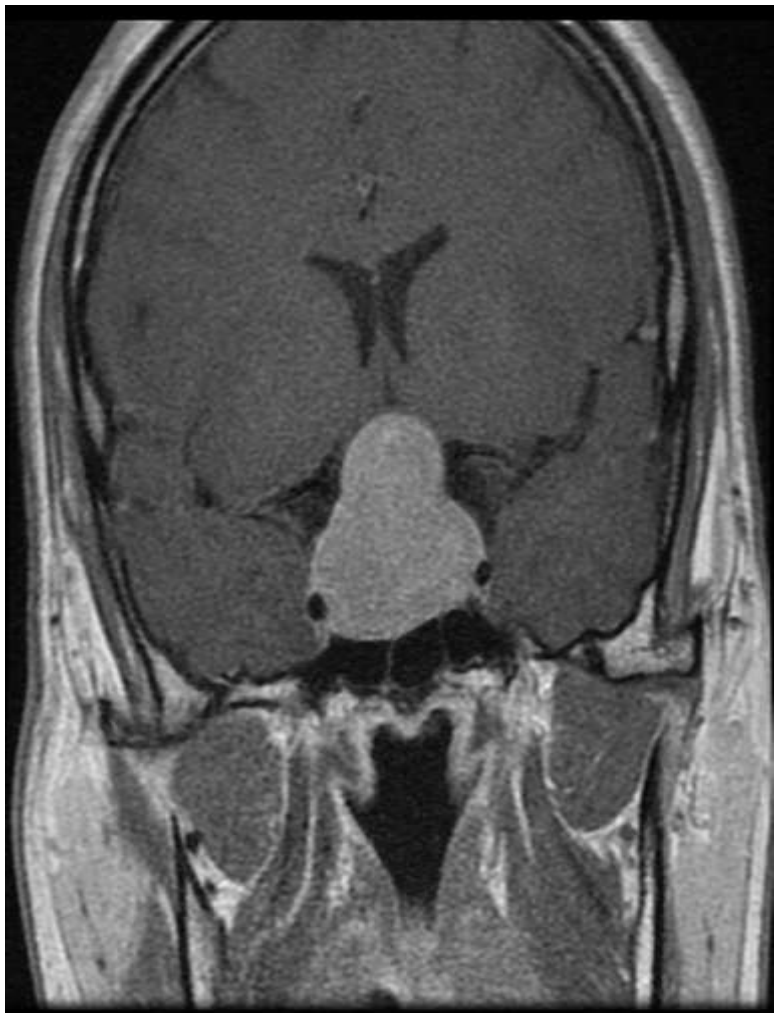
Non Functioning Adenomas

- More likely to be macro adenomas
- Symptoms related to mass effect
- Most common :

