Multidisciplinary Team Care in Pituitary Tumors

Mohammad Samadian M.D.
Professor of Neurosurgery
Fellowship of Skull Base Surgery,
Skull Base Research Center
Loghman Hakim Hospital
SBMU- Tehran
Day General Hospital

موضوع سخنرانی:
جراحی هیپوفیز- هماهنگی با اندوکرینولوژیست

Dr.M.Samadian

Patient outcome and safety

Introduction

- Management of pituitary tumors is complex and requires multiple specialists.
- Optimal outcomes are achieved through a dedicated multidisciplinary team (MDT).
- Key specialists: neurosurgeons, endocrinologists, neuropathologists, neuroradiologists, neuro-ophthalmologists.
- Collaborative MDT care ensures accurate diagnosis and effective treatment planning.
- Endocrinologists and neurosurgeons typically lead the pituitary MDT.
- Additional contributors: neuropathology, neuroradiology, neuro-ophthalmology, otorhinolaryngology, and others

Background & Importance

- Pituitary tumors account for 10–15% of intracranial neoplasms.
- Although mostly benign, 30–45% invade the cavernous or sphenoid sinus.
- They can cause:

  Hormonal excess syndromes (Cushing's, acromegaly)

  Hypopituitarism

  Neurological symptoms (visual loss, diplopia, headache)
- Complex anatomy + heterogeneous behavior → need for multidisciplinary management (MDT).

Why MDT Is Essential

- Pituitary sits next to critical structures (optic chiasm, internal carotid).
- Management requires:
  - Advanced imaging
  - Hormonal testing and interpretation
  - High-volume neurosurgery
  - Long-term follow-up
- All major guidelines recommend MDT-based care for pituitary diseases.

Mission of the Pituitary MDT/PTCOE

- Providing the best standard of medical care to patients with pituitary diseases
- Providing accurate, comprehensive and up-to-date information to patients regarding their conditions.
- Organizing multidisciplinary management, with engagement and collaboration between experienced neurosurgeons and endocrinologists, working together with other supporting medical specialties.
- Providing education and training to fellows and residents aiming to acquire competences and skills in the Mission of the management of pituitary diseases.
- Providing courses, lectures or education initiatives to primary care physicians and other medical specialists, as well as to undergraduate medical students.
- Compiling data and publishing the results to advance science and knowledge on pituitary diseases.
- Providing data to regional, national or international registries.
- Advising health administrators and authorities on problems related to the management of patients with pituitary diseases to improve patient's experience and safety, and to facilitate care across different healthcare settings.

Evidence of MDT Benefits

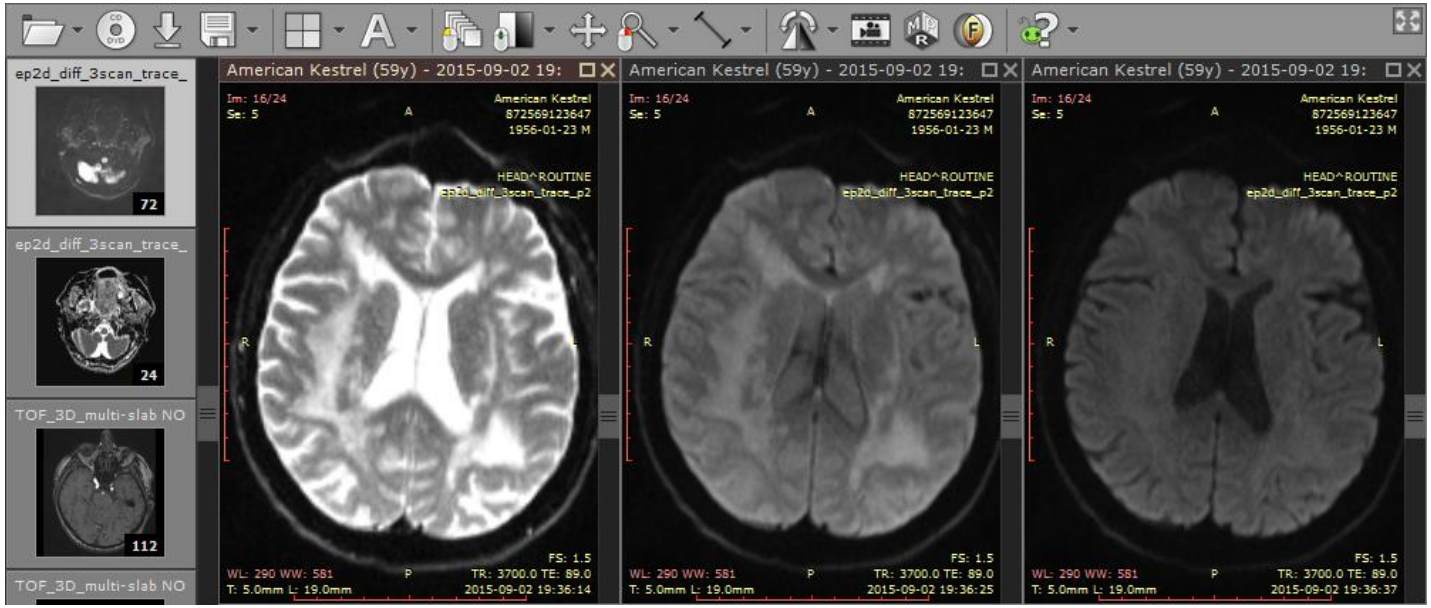
Studies comparing pre-MDT vs. post-MDT periods show:

- Shorter hospital stay
- Reduced post-operative complications (DI, SIADH, hypothyroidism).
- Lower risk of residual tumor after surgery.
- Fewer readmissions with endocrine-led post-op protocols.
- Lower healthcare costs (reduction in lab tests and treatments).
- Better outcomes in acromegaly and Cushing's with high-volume MDT centers.

MDT Composition

Other supporting healthcare professionals: neuro-oncologists; nuclear medicine physicians; cardiologists; sleep and bone experts; obstetricians; etc

DICIM Image viewer



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AI search in medical resource

OpenEvidence

Role of the Pituitary Neurosurgeon

- **First-line treatment for:**
  - Acromegaly, Cushing's disease
  - Thyrotrophinoma
  - Resistant prolactinoma
  - Non-functioning tumors with mass effect
- **PTCOE criteria:**
  - ≥100 pituitary surgeries/year (≥50 acceptable)
  - Post-op mortality <2%, readmission <10%
- **High-volume surgeons have:**
  - Lower complication rates
  - Higher cure rates
  - Better long-term outcomes

Roles of Other Key Specialists

Endocrinologist

- Hormonal diagnosis, dynamic testing
- Management of hypopituitarism, DI, sodium-water balance
- Long-term follow-up and medical therapy

Neuroradiologist

- High-resolution MRI (≥1.5T)
- Inferior petrosal sinus sampling for Cushing’s

Neuropathologist

- WHO 2022-compliant diagnosis
- Ki-67, mitotic index, transcription factors, receptor profiling

Roles of Other Key Specialists

Neuro-ophthalmologist

- Visual field testing, OCT
- Determines urgency of surgical intervention

ENT (Otorhinolaryngologist)

- Improves safety of endonasal surgery
- Reduces CSF leak rates

Radiation Oncology / Neuro-oncology

- SRS/FSRT for remnants and aggressive tumours
- Systemic therapy in rare aggressive cases

Barriers to MDT Implementation

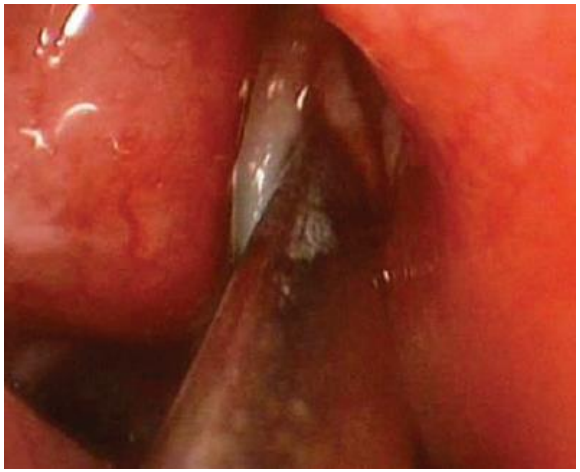
- Significant time, resource, and financial costs
    - (UK estimate: £9000–£12,000 per year for monthly MDT meetings)
- Resistance to consolidating cases in high-volume centers
- Lack of standardized reporting in low-volume hospitals
- Fragmented health systems / insurance barriers
- Geographic inequality in access
- Need for coordinated scheduling, data systems, and protocols

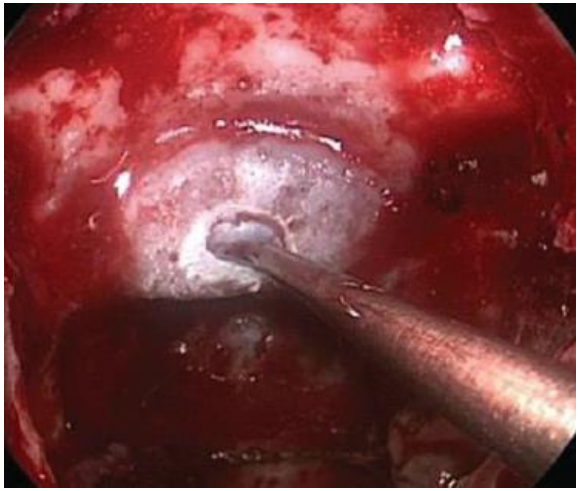
Conclusion

- MDT is the gold standard for diagnosing and treating pituitary tumors.
- Strong evidence: reduced complications, improved outcomes, lower costs.
- Core collaboration: neurosurgeons + endocrinologists supported by imaging, pathology, ophthalmology, ENT, and radiotherapy.
- Despite barriers, establishing PTCOE and MDT systems is essential for high-quality, cost-effective, and safe care.

Operative Stage in Endoscopic pituitary surgery

1. Nasal Stage
2. Sphenoid atage
3. Sellar stage
4. Reconstruction





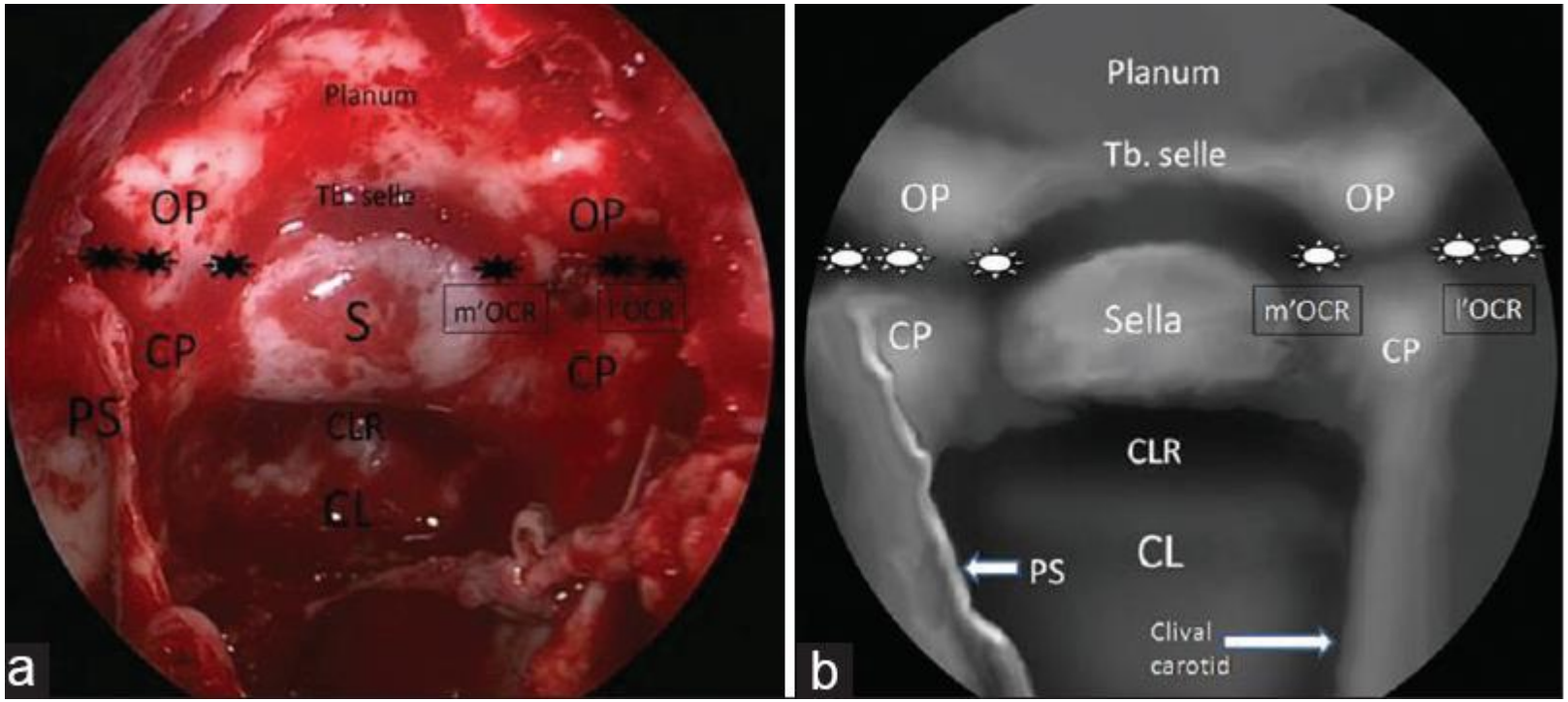
Preoperative Consideration for safe and as much as resection

1. Functional or Nonfunctional
   - Total resection or decompression
2. Previous treatment
   - Medical or surgical
   - Tumor consistency after cabergulin
3. Extension of tumor
   - Suprasellar, subfronal, cavernous, calivus bone, temporal…
4. Vascular anatomy
   - Carotid interval, encasement of vascular anatotmy(CA, ACA, Acom, Pcom, Basilar artery)
5. Optic pathway compression & Normal pituitary location
6. Plan of Reconstruction

Sellar stage

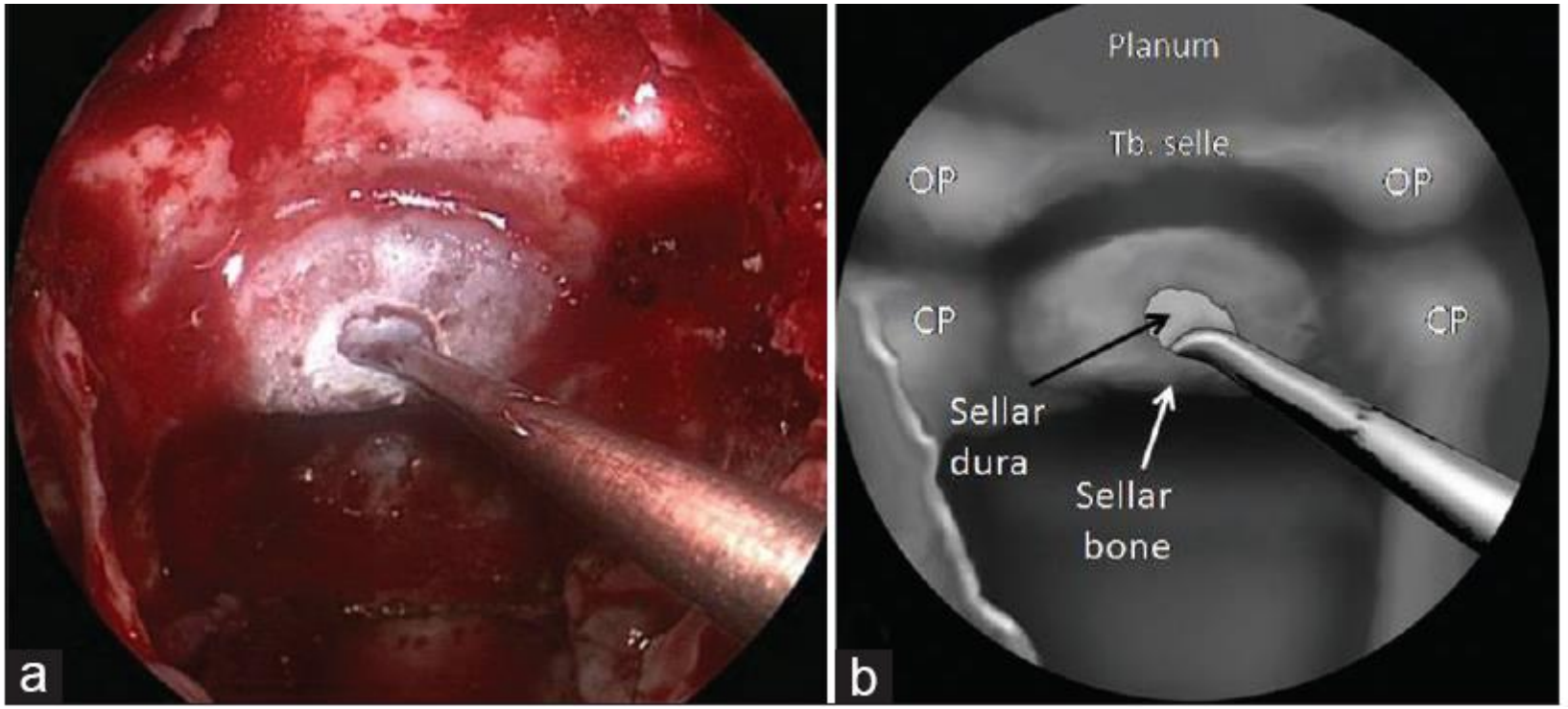
1. The sphenoidal mucosa located only on the anterior wall of the sella and the floor is coagulated with a bipolar and excised (and not stripped, to avoid bleeding).