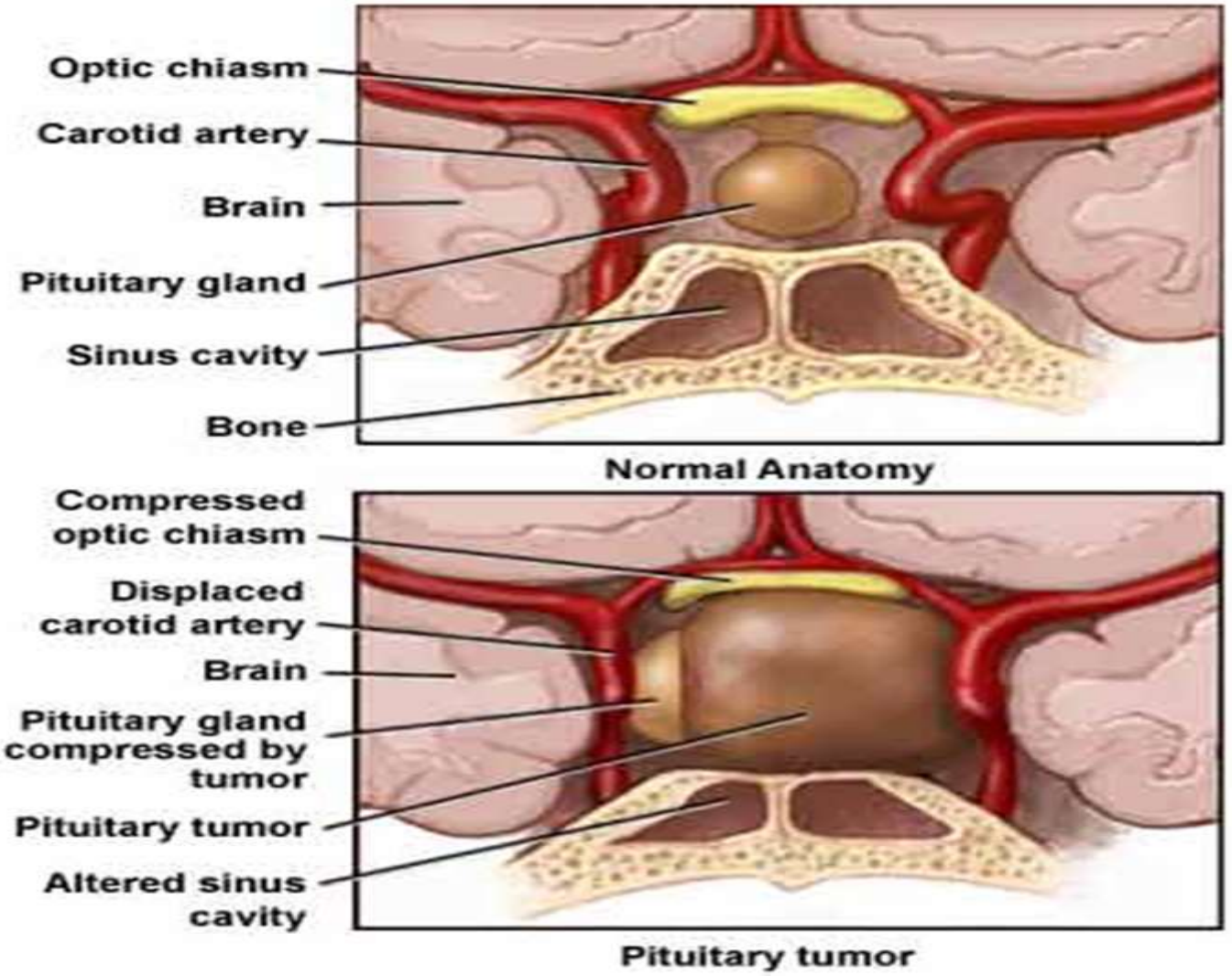
Chromophobe adenomas

Craniopharyngiomas

Meningiomas

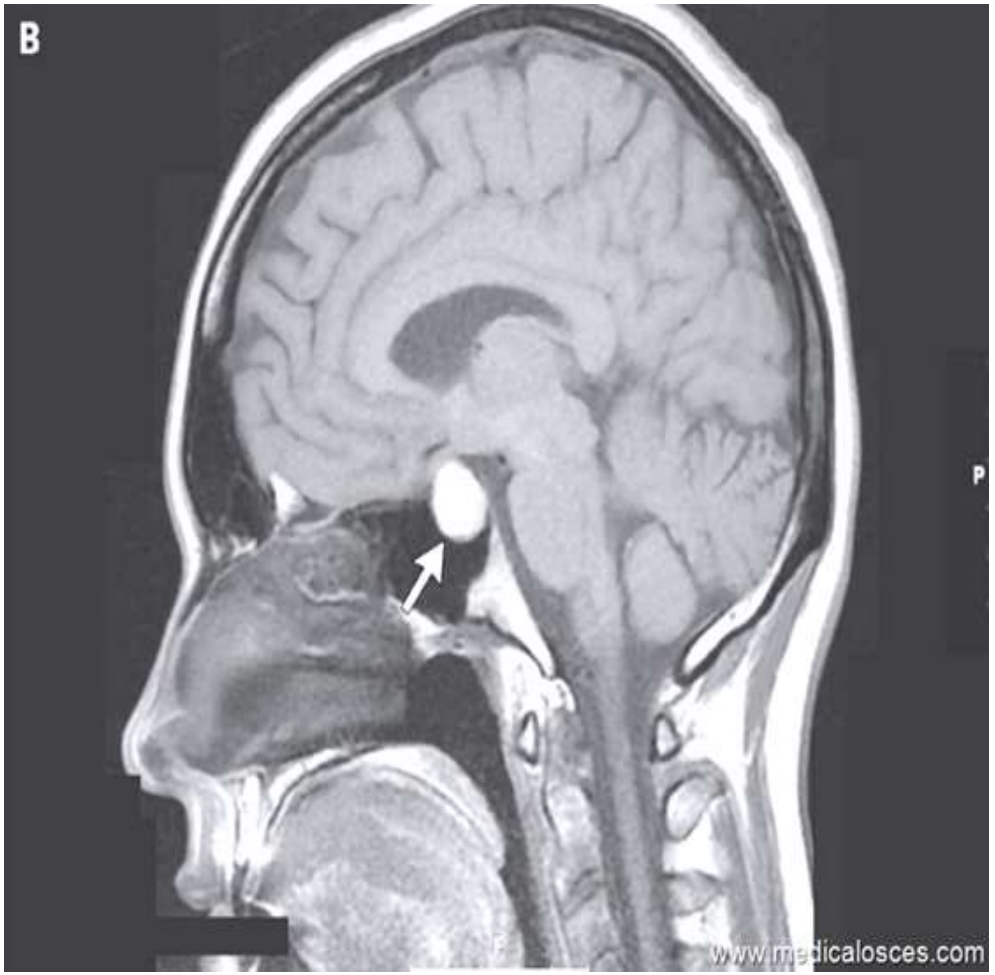


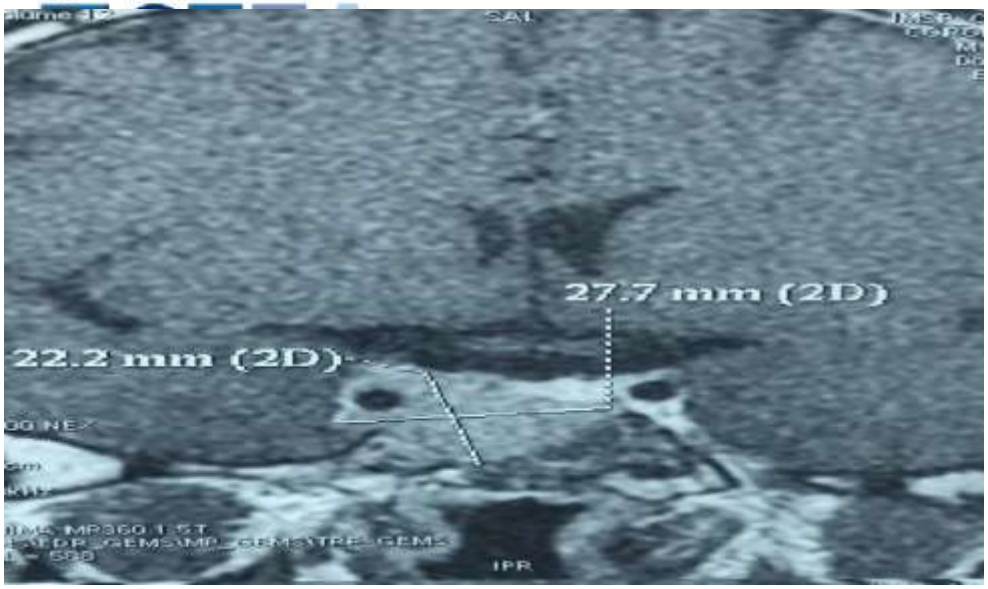
Volume effect of the tumor



Prolactinomas

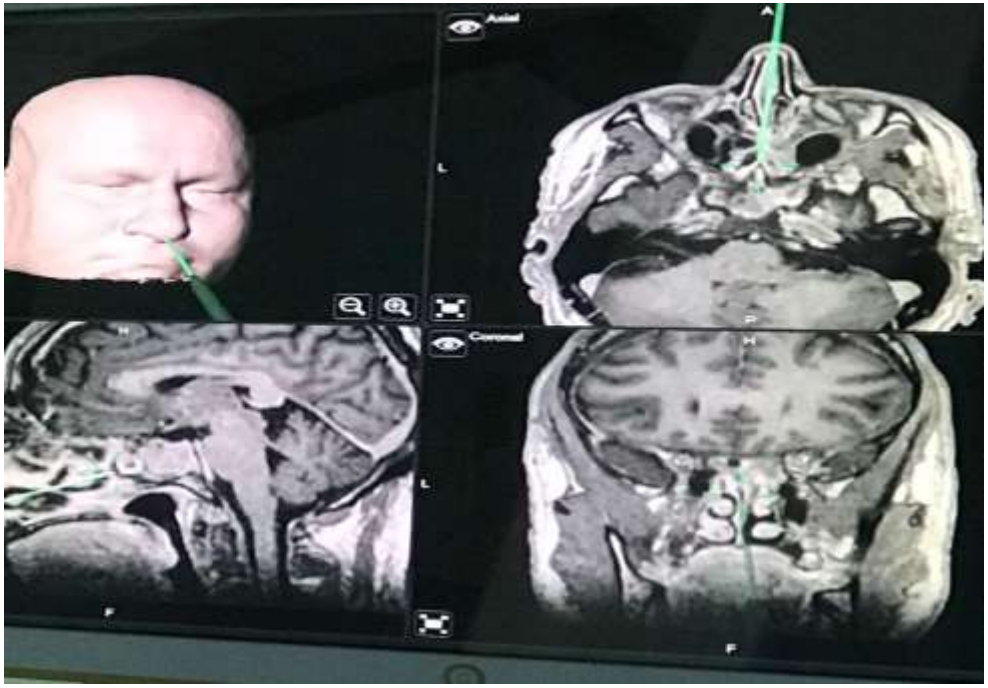
- Prolactinomas are the most frequently observed type of hyperfunctioning pituitary adenoma
- It represent 20%–30% of all clinically recognized tumours.
- More than 90% of patients respond to medical therapy with a dopamine agonist such as bromocriptine and only for few patients surgery is indicated.

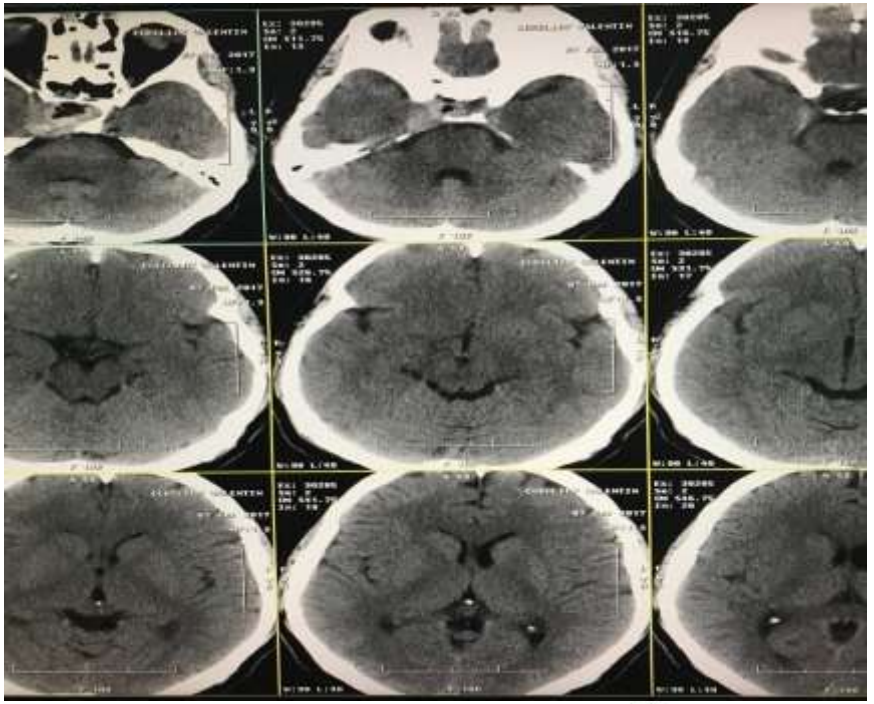




Notă: intervalul de referință corespunde sexului și vârstei a pacientului

Parametru	Rezultat		Valori de referință
Markerii funcției gonadotrope hipofizare			
Hormonul foliculostimulant, FSH	1,3		0,7 – 11,1
Hormonul luteinizant, LH	2,1		0,8 – 7,6
Prolactina, PRL	13 038,0	↑	53,0 – 360,0
Markerii funcției androgene			
Testosteron total	135,0	↓	250,0 – 1200,0
Testosteron liber (calculat)	2,88	↓	4,46– 17,1
Globulina de transport a hormonilor sexuali, SHBG	25,8		16,2 – 68,5
Estrogeni și progestine			
Estradiol total	64,6	↑	0,0 – 56,0





Clinical Features of Acromegaly

- Changes in facial features and bone proliferation
- Excessive increase in volume of forehead, jaw, mandible, lips and tongue.
- Thoracic and laryngeal tissue thickening, peri-epiglottic and glottic hypertrophy.
- Obstructive Sleep-apnea
- Dilated cardiomyopathy, systemic hypertension
- Glucose intolerance

Airway Management

Clinical Reports
BURNELL R. BROWN, JR., M.D., PH.D., *Editor*

Anesthesiology
51:72–73, 1979

Unusual Airway Difficulty in the Acromegalic Patient—Indications for Tracheostomy

JAMES P. SOUTHWICK, M.D.,* AND JORDAN KATZ, M.D.†

Although laryngeal and pharyngeal involvement in acromegalic patients have been recognized since 1896,[1] few references have appeared in the anesthesia literature regarding airway management difficulties in this group of patients.[2–5] The following report describes the anesthetic management of such a patient, who had massive hypertrophy of the pharyngeal soft tissue but a normal larynx.

REPORT OF A CASE

A 31-year-old man was scheduled for transsphenoidal hypophysectomy. Twelve years prior to admission there had been a gradual-onset weight gain, coarsening of facial features, enlargement of hands and feet, and deepening of the voice. The diagnosis of acromegaly had been made, and a course of radiation therapy had reduced the growth hormone level from 300 to 50 ng/ml (normal less than 10). However, continued enlargement of the sella occurred.

On physical examination, the patient had the classic stigmata of advanced acromegaly, including marked prognathism, a thickened tongue and a broad flat thyroid cartilage. Results of endocrine studies were consistent with the diagnosis. All preoperative spirometric indices of pulmonary function were within normal limits; however, fiberoptic laryngoscopy and soft-tissue X-rays and tomograms of the upper airway revealed generalized thickening of all tissues, including nasal turbinates, epiglottis, walls of the hypopharynx, and a broad-based tissue mass protruding from the posterior pharyngeal wall. The vocal cords were normal in appearance and mobility.

Premedication consisted of morphine sulfate (5 mg), droperidol (5 mg), and atropine sulfate (1 mg), im, one hour prior to operation. After preoxygenation, anesthesia was induced with thiopental (4 mg/kg). In spite of considerable difficulty in maintaining a tight mask fit because of abnormal facial contours, it was possible to ventilate the lungs adequately. After administration of succinylcholine, direct laryngoscopy was undertaken. However, the massive hypertrophy of the pharyngeal mucosa prevented visualization of any portion of the larynx with either straight or curved blades. Endotracheal intubation was accomplished by blind insertion of an oxotracheal tube. Anesthesia was maintained with halothane, nitrous oxide, and oxygen. After completion of the hypophysectomy, for fear that the trauma of the original tracheal intubation might have further compromised the airway, an elective tracheostomy was performed.

The postoperative course was complicated only by the development of mild diabetes insipidus. On the third postoperative day the patient was able to breathe adequately around the tracheostomy tube, which was removed the following day.

DISCUSSION

Various airway abnormalities associated with acromegaly have been described. Chappell[1] mentioned hypertrophy of the inferior nasal turbinates and lingular glands, thickening of the anterior and posterior pillars, soft palate, uvula, tonsils, tonsillar capsules, epiglottis, arytenoids and ventricular bands, enlargement of the larynx on external examination, and marked narrowing of the glottic opening. Jackson[5] emphasized the frequent asymmetry of the cartilaginous enlargement. Grotting and Pemberton[6] discussed the problem of vocal cord "fixation" and suggested several possible etiologies, including stretching of the recurrent laryngeal nerve(s) or of the cords themselves by laryngeal enlargement, impaired mobility of the cricoarytenoid joints, or compression of the recurrent laryngeal nerves by the thyroid enlargement that frequently accompanies acromegaly.

The clinical significance of these findings varies widely. While the great majority of acromegalic patients are free of symptomatic airway obstruction, Chappell's patient[1] apparently died of acute airway obstruction. There are numerous reported cases of hoarseness and dyspnea on exertion secondary to airway changes of acromegaly.[1,6–8]

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Accepted for publication November 25, 1978.
Address reprint requests to Dr. Katz (Veterans Administration Hospital).