2. Anatomical landmarks are identified in the aerial panoramic view and mimic a “fetal face



Drilling the sellar floor

- The medium sized 3–4 mm coarse diamond burr is used to drill the sellar floor. Gentle drilling with a diamond burr under low speed is done to thin the sellar floor to an egg shell thickness, which is then dissected and broken with a fine spade dissector or a Kerrison number 1 punch

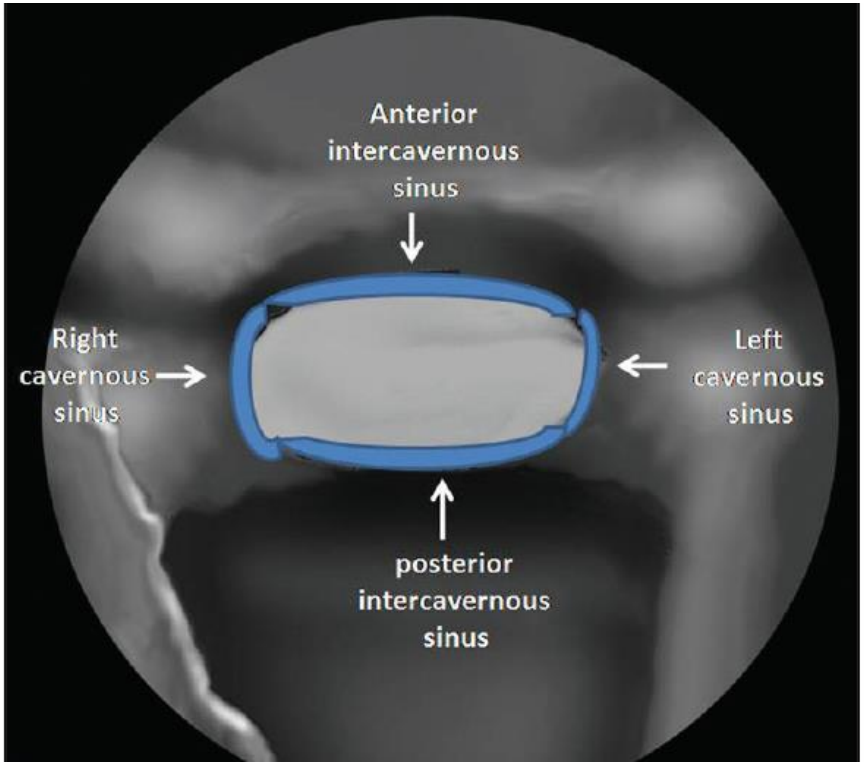


Video: bone removal

Extension of the sellar bone

- General Extension of bone removal

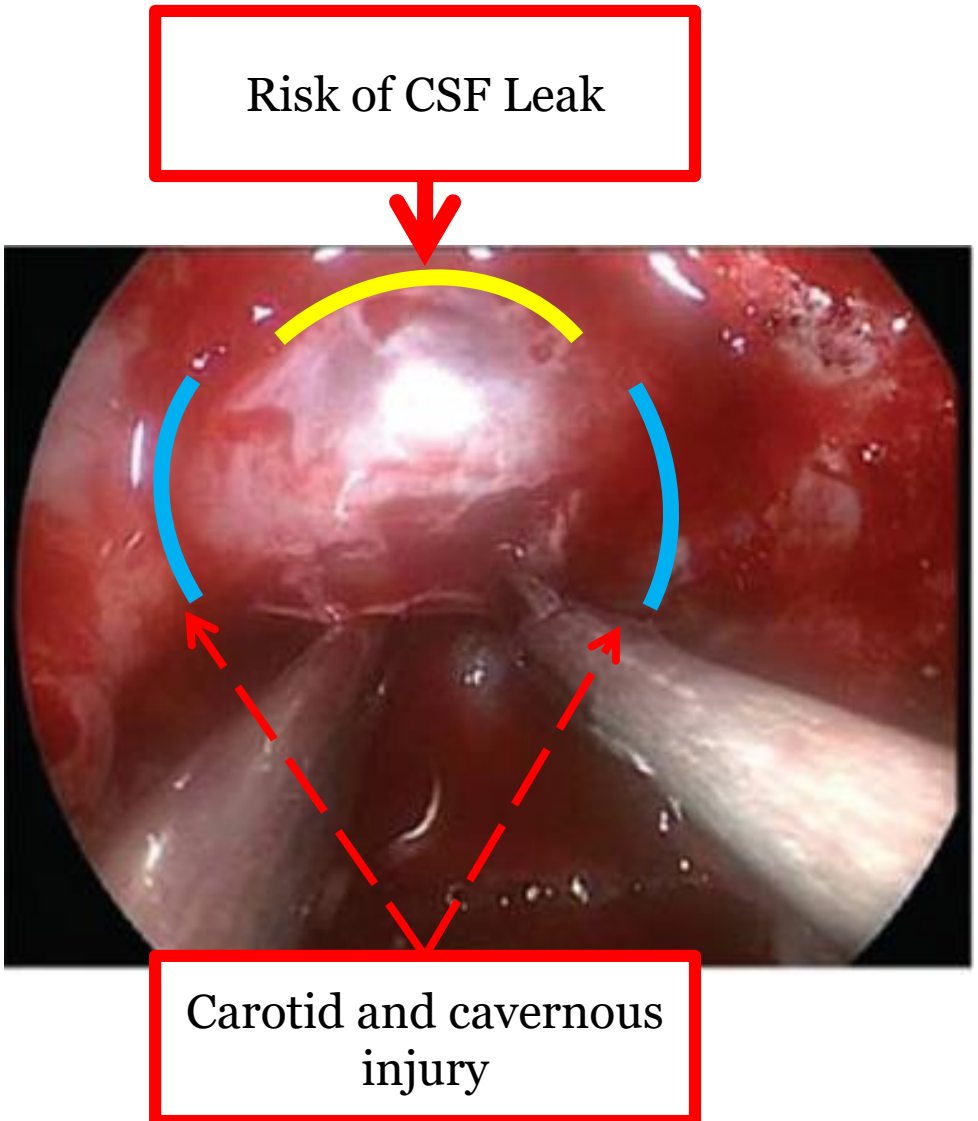
Video:
Bone removal



- An extended approach with removal of the tuberculum sellae, planum sphenoidale, and the medial optico-carotid recess with or without transdiaphragmatic dural opening is required for firm tumors with dumbbell configuration and a narrow waist

Opening of the dura

- The dura may be opened in many ways
  1. vertical linear incision with crossed extensions,
  2. cruciate incision
  3. two lateral vertical cuts joined by a transverse cut.

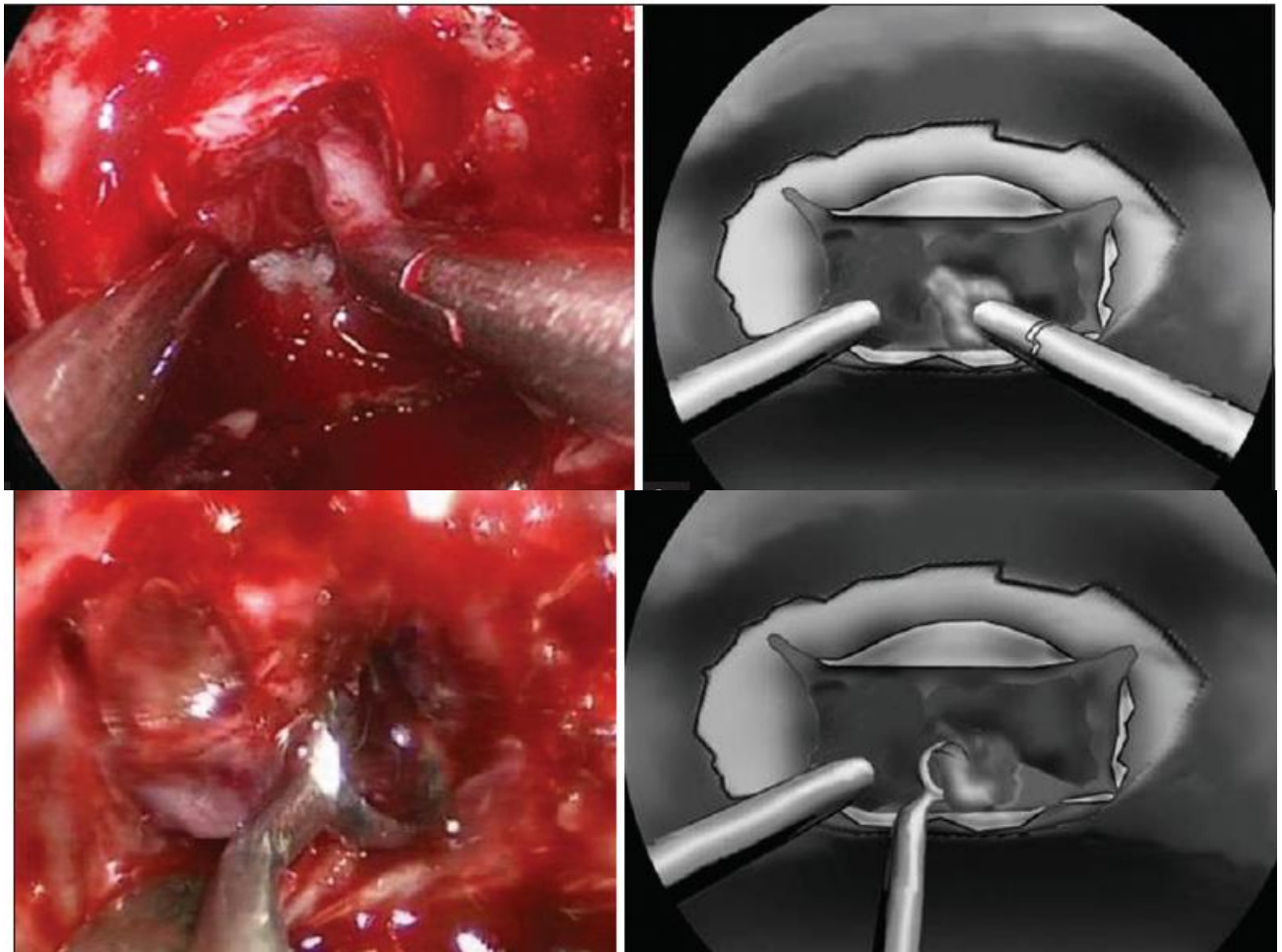


Tumor removal

- **Extracapsular tumor removal**
  1. Remove the bone overlying the medial optico-carotid recess
  2. Only the outer layer of dura is cut and reflected upwards or excised completely
  3. Dissection with a ball dissector keeps the inner layer intact.
  4. This is followed by the all around dissection of the capsule to remove the tumor in a single piece.

Tumor removal

- **Piecemeal tumor removal**
  - The tumor should first be mobilized free in piecemeal manner and then taken in a holding forceps or suction



Tumor removal

- First, the basal and posterior part of the tumor is removed
  - from the opening in the inferior flap in a posterior trajectory toward the clivus-dorsum sellae junction in a caudal to rostral direction. During this time, the superior dural flap supports the superior or anterior part of the tumor, like a retractor, preventing the premature arachnoidal bulge.

- Next, the lateral portion of the tumor is removed with the upward angled curettes.

-

Tumor removal

- Lastly, the superior portion of the tumor is removed after making an upward oblique cut in the dura at 10 and 2 O'clock position.

- **Method for tumor decompression**
  - Bimanual dissection with curette & suction
  - Double suction method

Video Tumor resection 1

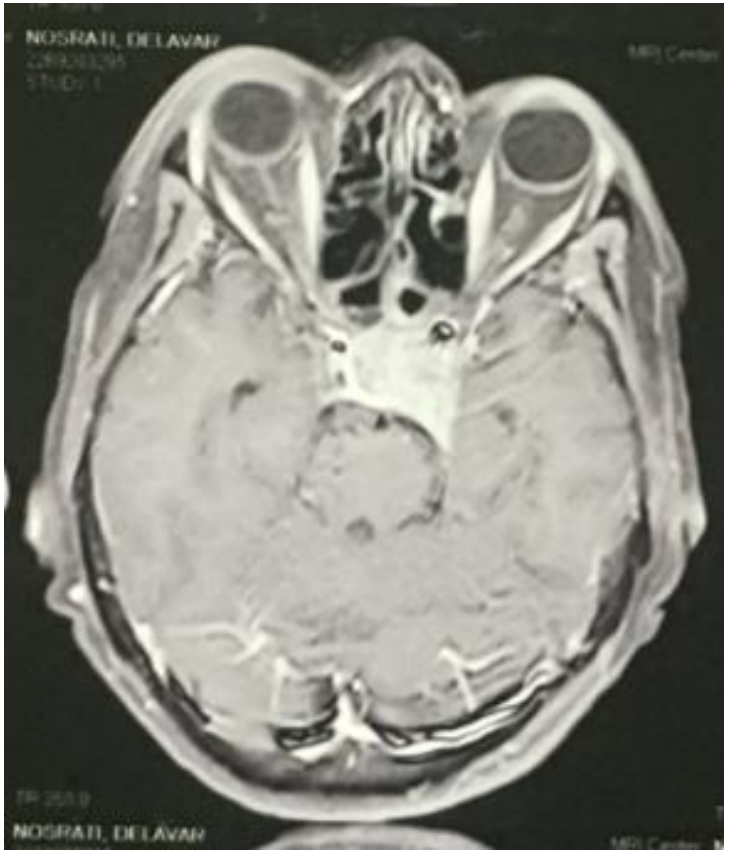
Video Tumor resection 2

Instrument

Tumor removal

- **Resection of intercavernous extension of tumor**
  - **Medial wall extention (medial to carotid artery)**
    - the space between the posterior clinoid and the carotid siphon (the reverse S contour) represents an ideal entry point for the removal of tumor from the posterior segment of the cavernous sinus
  - **Lateral wall Extension (lateral to carotid artery)**
    - gentle mobilization of CA and resect lateral aspect of cavernous sinus
    - Some timetimes need 30° and 45° scope
  - Bleeding from the cavernous sinuses is controlled with surgicel, gelfoam, or compresion.