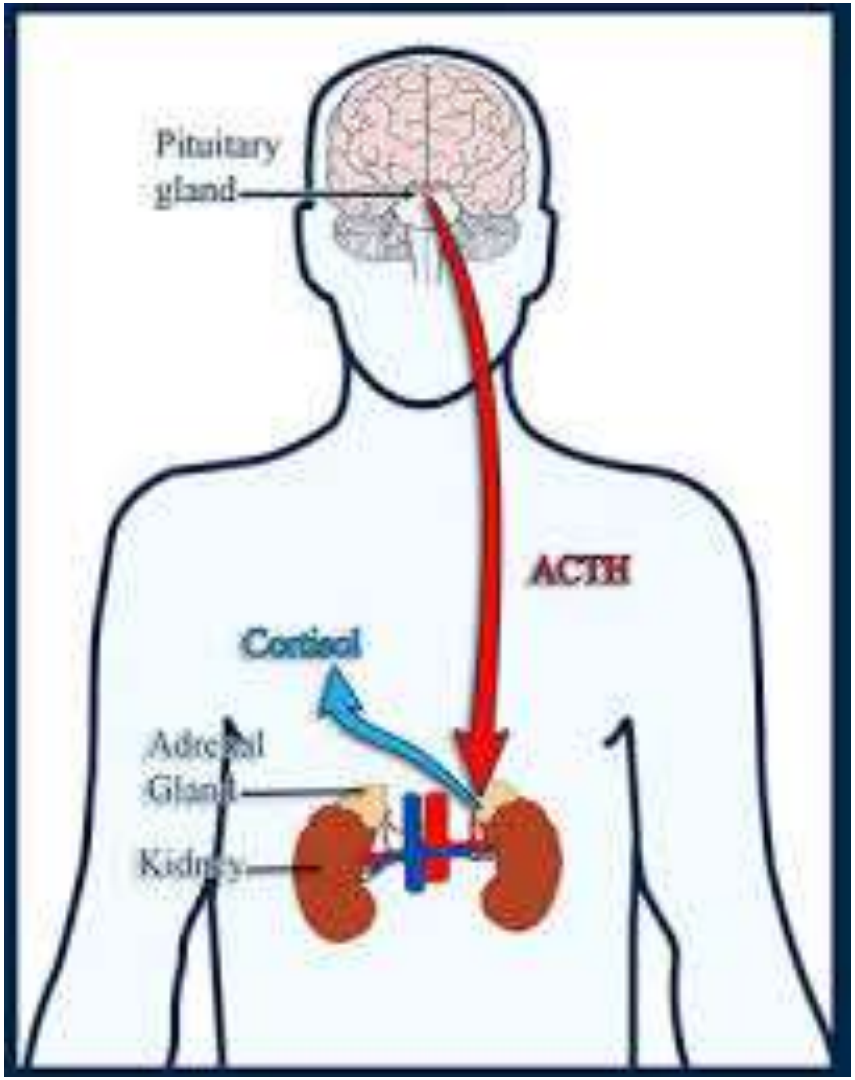
Airway Management Southwick Katz

- **Four grades of airway involvement:**
- Grade 1-- no significant involvement
- Grade 2-- nasal and pharyngeal mucosa hypertrophy but normal cords and glottis
- Grade 3-- glottic involvement including glottic stenosis or vocal cord paresis
- Grade 4-- combination of grades 2 and 3, i.e. Glottic and soft tissue abnormalities

Preparation for Difficult Airway

Clinical Features of Cushing

- Systemic hipertension
- Glucose intolerance
- Obstructive Sleep-apnea
- Osteoporosis
- Gastro esophageal reflux
- High fragility of the skin and immunosuppression
- Fatness



Hypopituitarism

- Low levels of peripheral hormones, not associated with high pituitary tropic hormones.
- Pituitary apoplexy: present with sudden headache, loss of vision, loss of consciousness and panhypopituitarism, requiring urgent surgery.
- Requires glucocorticoid replacement
- Thyroxine replacement is also required (50–150 ug daily).
- Perioperatively, these patients are extremely sensitive to anaesthetic agents, and pressure agents may be needed to maintain blood pressure.

Surgical approach

Transphenoidal Approach

Advantages

Decrease of diabetes insipidus.

Magnified visualization.

Decreased frequency of blood transfusions

Disadvantages

CSF leakage and meningitis ,

Inability to visualize neural structures adjacent to a large tumor,

Possibility of bleeding from cavernous sinuses or carotid.

Transcranial Approach

Advantages

For pituitary tumors that have significant suprasellar extension

Less surgical stimulation

Disadvantages

Incidence of permanent diabetes insipidus and anterior pituitary insufficiency is increased.

Damage to the olfactory nerves, frontal lobe vasculature, and optic nerves and chiasma

Preoperative issues

- **Hormone replacement**

Preoperative hormone replacement therapy should be continued into the operative period

In general, all patients with Cushing's disease require glucocorticoid coverage.

Intraoperative Issues

- **General issues :**

Optimization of **cerebral oxygenation**

Maintenance of **hemodynamic stability**

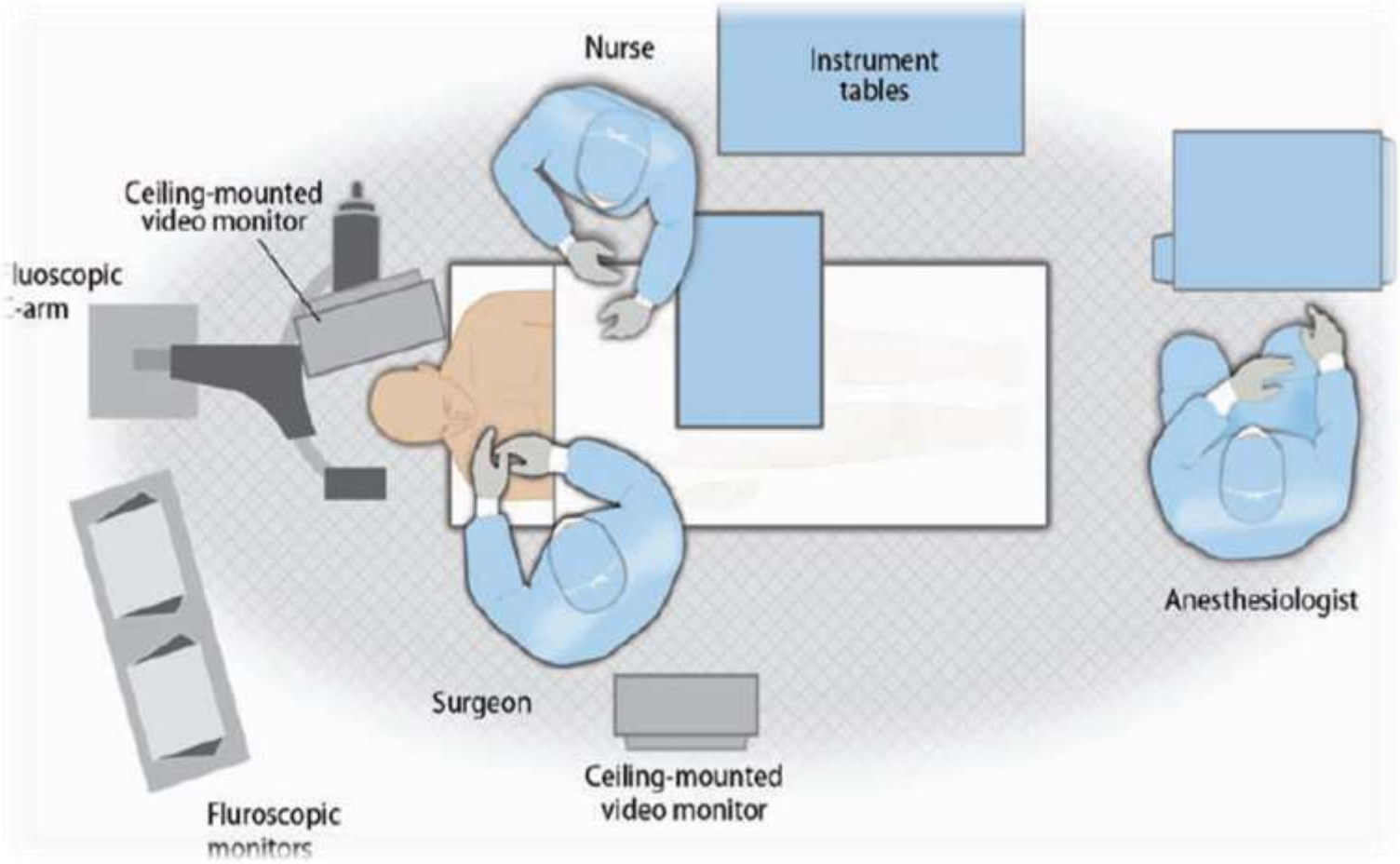
Provision of conditions that **facilitate surgical exposure**

Prevention and management of intraoperative complications

Rapid, smooth emergence.