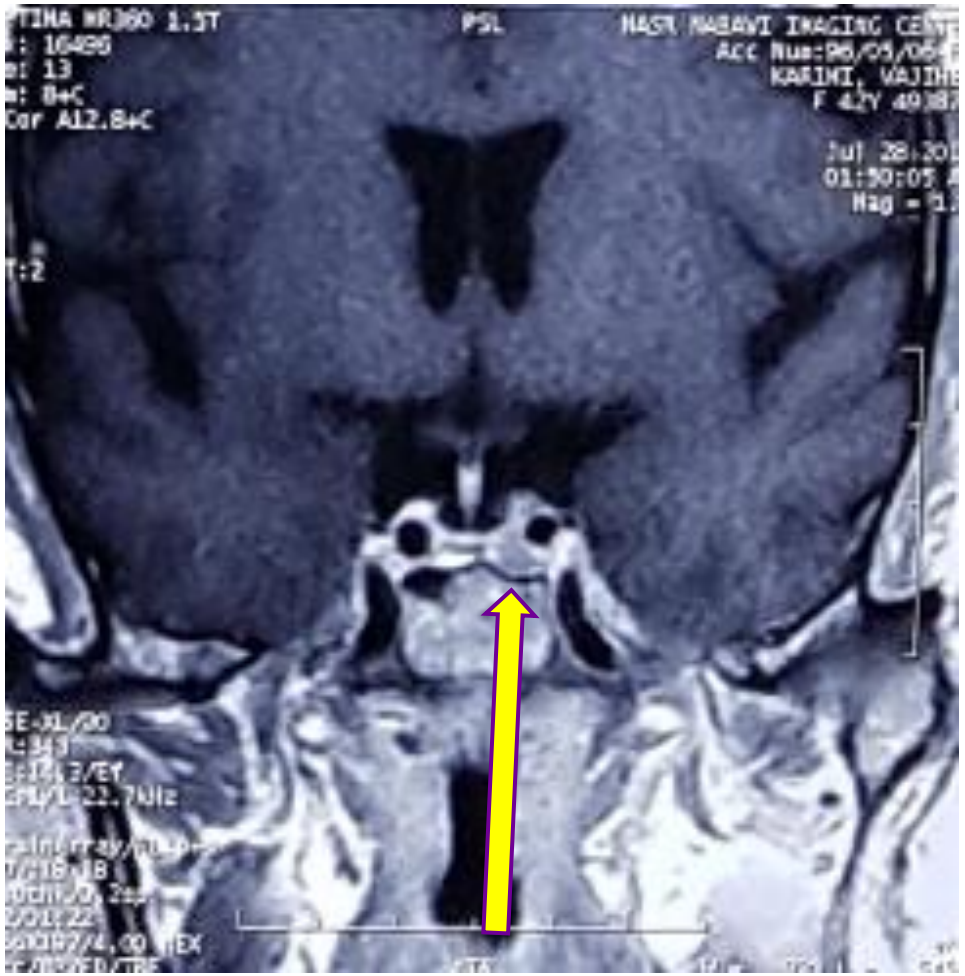
Resection of intercavernous cavernous extension



Video :Resection of cavernous invasion

Relapsing somatotroph adenoma adjucent to carotid artery

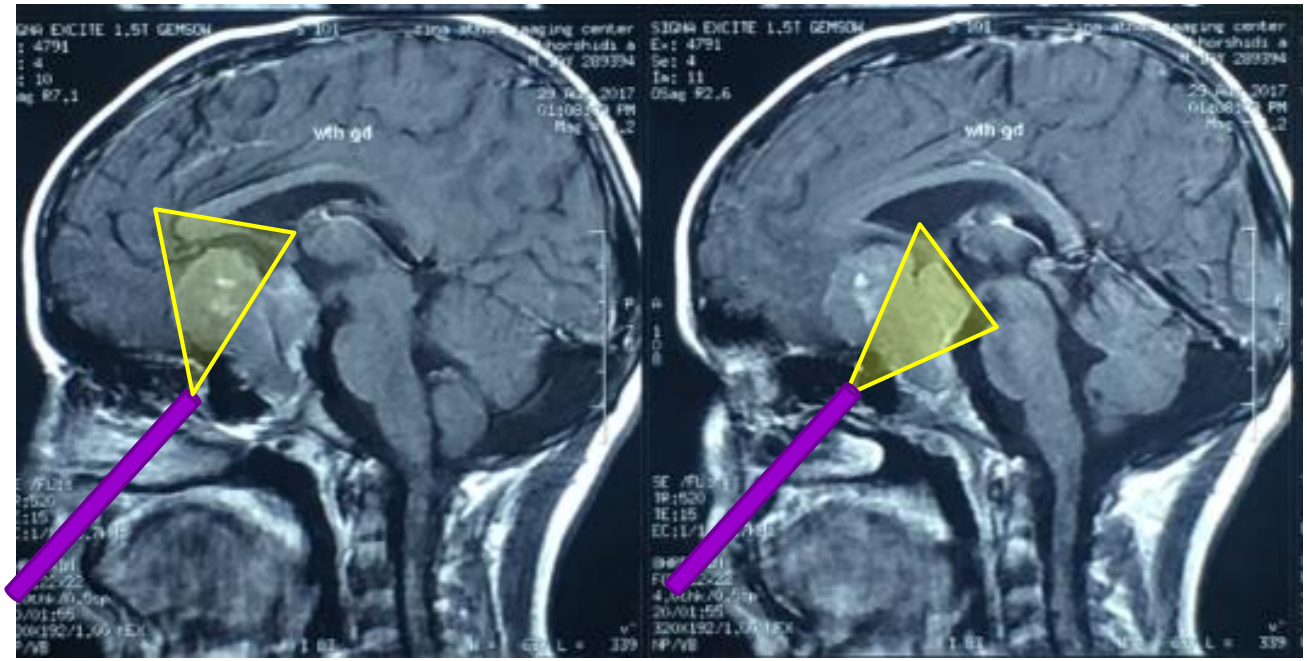
- video



Tumor removal

- **Resection of subfrontal extension of tumor**
  - **Reval of tuberclum sella and planum with high speed dril and kerisson**
  - **Coagulation of superior intercavernous sinus**
  - **Dural opening with knife or cutting forceps**
  - **Use 30° , 45° and 70° scope for better visualization and use angled instrument**
  - **Avoiding from blind drag and drowing of suprasellar part of tumor because of high risk of optic, vascular and hypothalamic injuries**

Subfrontal extention oncocytoma



45 ° Scope **o ° Scope**

- Video: intraoperative view after tumor resection

Rt Subfrontal Extension

Video Ghorbani

Reop Acromegaly

Video Yadollahi

Apoplexy

Video Apo

Inspection of the tumor cavity

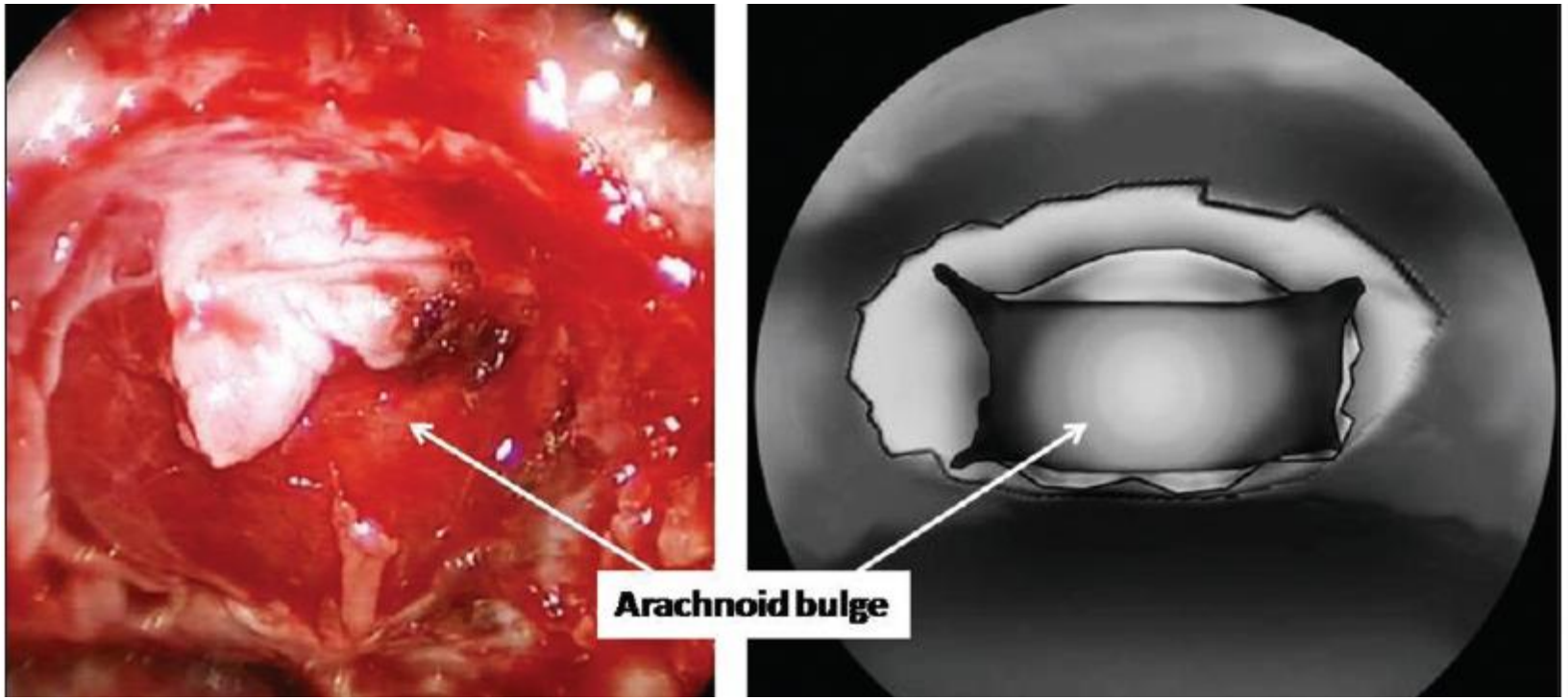
- At the end of the procedure, the diaphragma sellae is pushed up with cotton patties and the hidden tumor remnants are removed using curved suction/curette from the recesses under direct vision using a 30° scope.

- 2 to 5 O'clock and 7 to 10 O’clock position is most probable site for reminant
-
- The most common sites where the tumor has been found to be retained are the angle between optic nerve and carotid artery at the medial optico-carotid recess and under the anterior lip of dura at the level of anterior intercavernous sinus

- In some case of the 30° scope, one needs to rotate the scope for examining the cavernous sinus.

Inspection of the tumor cavity

- Failure of descent of the diaphragma sellae indicates the presence of retained tumor in the suprasellar space; while if there are pulsations visible in the diaphragma, it is a robust finding of near total tumor removal

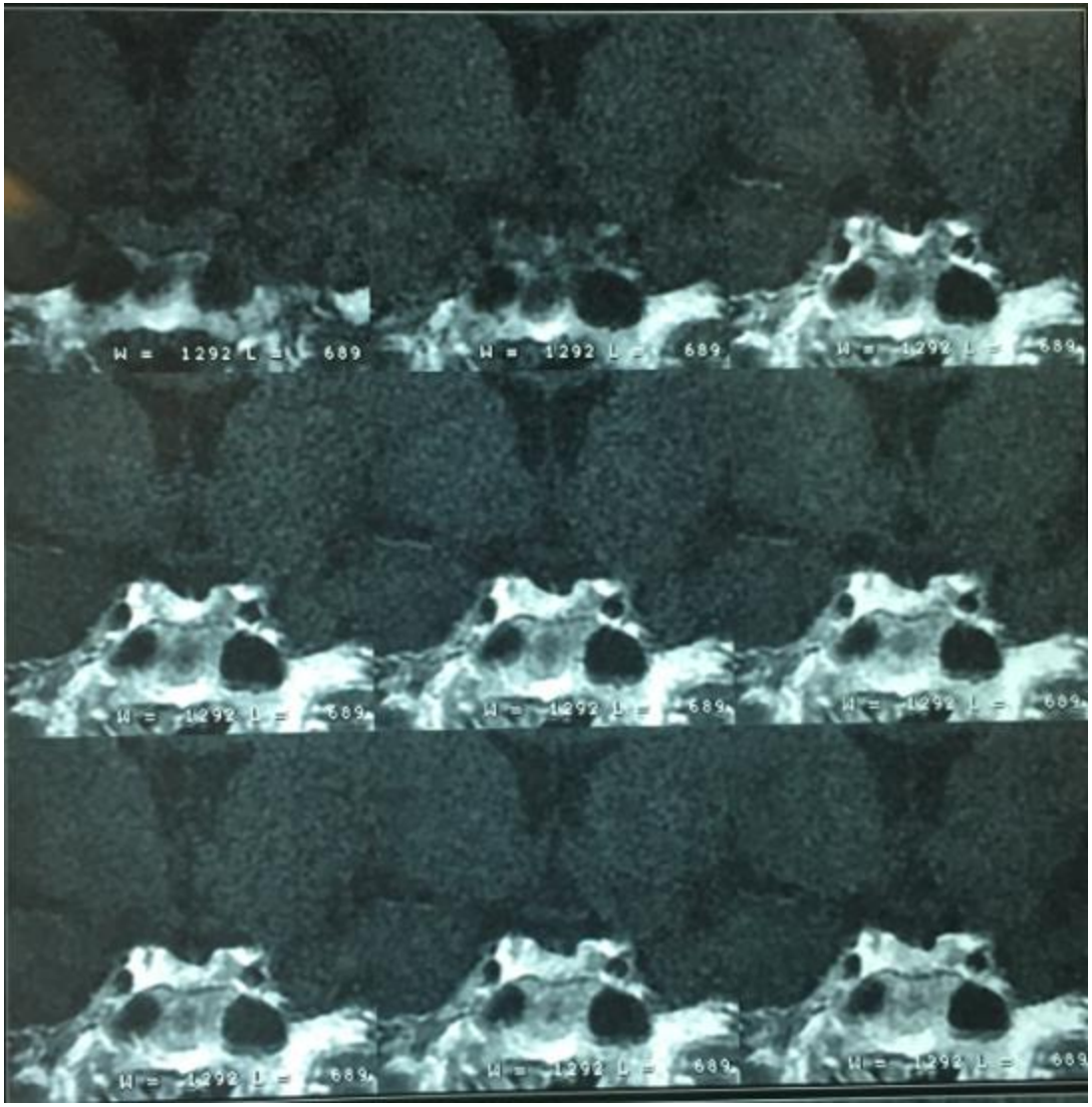


Inspection of the tumor cavity

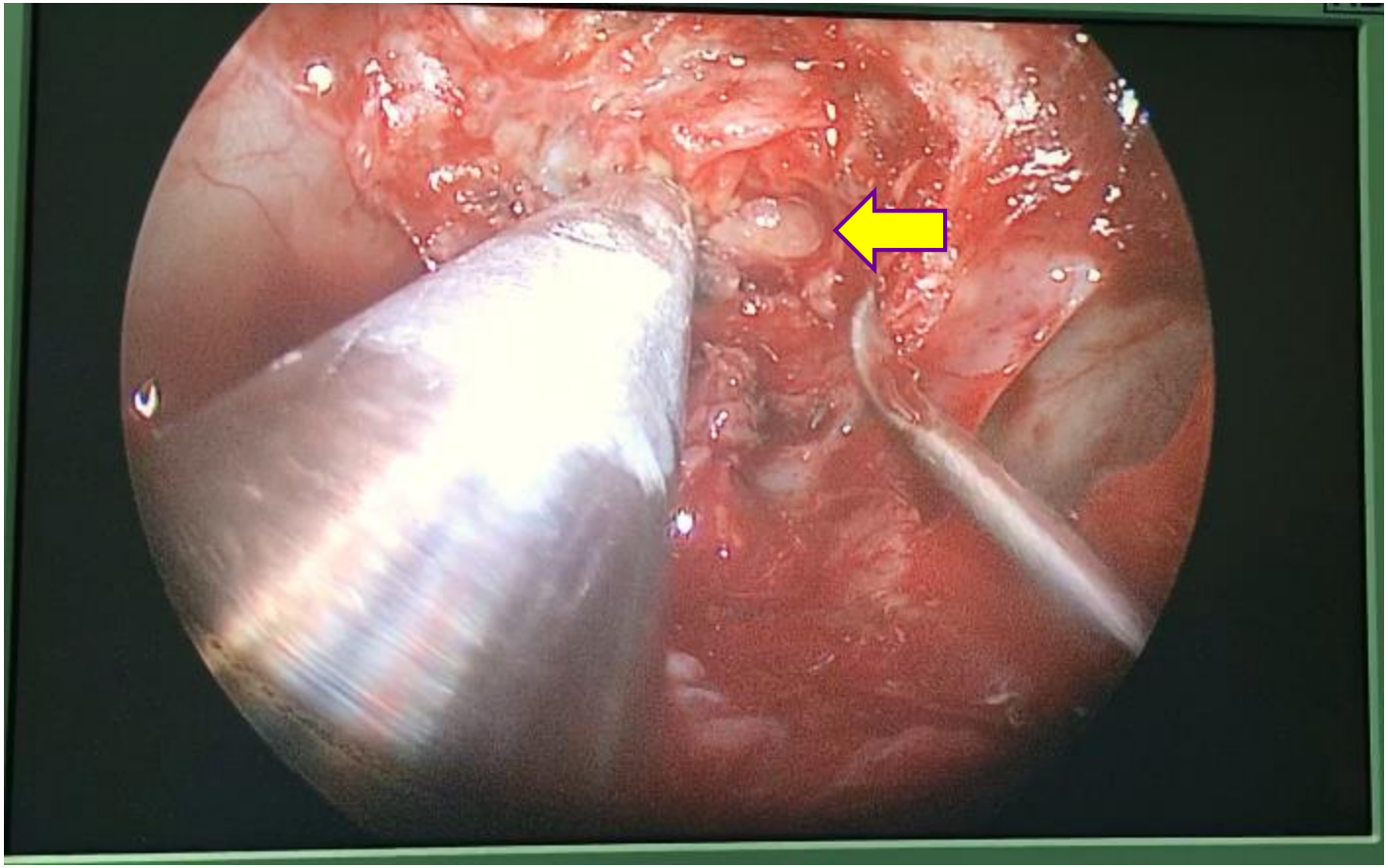
- The capsule of the normal pituitary gland may be present all around the lesion especially in a microadenoma and this may require its incision and dissection.
- In a functioning microadenoma, a thin shell of normal pituitary gland is shaved along the tumor cavity to enhance the chances of “cure.”
- Even 10% of preserved pituitary tissue may be enough for a normal functioning.
- Direct Irrigation of sellar fossa may be usefull

Case #3

- A 30 y/o cushingoid woman
  - Hx of ETSS 6 months earlier
  - No regression in symptoms of Cushing Disease
  - NL report of postoperative MRI