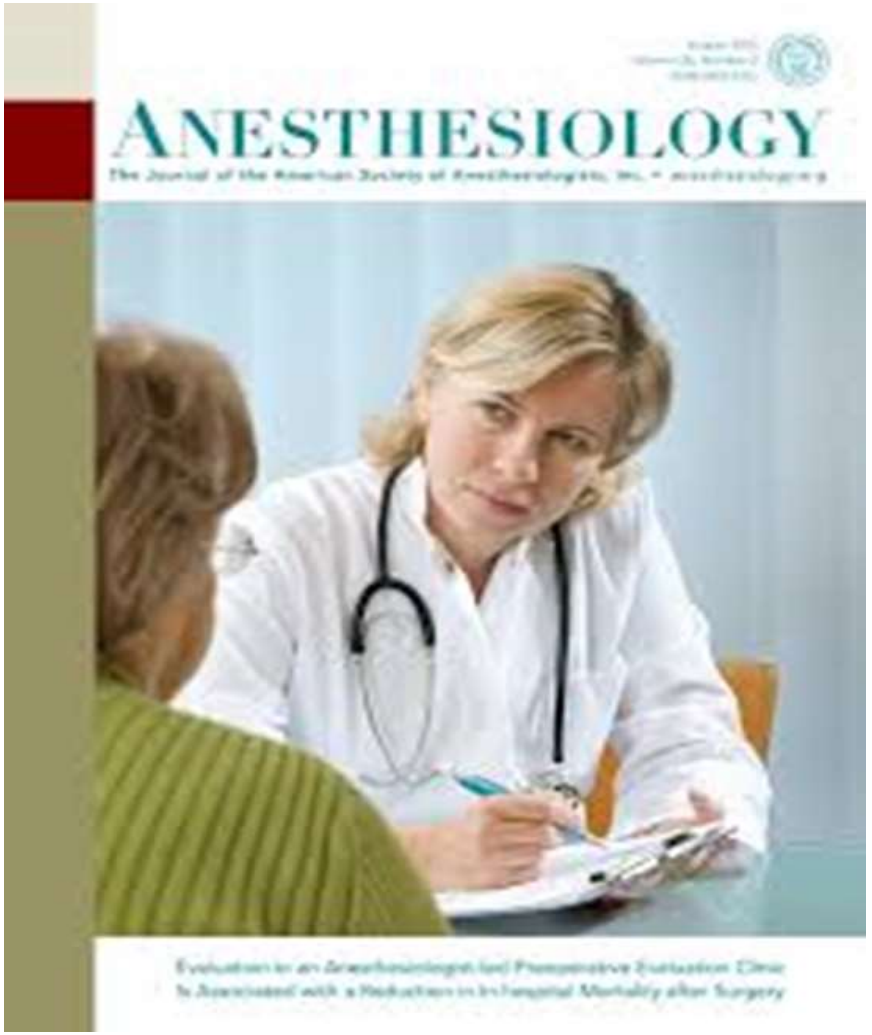
Operating Room Facilities

Ergonomics in Operating Room



Doctor's round and Pre-anesthetic preparation

- Evaluation of the patient
- Risks of anesthesia
- Informed consent
- Psychological preparation of the patient
- Detailed explanation of the neurosurgical surgery

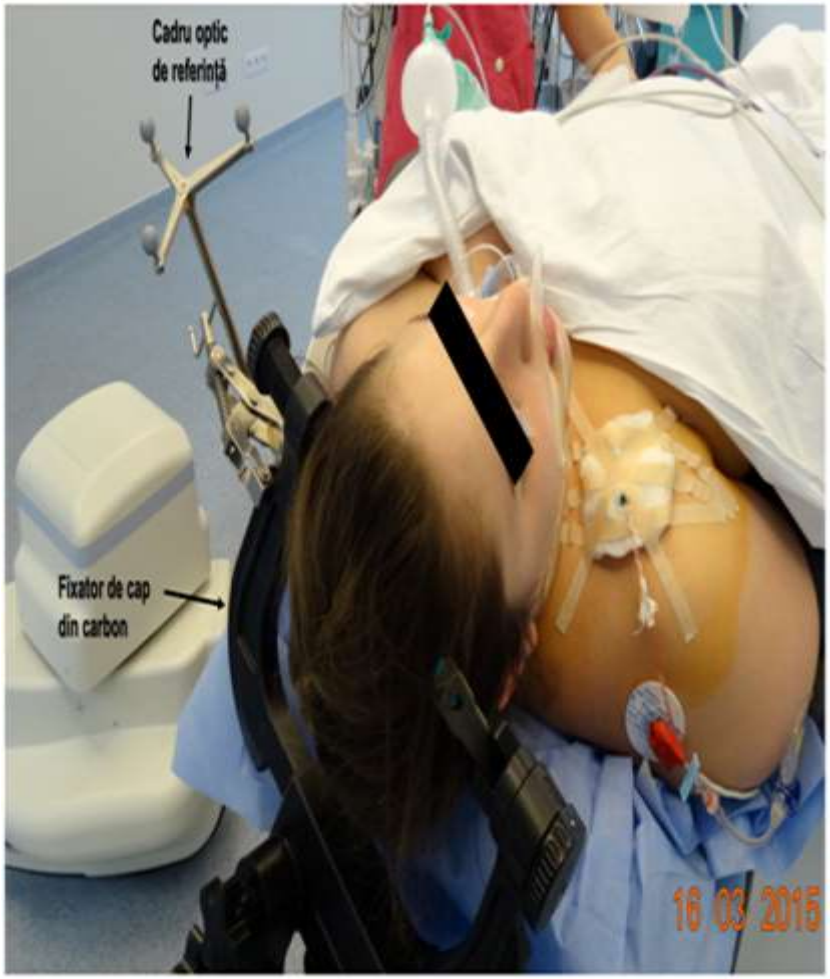


Preanesthesia premedication

- Premedication in the ward, with sedative and anxiolytic purpose.
- Preanesthesia follows as well anxiolysis, when sedation decreases intraoperator drug quantity.

Positioning

- Head elevated
- Patient closer to the right hand side of the table
- Neck tilted laterally to the left, slightly extended and secured in a Mayfield clamp



Intraoperative Management

- Anesthetic Technique
  - Inhaled agents sevoflurane, desflurane and isoflurane have all been shown to increase lumbar CSF pressure.
  - Whether an inhalational or intravenous technique is employed, short-acting agents should be utilised to facilitate rapid recovery

Postoperative Airway Maintenance Is An Issue

Anesthetic Stage

Propofol & Remifentanil

- slightly titrable
- rapidly reversibile

Maximum Propofol	115 (100-150) mcg/kg/mi
Maximum Remifentanil	0,5 (0,5-0,9) mcg/kg/min
Incision to request for wake up	48 (28-51) min
Start drug to request for wake up	78 (58-98 min)
Infusion off to eyes open	9 (6-13) min

Intraoperative Management

- Controlled hypercapnia (to a maximum PaCO2 of 60 mmHg). However, it is preferred to maintain high-normocapnia (40–45 mmHg).
- Lumbar cerebrospinal fluid catheter. a forced Valsalva can often be sufficient.