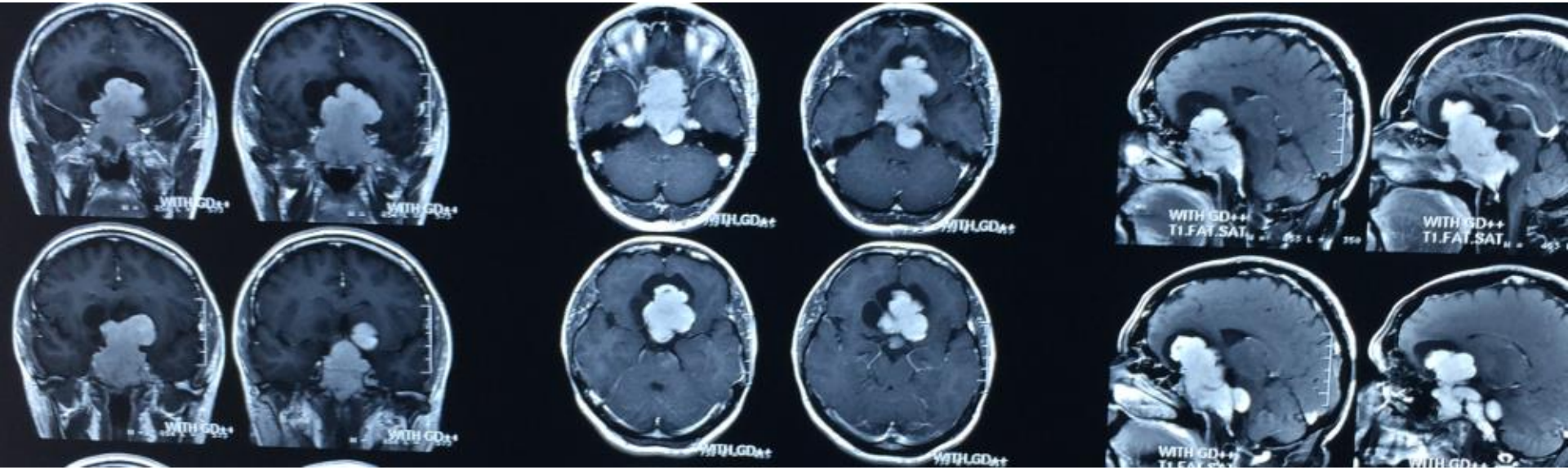
Case #3 our approach ETSS



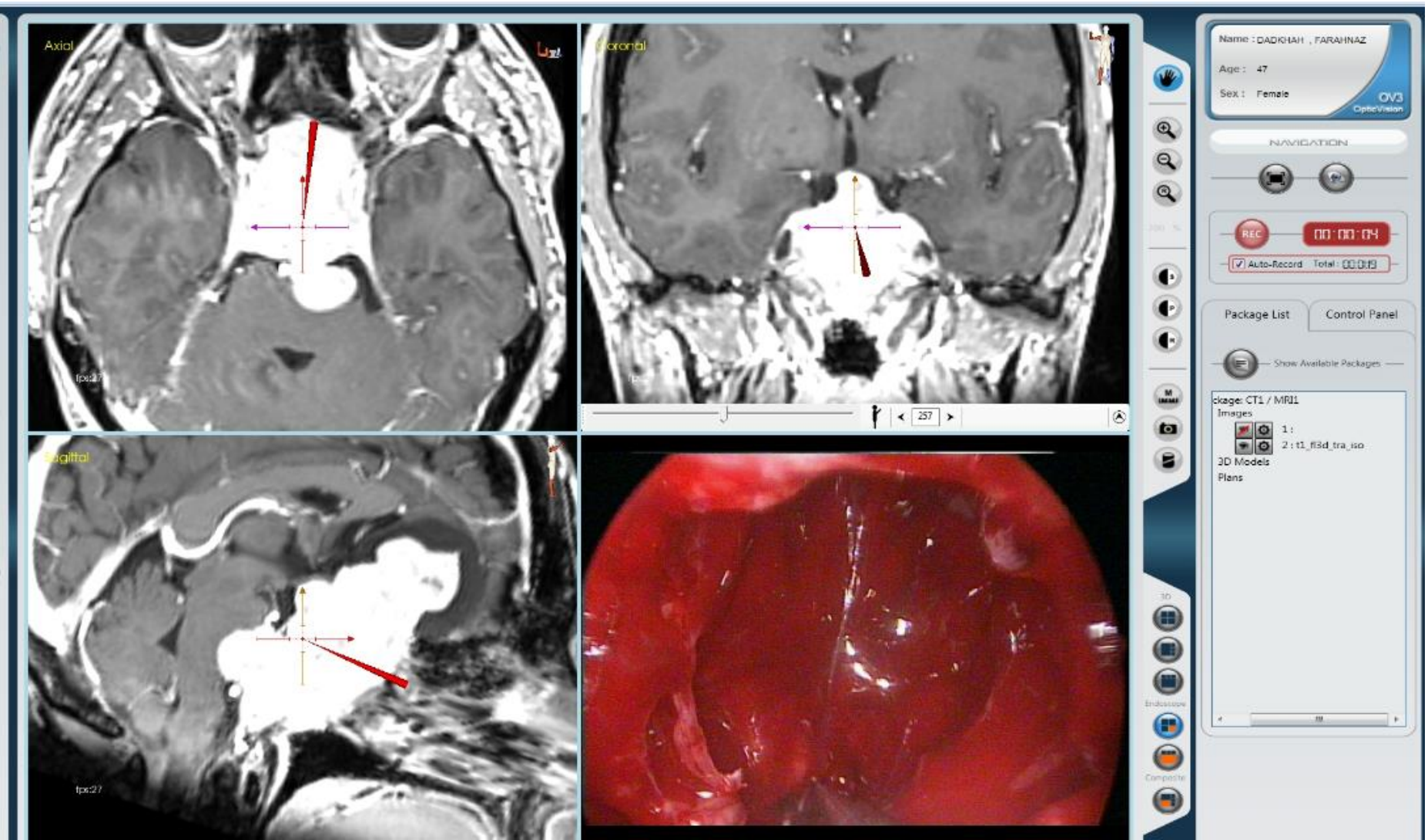
Well-Defined Adenoma at left side

Case #1

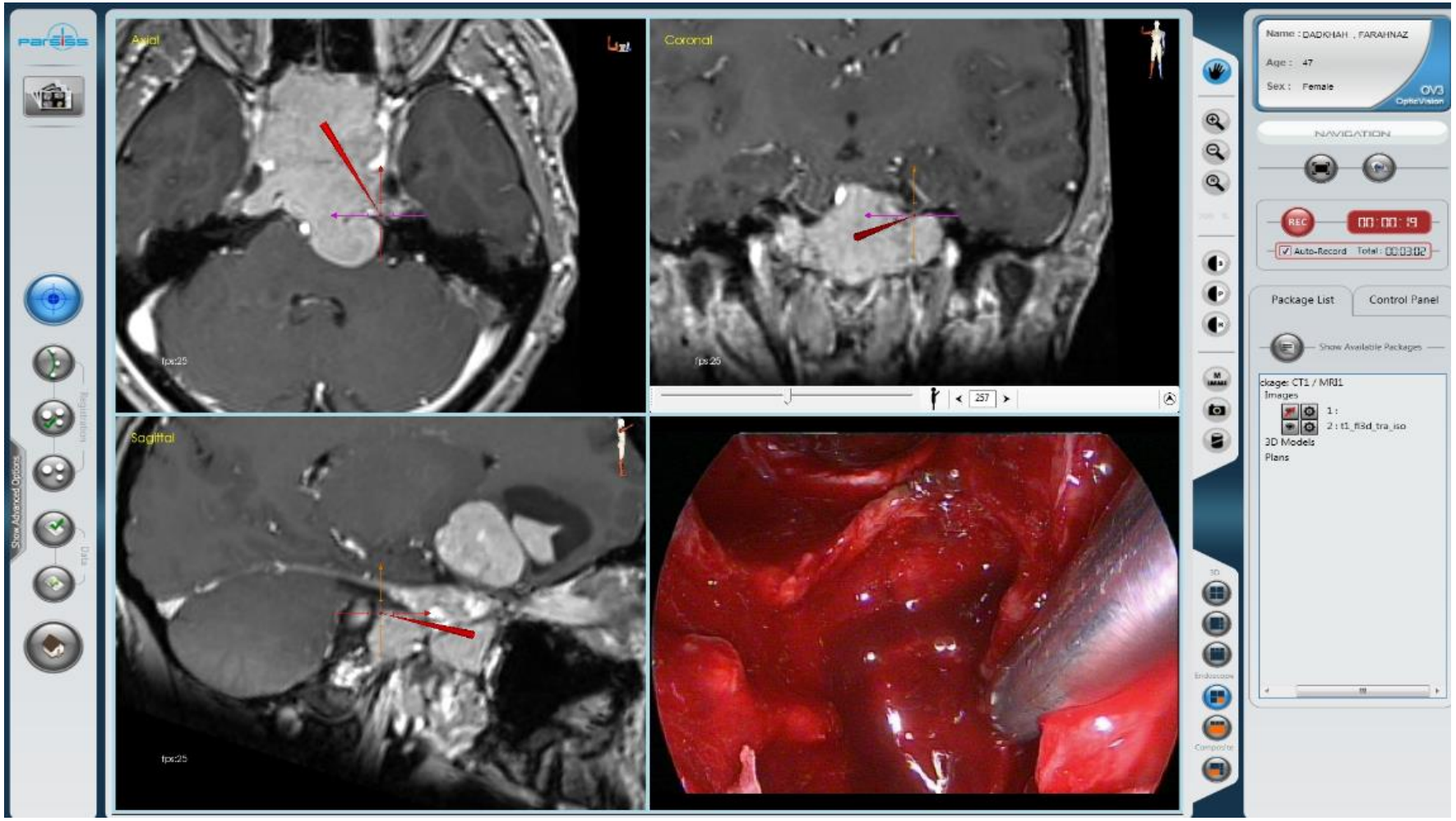
- A 44 y/o woman (Gynecologist)
  - Headache
  - Mild Visual field disturbance



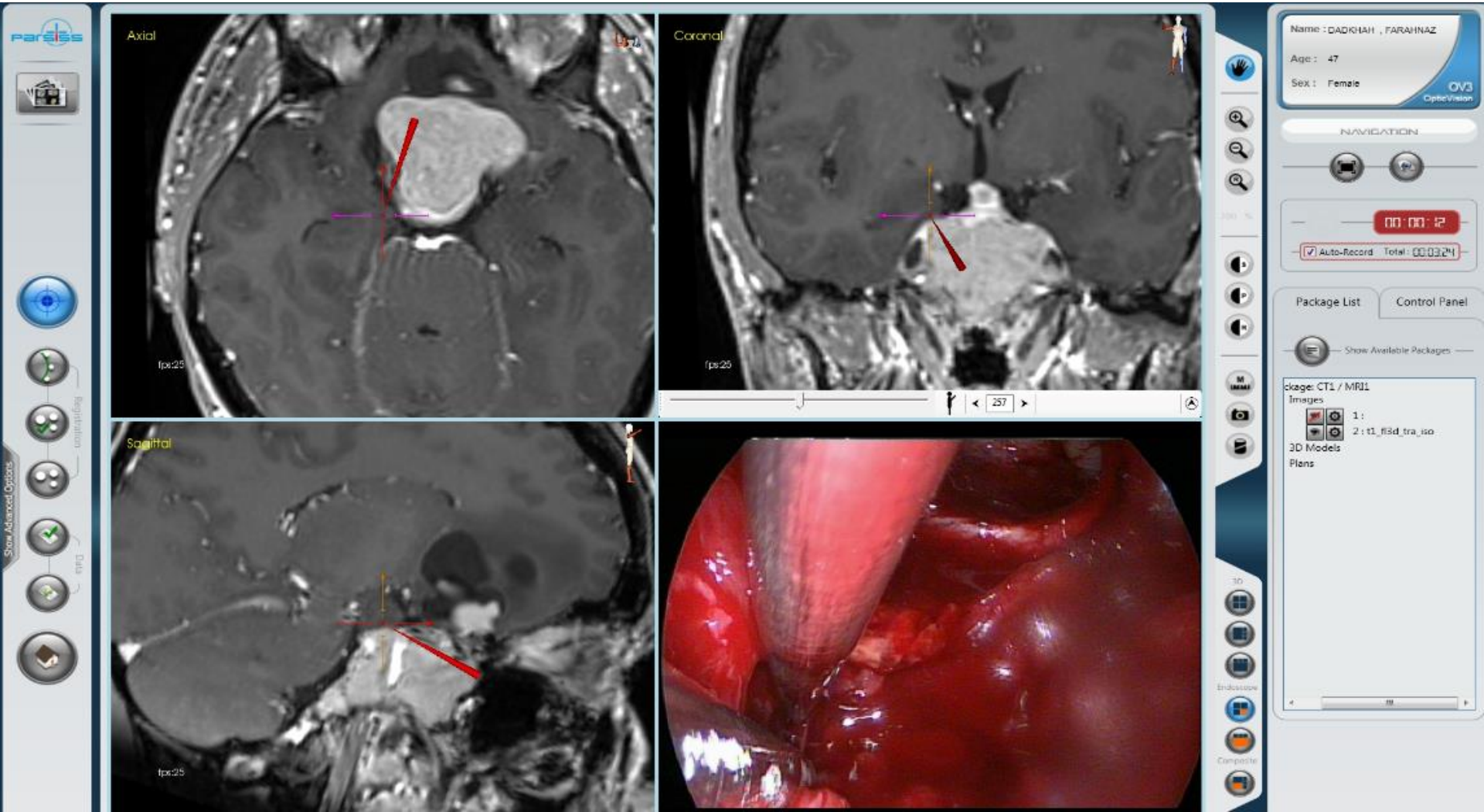
Case #1- our approach ETSS navigation snapshot



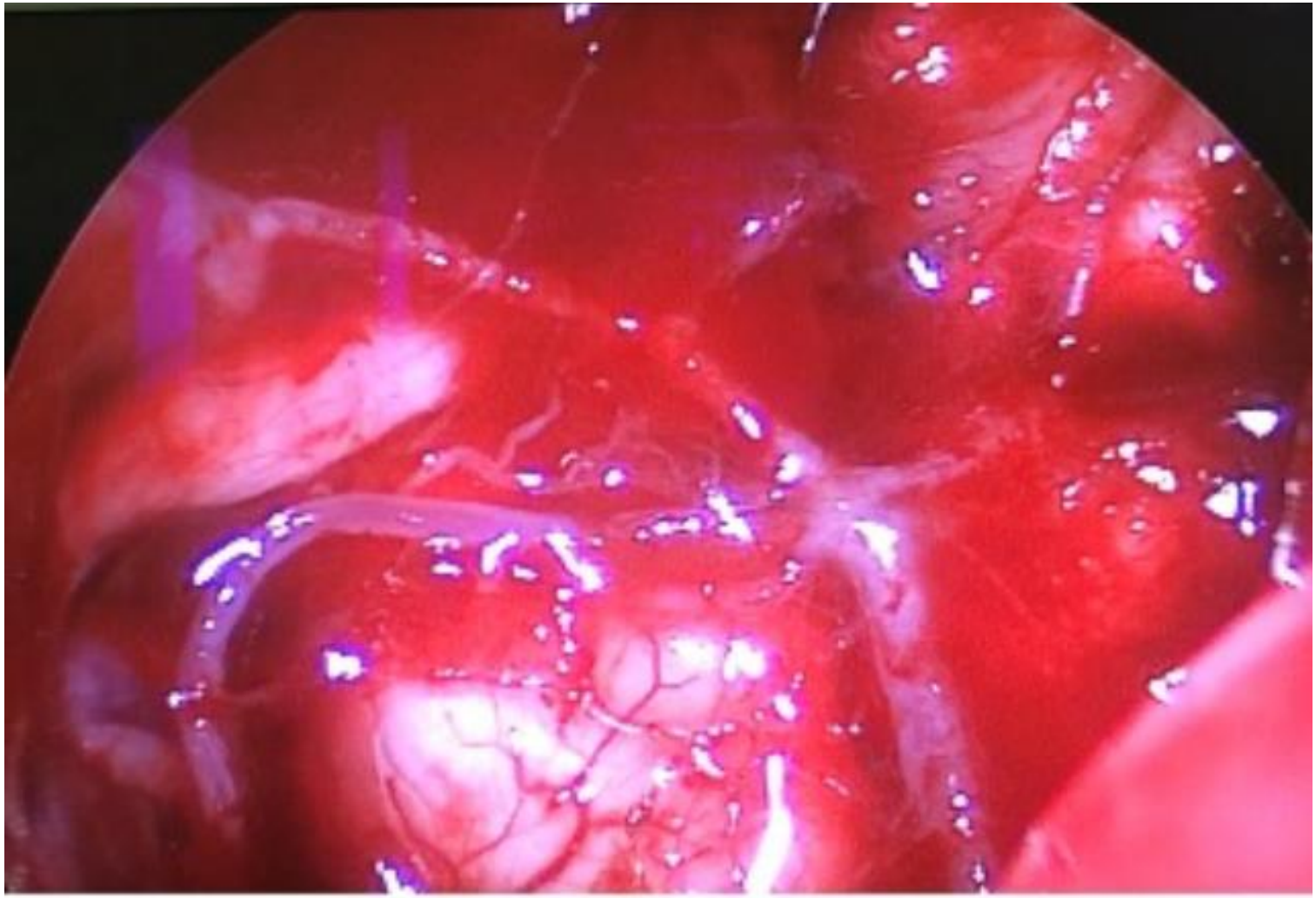
Case #1- our approach ETSS navigation snapshot



Case #1- our approach ETSS navigation snapshot



Case #1- our approach ETSS Basilary Artery

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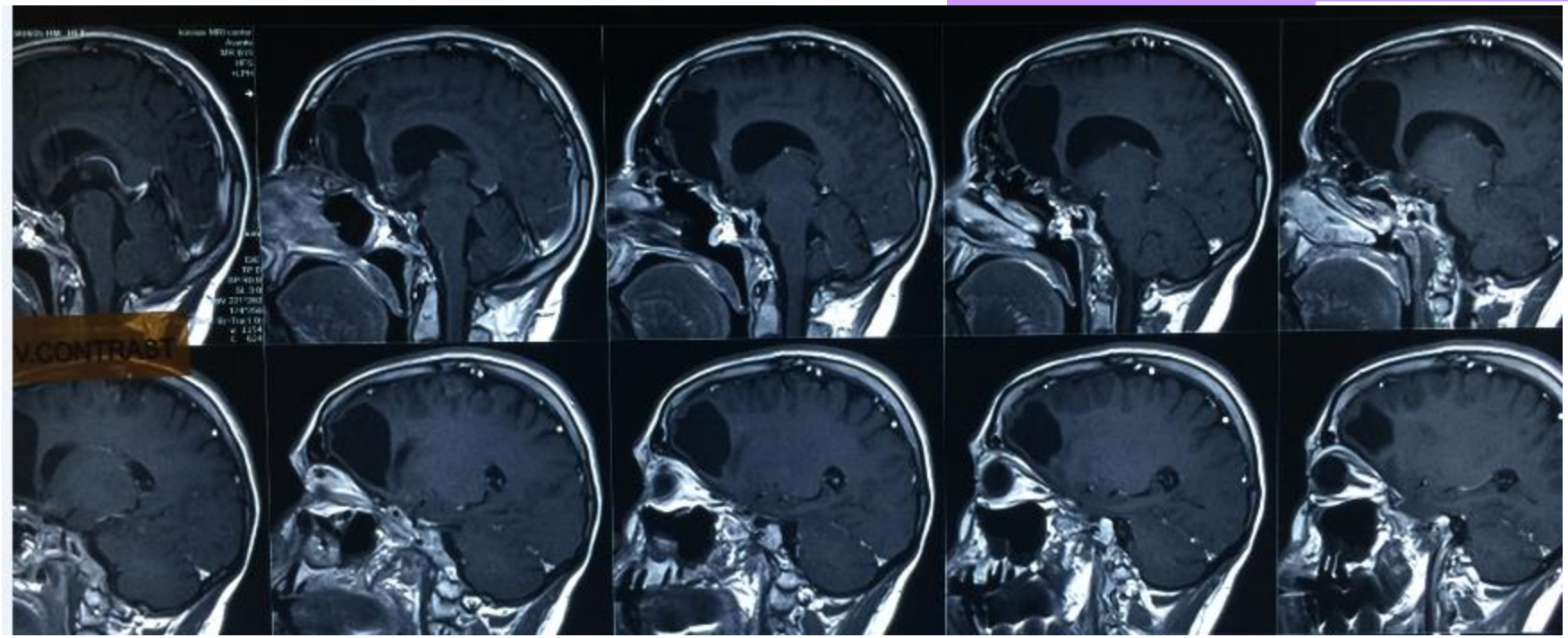
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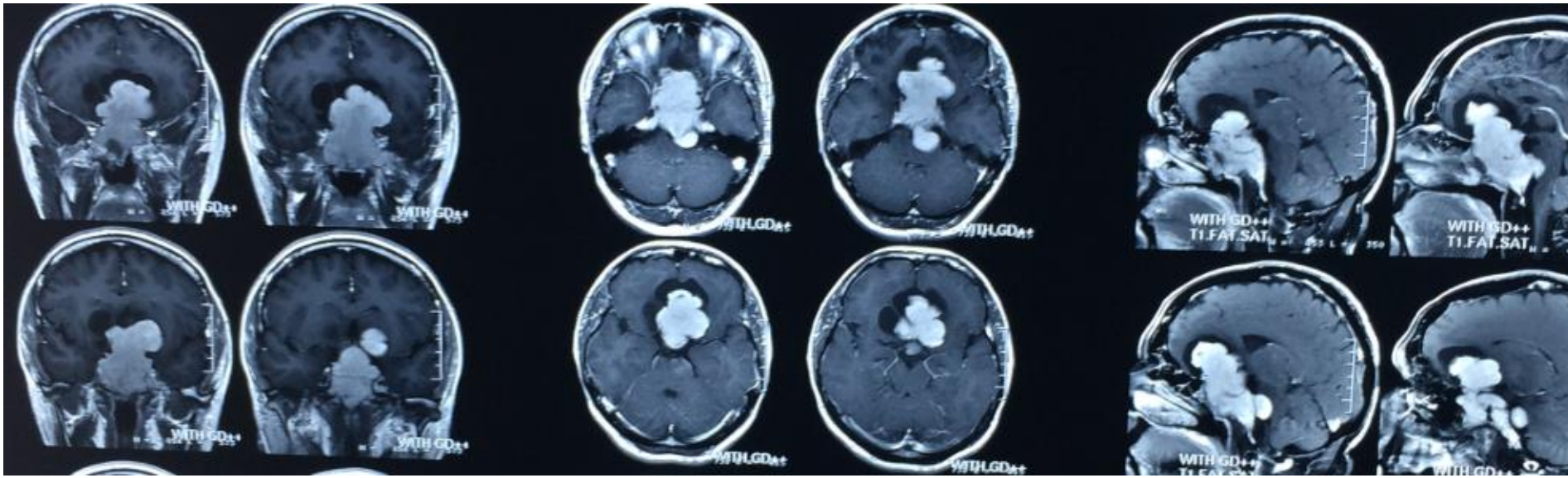

WITH GD++
T1.FAT.SAT

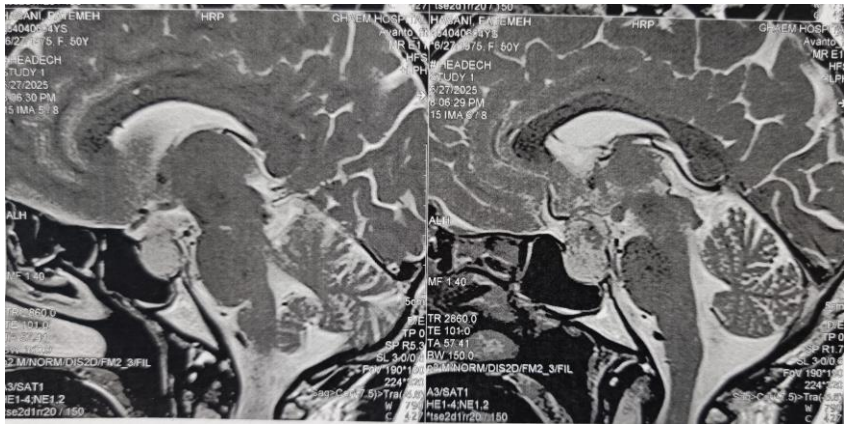
CCF after ETSS (Proptosis)

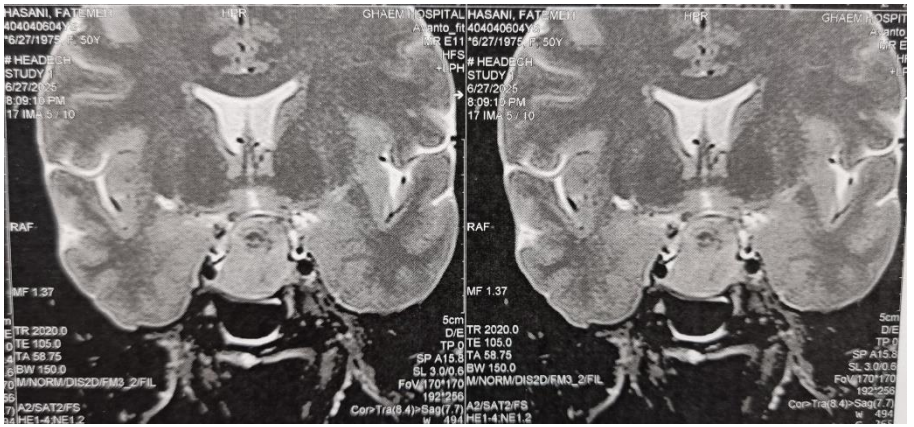
CCF after ETSS (DSA- Coiling)

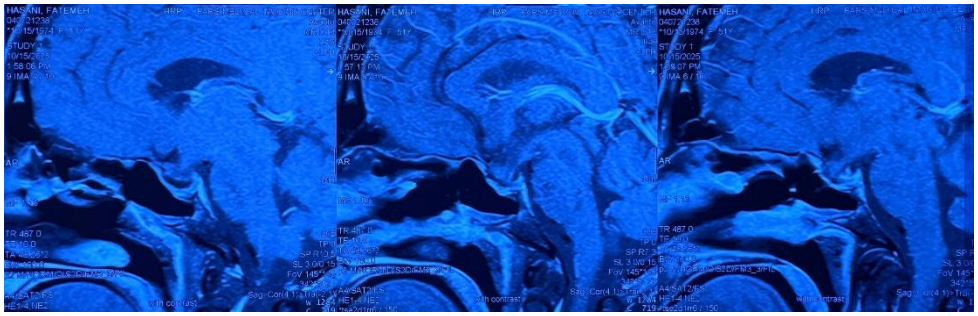
Complication related to tumor resection

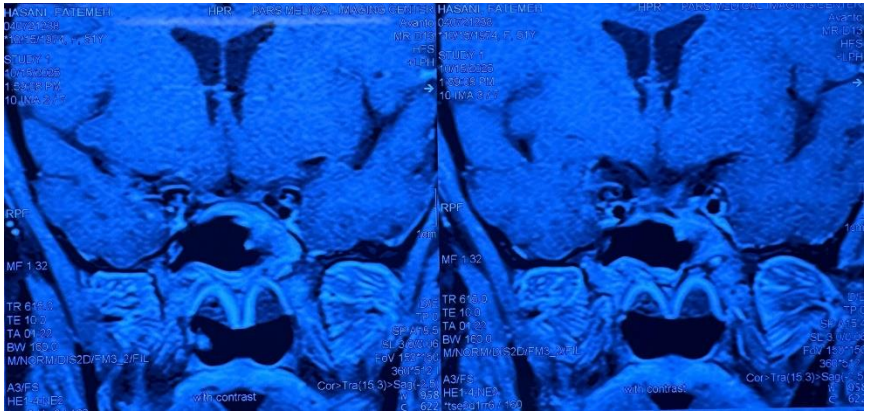
Carotid injury	Cavernous segment is most vulnerable	Study preoperative CT, MRI for kissing carotids, anomalous position, and bone dehiscence (20%) Keep always oriented by checking that buttons of the camera are facing the screen Use Doppler and navigation
C. Cranial		
CSF leak/meningitis/ pneumocephalus	Inadvertent entry into ACP Blind dissection Pulling tumor without mobilization	Do not enlarge ostium superiorly No blind dissection to prevent arachnoidal tear Tumor should be mobilized first and then sucked in suction Use "flashlight effect" to visualize and differentiate arachnoid from diaphragm If cerebrospinal fluid leak occurs, immediately seal the rent and reconstruct sellar floor
Postoperative apoplexy/ bleed/swelling in residual tumor	Incomplete tumor removal	Always remove maximum tumor Use extended approach with removal of tuberculum sella and m'OCR (cause of constriction) in large SS extension Use image guidance, angled scope and instruments
SAH and vasospasm	Fixing the scope Arachnoidal tear	Use four-hand technique and flashlight effect and avoid arachnoidal tear Do not fix the scope If occurs, seal it immediately with glue and prevent further opening Use cotton patty to cover the arachnoidal defect to prevent blood going into the subarachnoid space
Perforator injury	Blind dissection	Remove tumor under vision, using "flashlight effect" No intra-arachnoidal dissection
Decreased vision		Avoid overzealous sellar packing Maximal tumor resection to avoid postoperative apoplexy
Hydrocephalus		Remove maximal tumor/avoid arachnoidal tear

A 51-year-old woman with headache and visual impairment. Visual acuity: left eye 50 cm, right eye 4 m. Visual field testing shows defects in both eyes, more severe on the left.