- **Typical neuroanesthetic maneuvers designed to reduce ICP in these cases because they make the pituitary retreat upward out of the sella turcica**

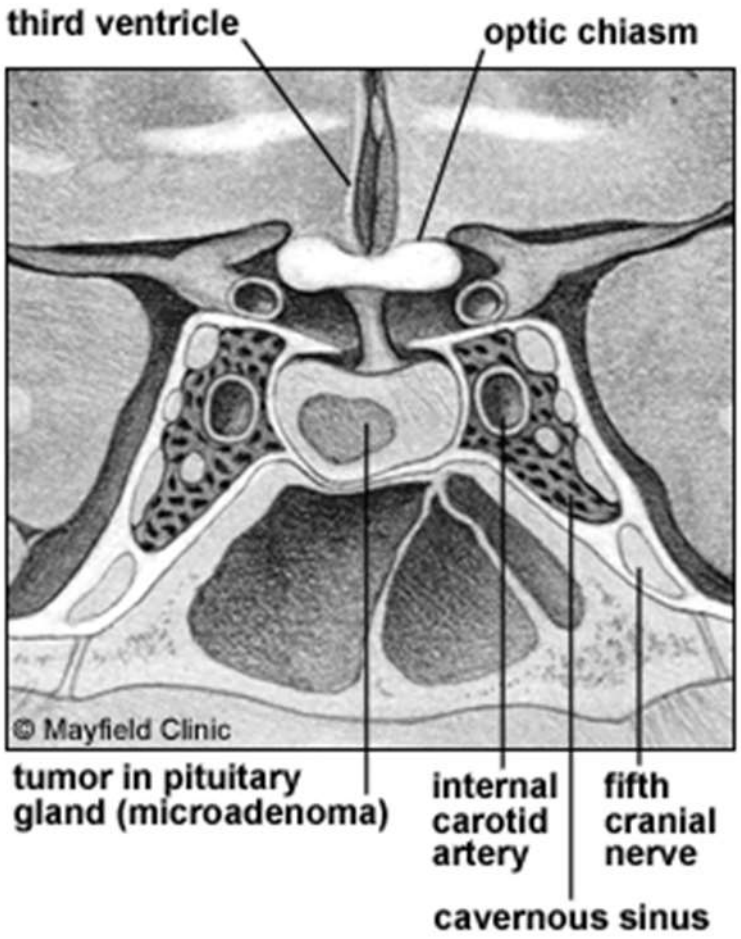
Intraoperative Complications

➢ Venous air embolism

- Aspiration of air from a multi-orifice air aspiration catheter (if in situ).
- Administration of 100% oxygen
- Application of internal jugular vein pressure bilaterally
- Saline irrigation of the wound.
- Haemostasis of open vessels are crucial

Intraoperative Complications

- Hemorrhage from carotid artery damage.
- Pseudo-aneurysm and carotid-cavernous fistula formation



Postoperatively

Postoperative considerations

Cranial nerve dysfunction

Immediate assessment of visual acuity, visual fields, and extraocular motility.

CT and MRI.

Reexploration

Postoperative complication

- Nausea and Vomiting
- Disorders of Water Balance
- CSF leakage
- Diabetes Inspidus (DI)

Perioperative Steroid Management

Pituitary adenoma for surgery

0800 hours cortisol and short ACTH 1–24

Normal
(cortisol >550 nmol/L)

No Perioperative Glucocorticoid Cover

0800 hours cortisol for 1-3 d

Abnormal

The patient should be given supraphysiological glucocorticoid cover for 48 h

- Hydrocortisone 50 mg i.v. 8-hourly on day 0
- 25 mg i.v. 8-hourly on day 1
- 25 mg i.v. at 0800 hours on day 2

0800 hours cortisol for 3-6 d

Syndrome of Inappropriate Antidiuretic Hormone (SIADH) Versus Diabetes Insipidus

	SIADH	DI
Presentation	Hyponatremia	Polyuria
Plasma volume (awake patients)	Euvolemic (or slightly hypervolemic)	Euvolemic
Serum	Hypotonic (<275 mOsm/L)	Hypertonic (>310 mOsm/L)
Serum sodium	Decreasing (<135 mEq/L)	Increasing (>145 mEq/L)
Urine volume	Low (but not normally absent)	Voluminous (4 to 18 L/d)
Urine osmolarity	Relatively high (>100 mOsm/L)	Relatively low (<200 mOsm/L)
Urinary sodium	>20 mEq/L	>20 mEq/L
Treatment	Fluid restrictionIf Na <120 mEq/L, consider hypertonic saline to correct sodium (but no faster than 1 mEq/L/h) Intravenous urea DemeclocyclineLithium (rarely used)	Supportive DDAVP (desmopressin)

Conclusion

- Pacienții cu tumori pituitare necesită o abordare complexă și o coordonare între endocrinolog, neurochirurg și anestezist.
- Manifestările sistemice preoperatorii și bolile sistemice secundare datorate disfuncției pituitare necesită a fi diagnosticate și corijate în preoperator.
- Gestionarea pacienților cu adenom hipofizar necesită un management perioperator anestezic individualizat cu scop de prevenire și corecție rapidă a complicațiilor posibile.
- Toți pacienții au nevoie de un follow-up pe termen lung de un endocrinolog pentru a-și evalua și corija statutul hormonal.

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