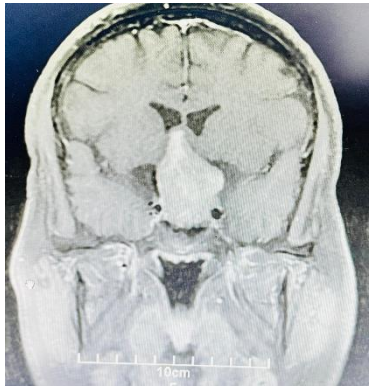


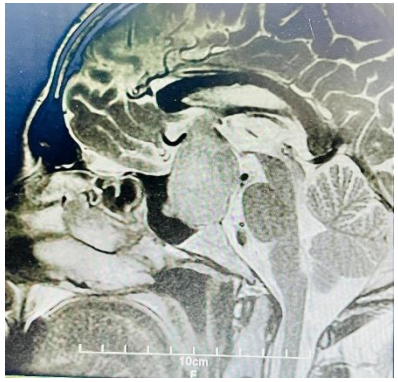


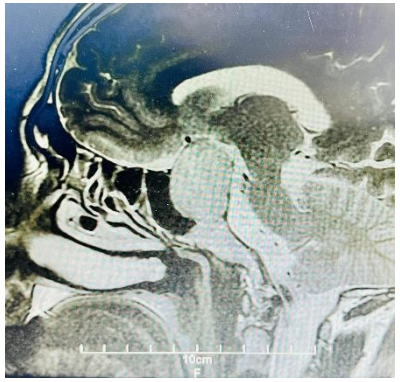


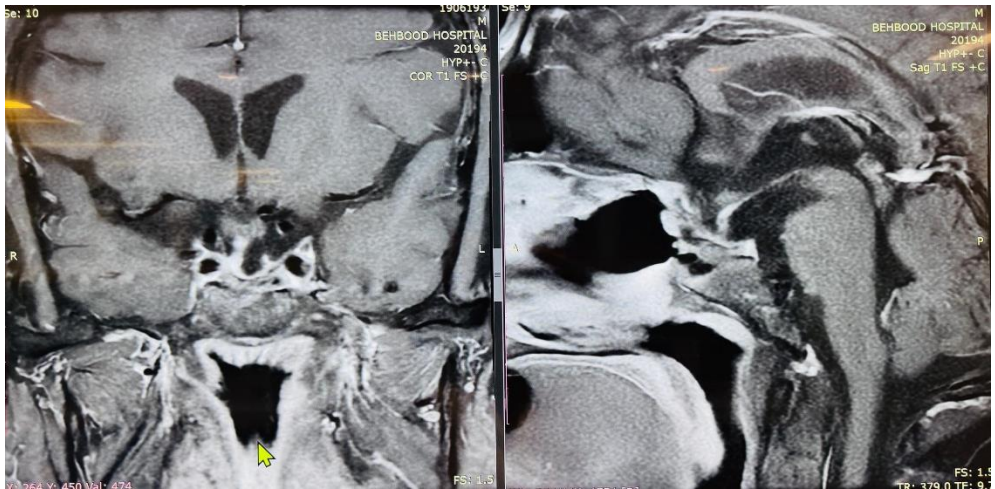


A 41-year-old man with headache and reduced visual fields

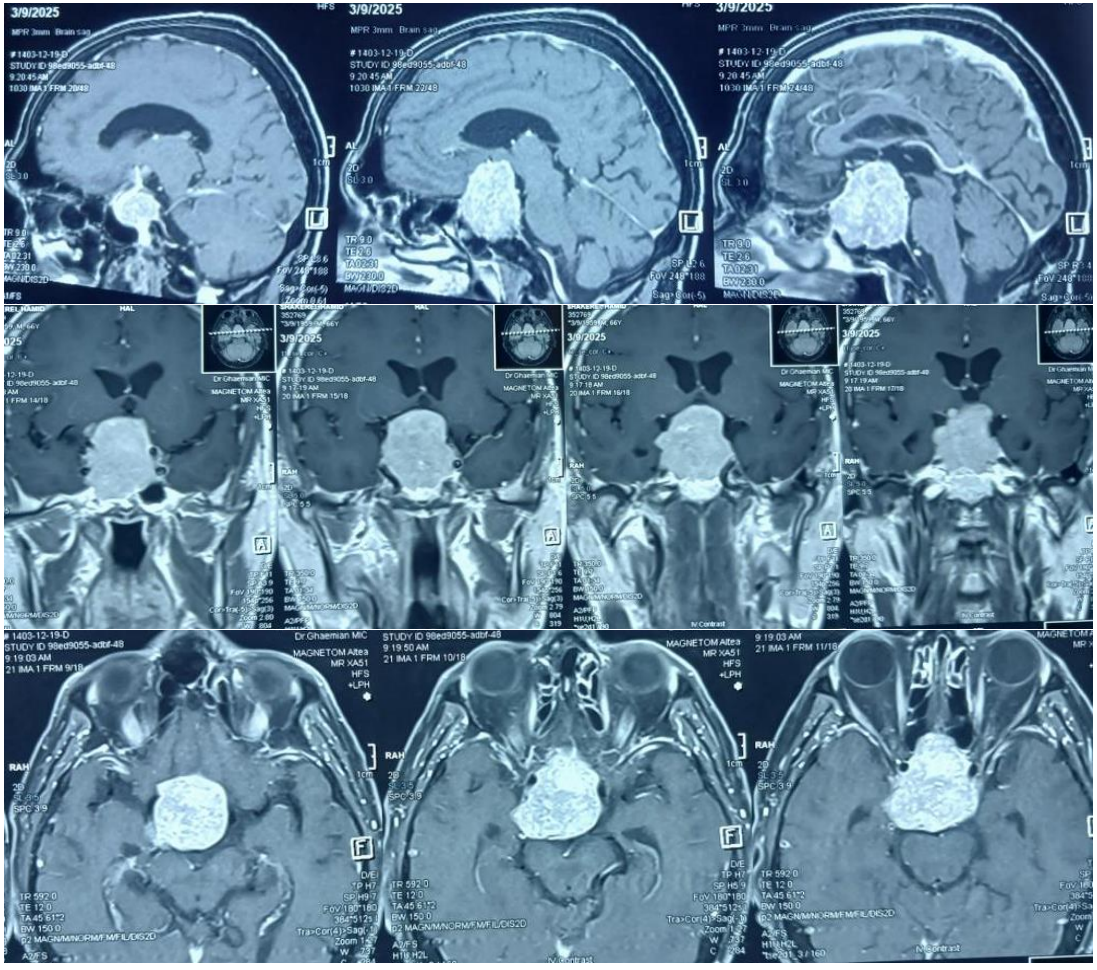


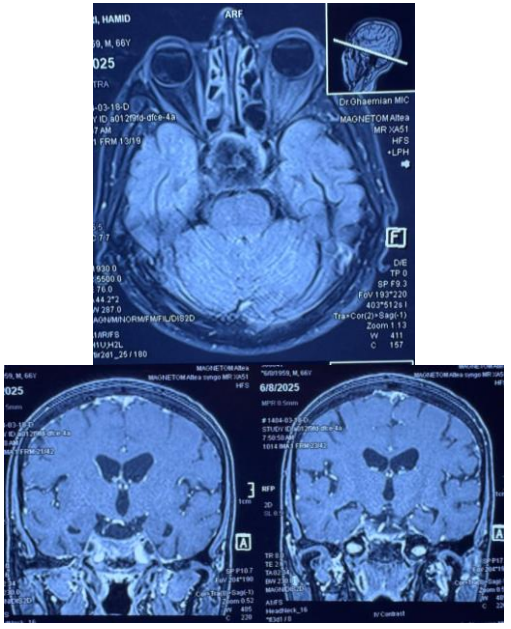




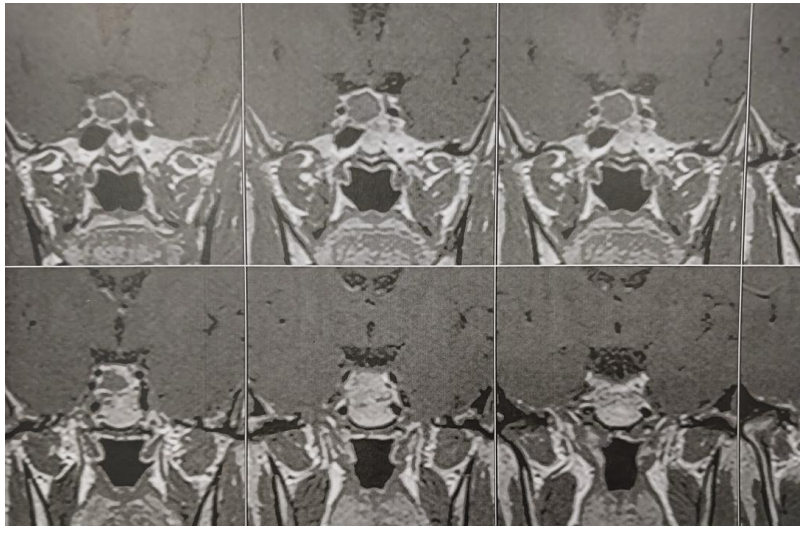


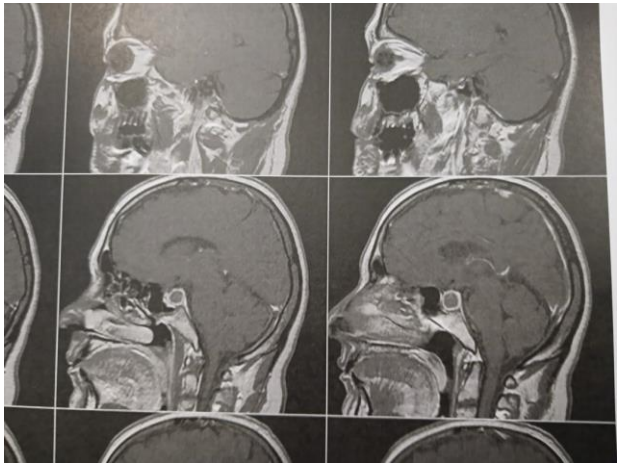
A 68-year-old man with headache and blurred vision

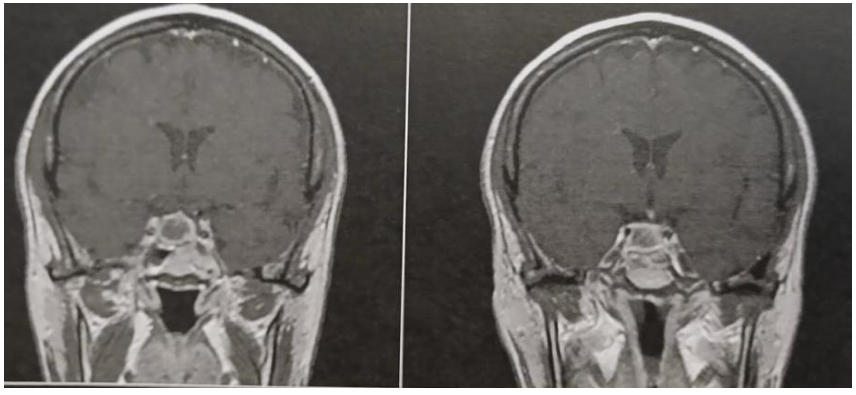


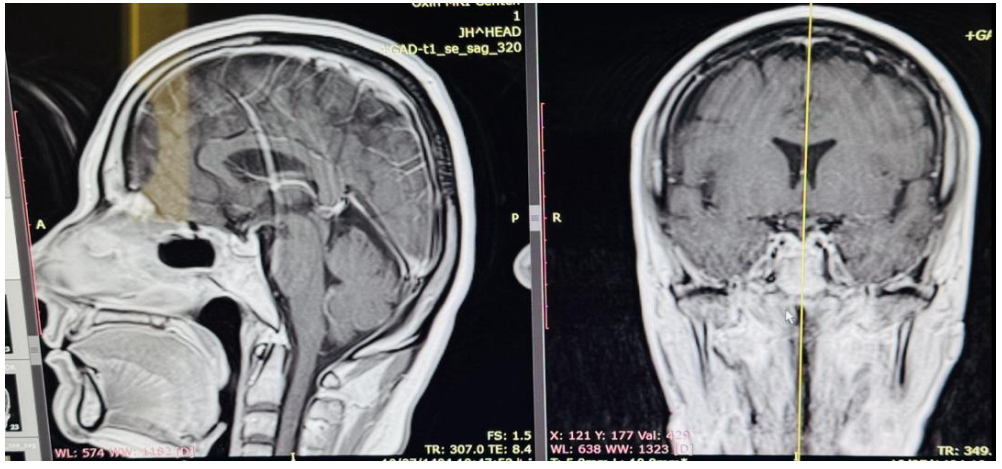


A 58-year-old woman with headache and double vision

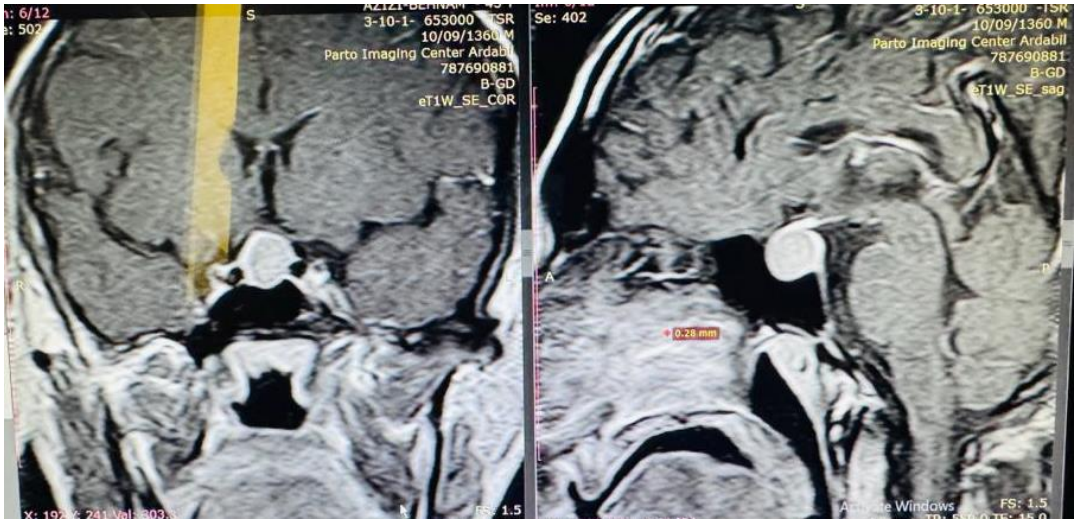


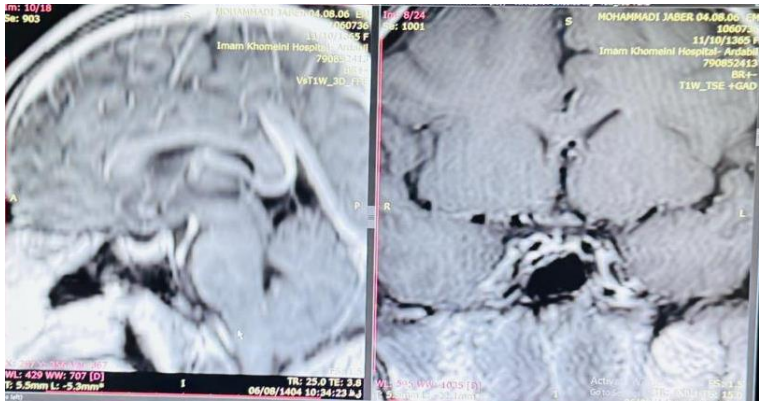


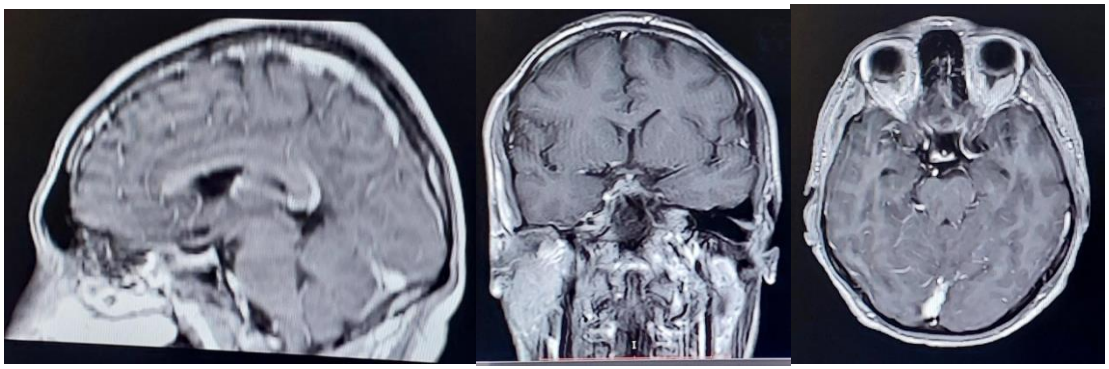




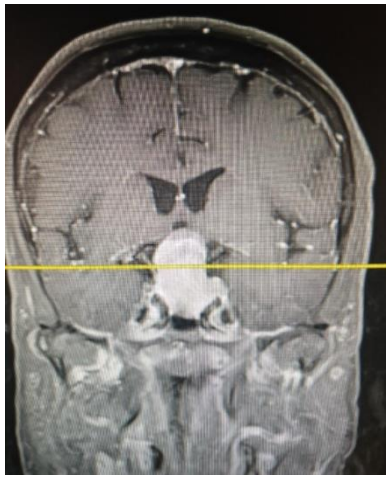
A 39-year-old man with headache and visual field impairment

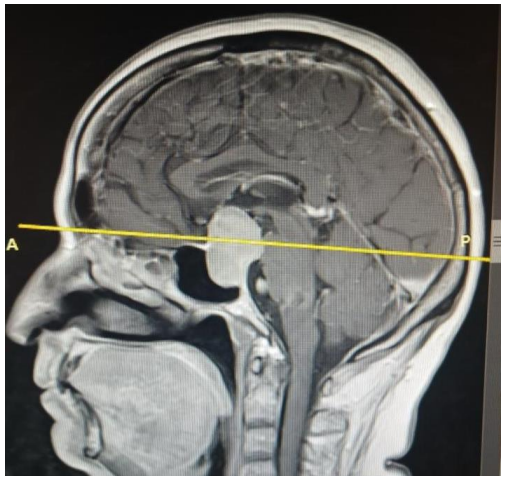


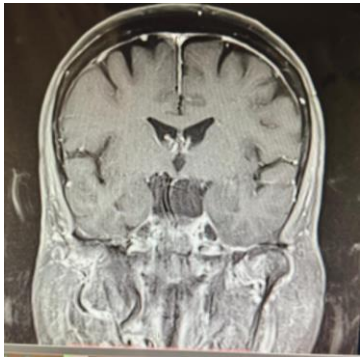


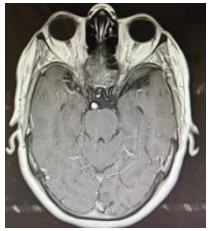


A 63-year-old woman with visual disturbance

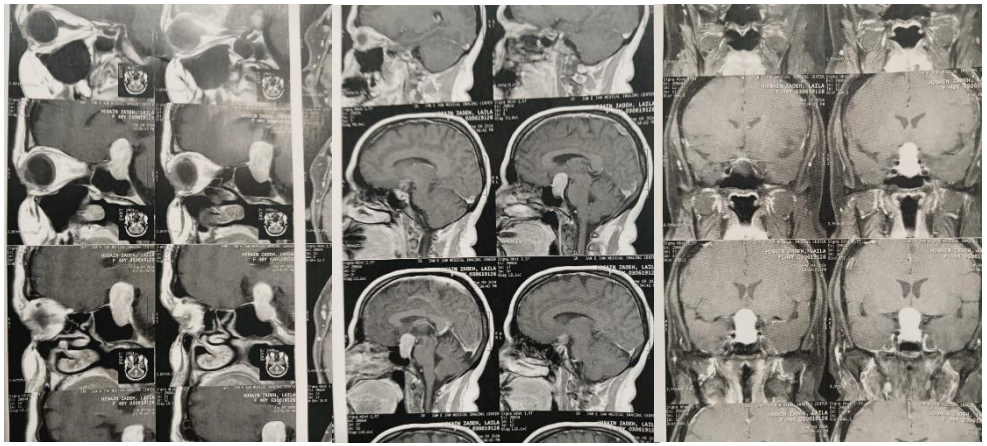


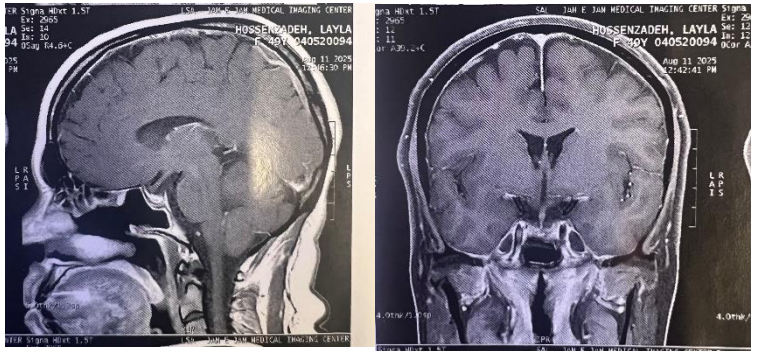


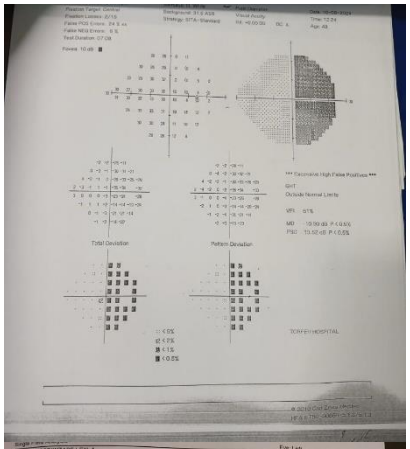


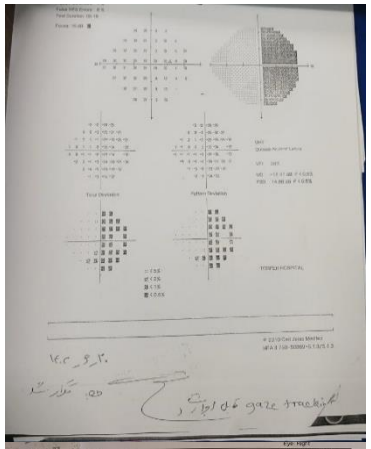


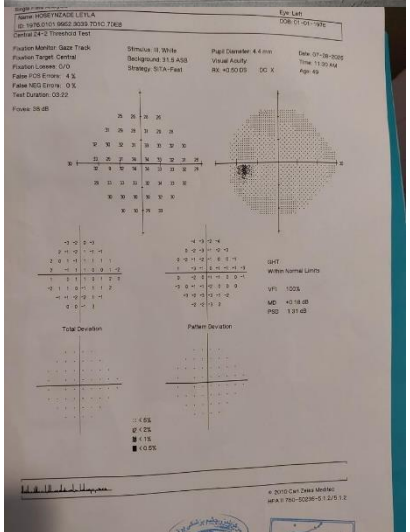
A 48-year-old woman with blurred vision

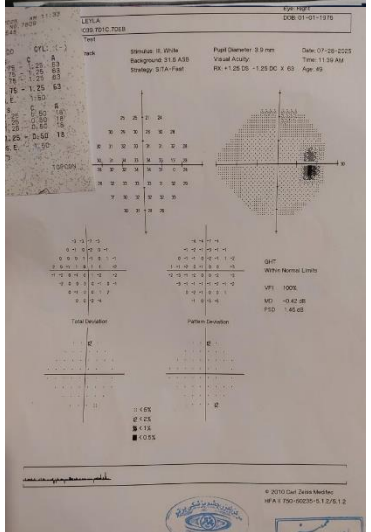




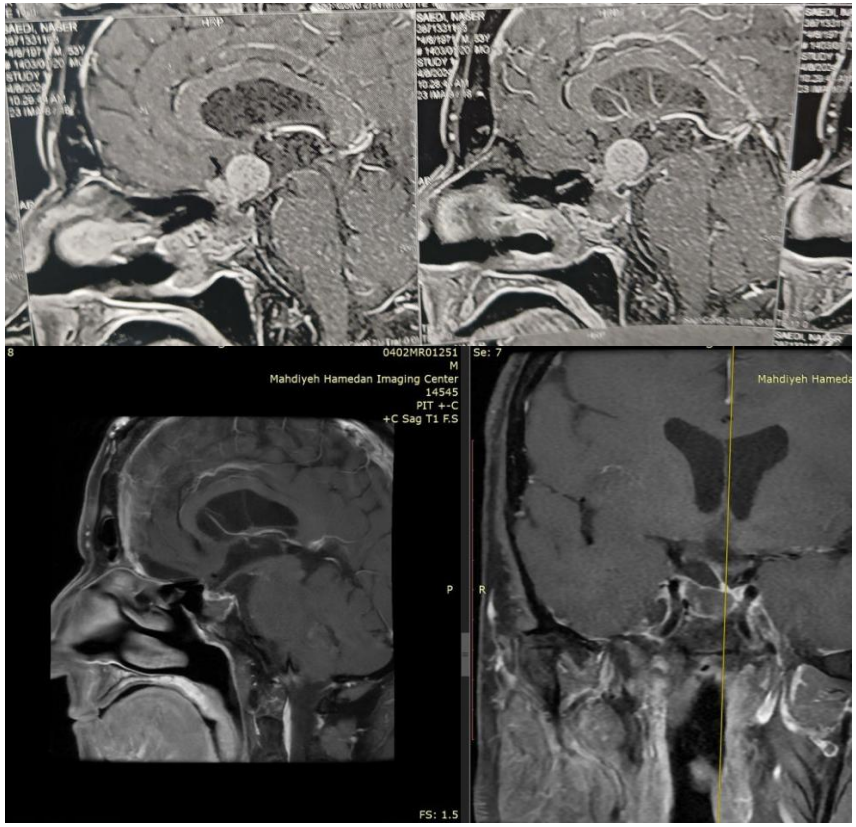




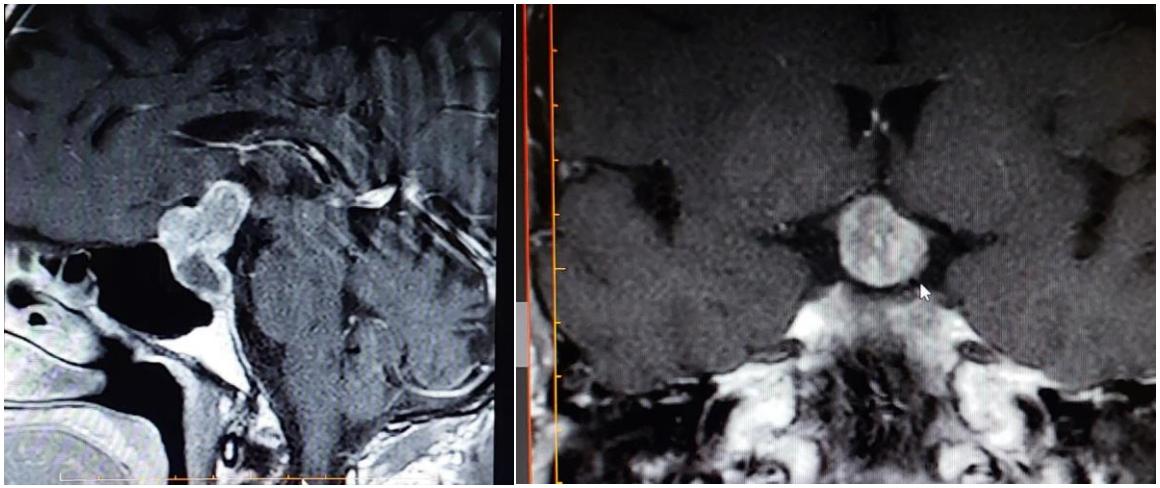


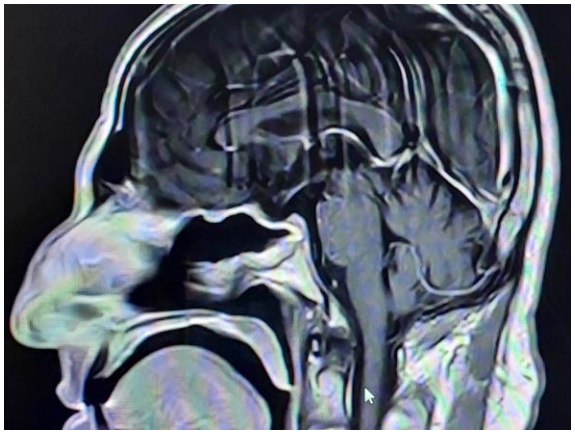


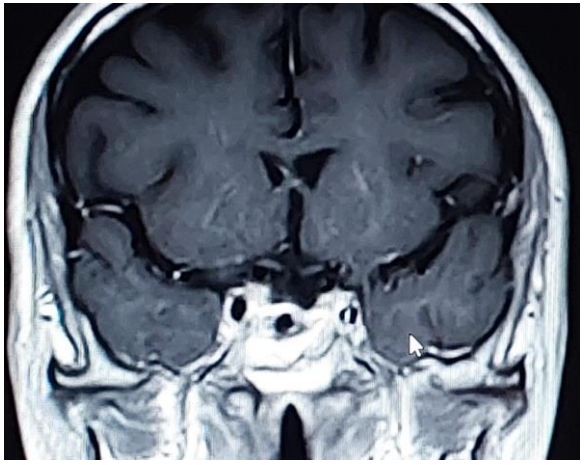
A 54-year-old man with a history of four prior surgeries and previous radiotherapy



A 70-year-old man with dizziness







Invasive prolactinoma

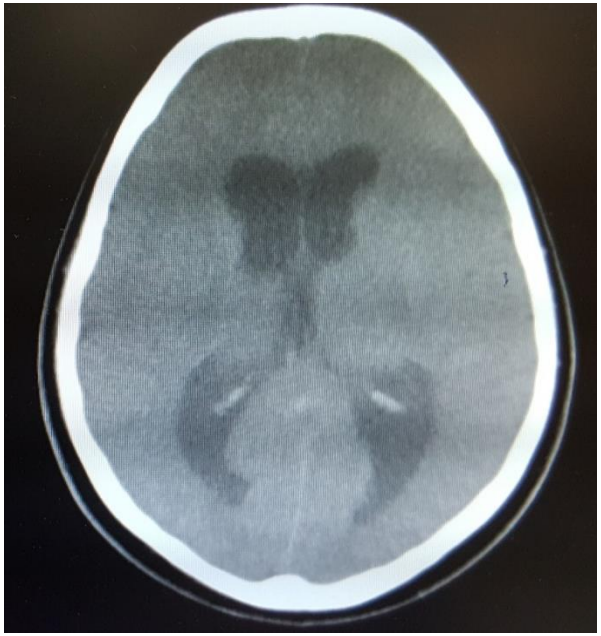
23 year old man

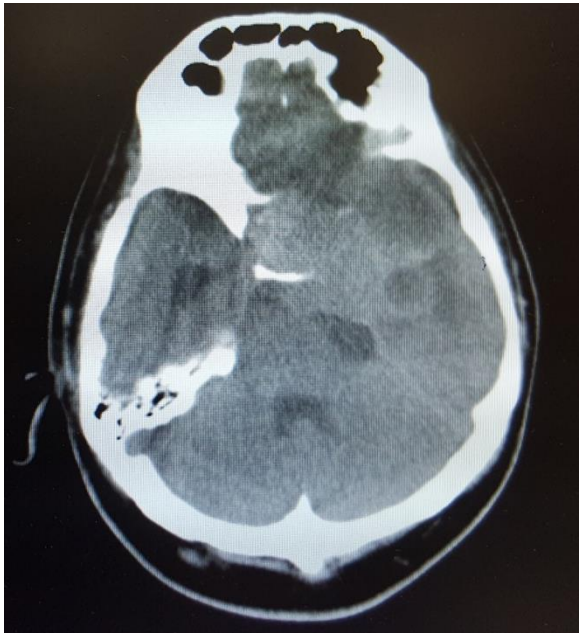
Headache, Blurred vision, Diplopia ,Left eye proptosis

Delayed puberty, gynecomastia

Lab test: hyperprolactinemia

Pre op CT

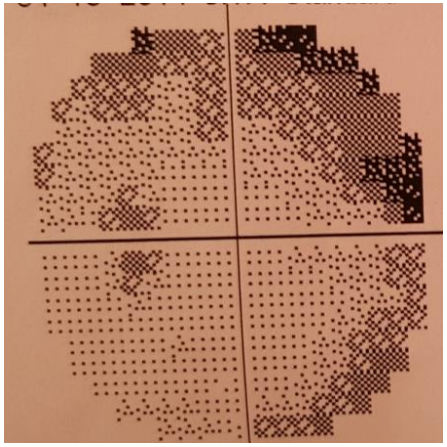


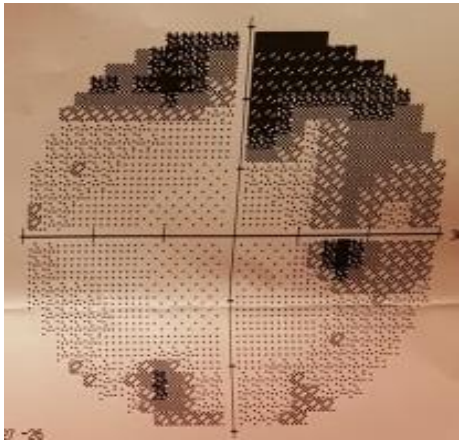


Lab test before medical treatment

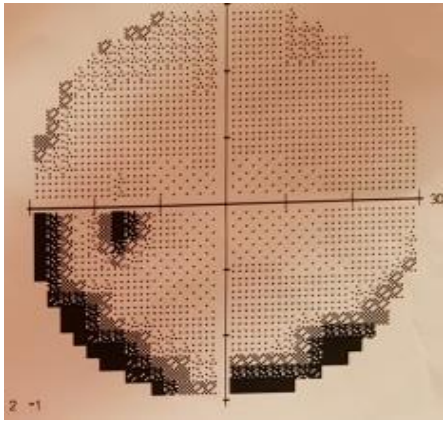
TSH:
T3: 1.1 (0.7-2)
T4: 5.1 (5.1-14.1)
Cortisol AM: 15.1(6.2-20)
Prolactin: 18788 (4.04-15.2)
Prolactin after treatment: over 470

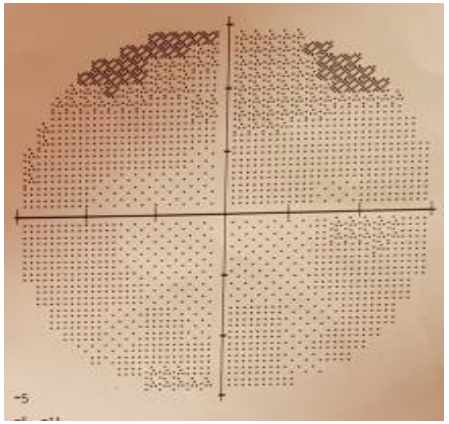
Pre-treatment perimetry





Post-treatment perimetry





Prolactin level following treatment

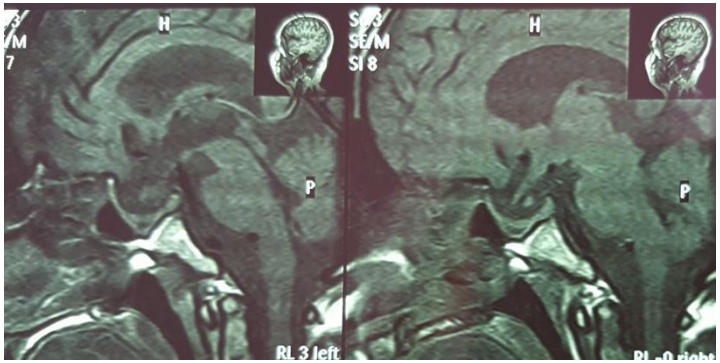
Prolactin: 13905 (86-324) following Cabergoline *3/week

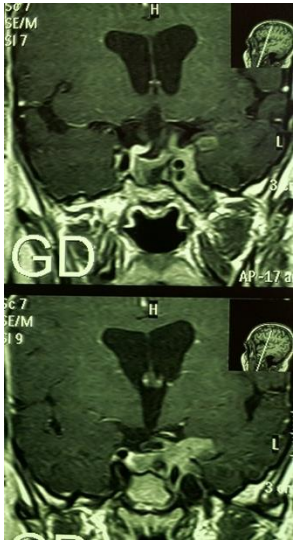
Prolactin:7853 (73-407) following Cabergoline *1/day

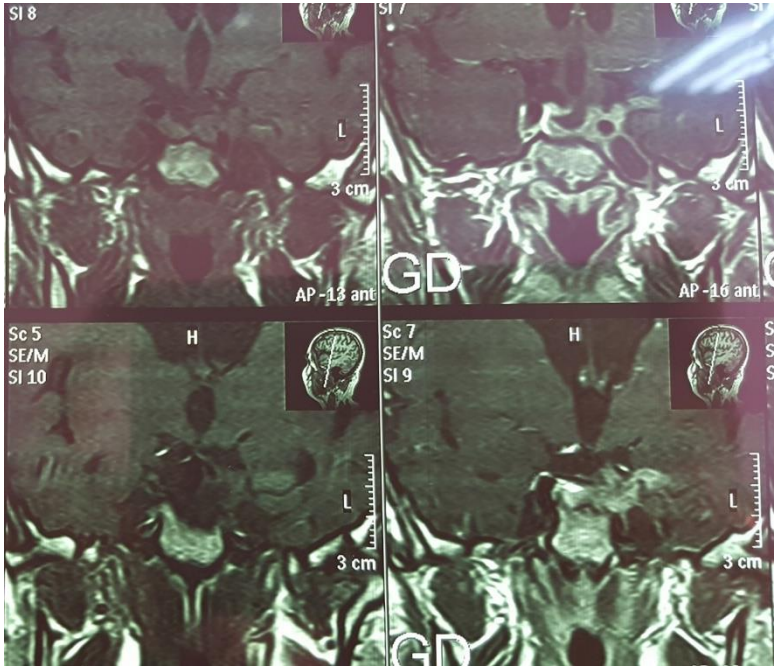
Prolactin: 185.1 (4-15.2) following Cabergoline * 2/day alternating with 1*/day

Prolactin: 1170 (73-407) following Cabergoline *2/day

Post Treatment MRI





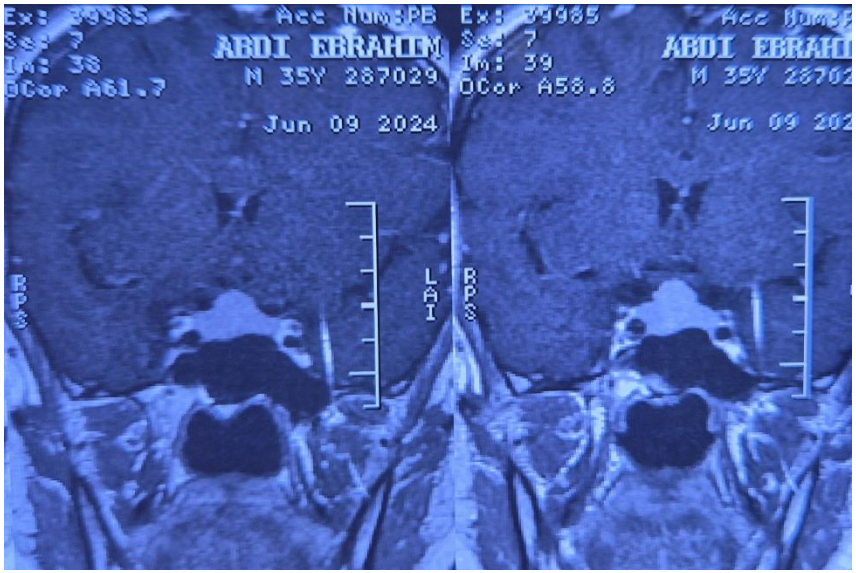


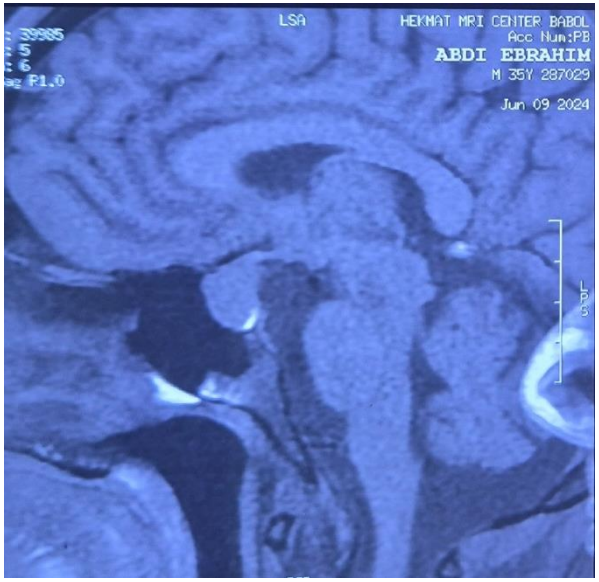
- A 36-year-old man
- decreased libido
- He was treated with levothyroxine 100 μg daily. After four months, he became euthyroid, the pituitary mass completely resolved on MRI, and all hormonal axes normalized.

Lab test

TSH: >75 (0.3-4.2)
T3:
T4:
Cortisol: 4.7 (5-25)
ACTH: 24.2 (Less than 46)
IGF-1: 48.5
Testosterone <0.20 (1.6-7.26)
FSH: 5.93 (1-7)
LH: 0.45 (2-9)

MRI: pituitary macroadenoma





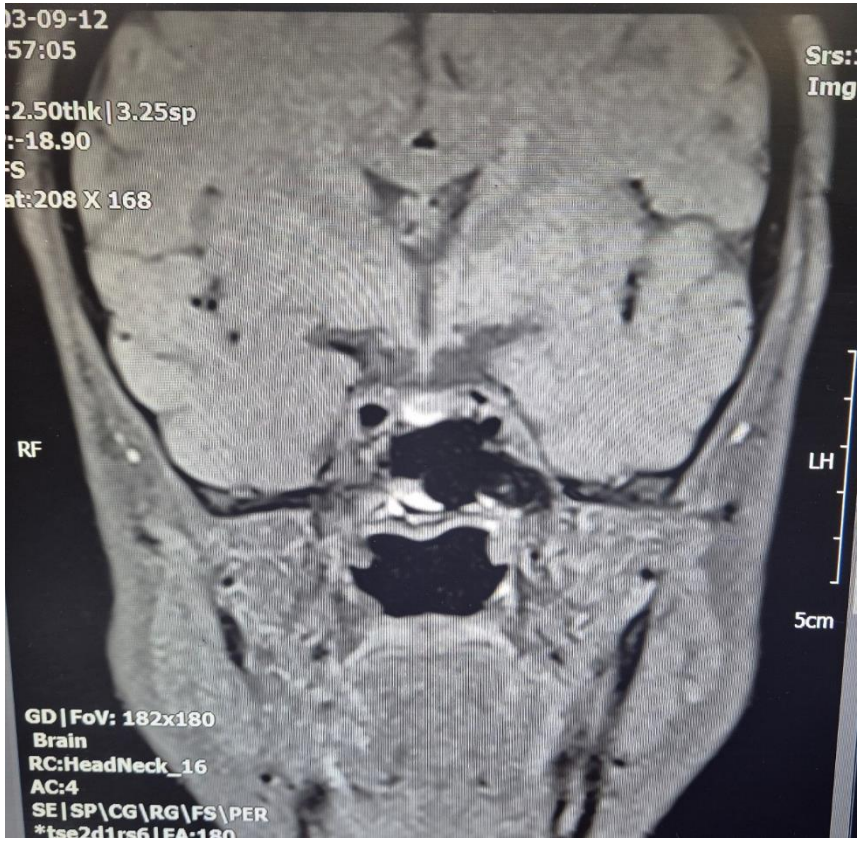
Lab test following treatment

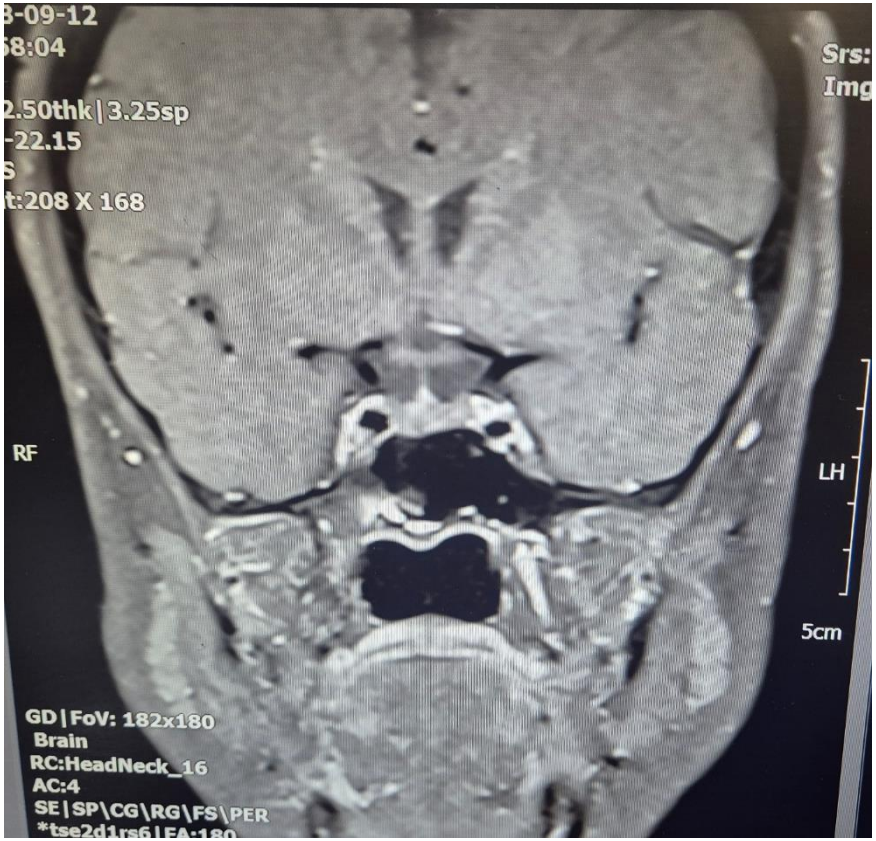
1- TSH: 24.6 (0.3-4.2)

2- TSH: 2.3 (0. 6-8.1)

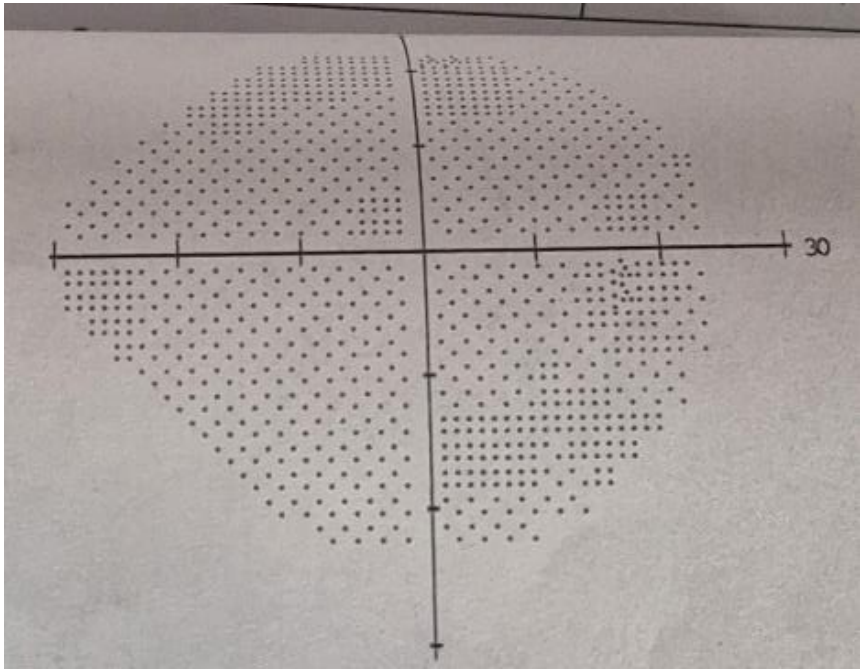
T4: 9.6 (4.5-11.7)
T3: 1.1 (0.6-1.8)

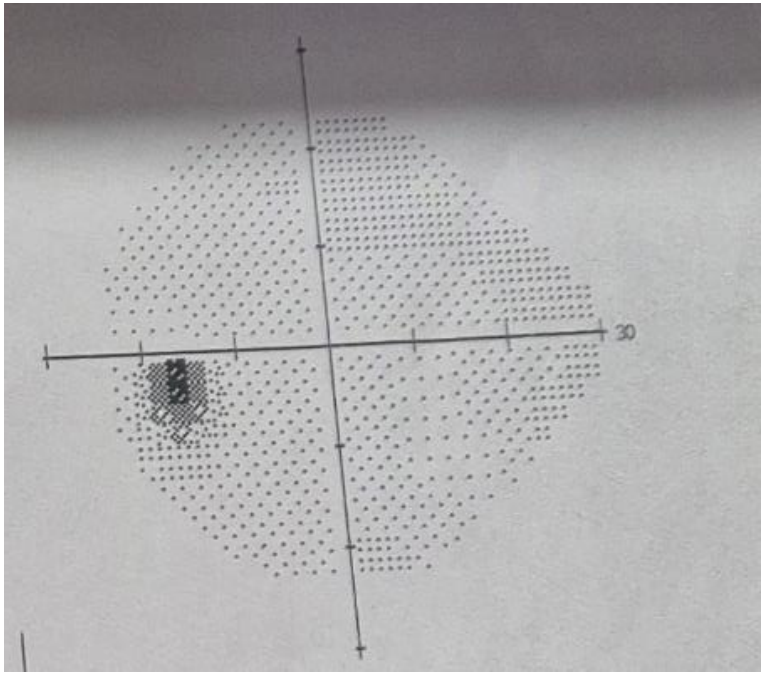
MRI following treatment

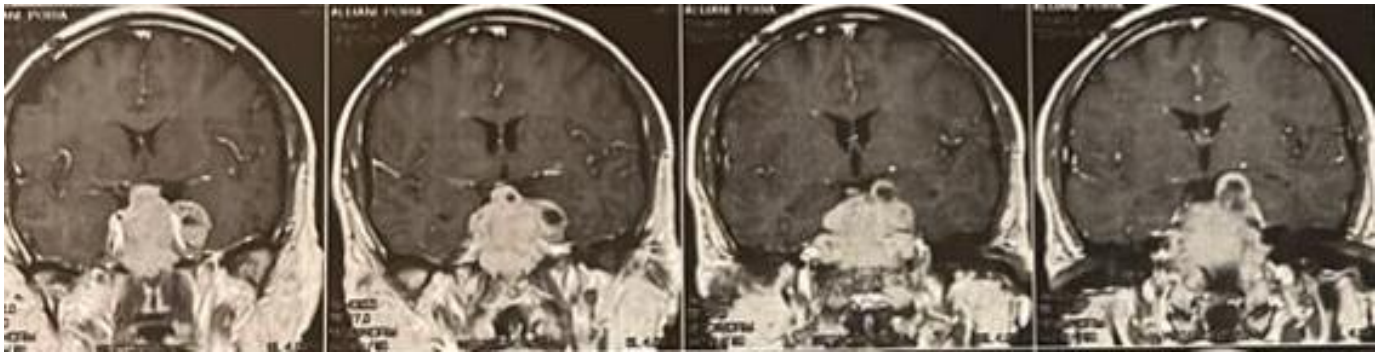


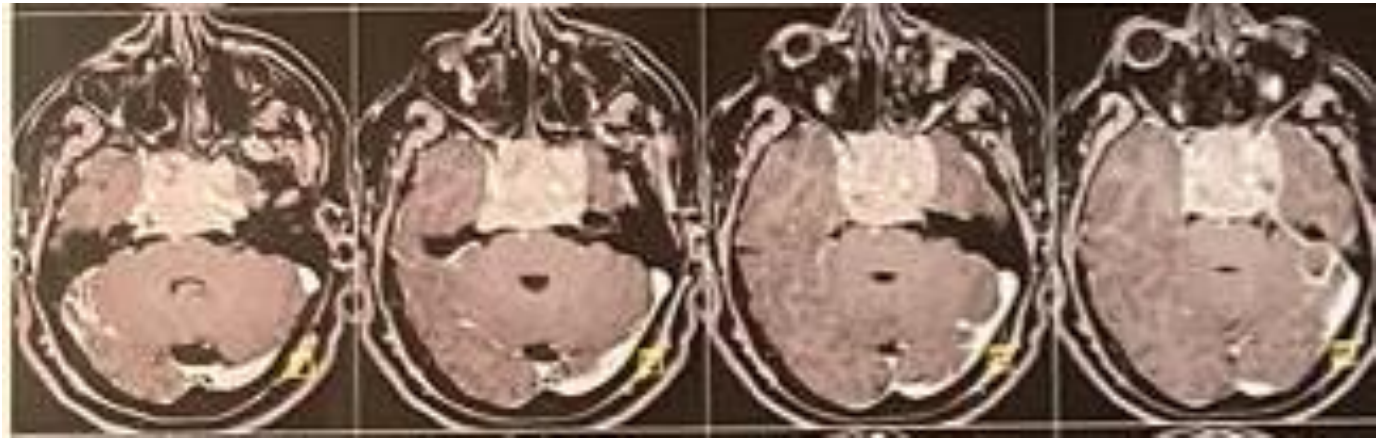


Perimetry









(CLIA).....				: <1 year : Up to 0.21 1-10 years : Up to 0.25 11-12 years : Up to 3.41 12-14 years : 0.09-5.62 14-15 years : 0.23-7.42 15-20 years : 1.18-9.48 21-49 years : 1.64- 7.53 50-100 years : 0.86-7.88
Cortisol AM (CLIA).....		15.7	ug/dL	6.2 - 20
ACTH AM (CLIA).....		40.5	Pg/ml	7.2 - 64
25-Hydroxy Vitamin D(CLIA)...		23.6	ng/ml	Deficient : < 20 Insufficient: 20 - 30 Sufficient : 30 -80 Potential intoxication : >80
IGF-1 (CLIA).....		192	ng/ml	109 - 284
Prolactin after PEG treatment	H	44.0	ng/ml	2.1 - 17.7

Electronically signed by : E. Mottaez

آزمایشگاه بیمارستان پارس
Pars Hospital Laboratory

آزمایشگاه بیمارستان پارس

بیمار:یوریا علی جانی	6279961923:تامین اجتماعی	سن:37
پزشک :سپهد نسترن مومنی	تاریخ : 1401-10-27 07:35	ک :G1180

Hematology_Dpt.

Complete Blood Count

Test	Result	Unit	Reference
WBC.....	8100	/Cumm	3500 - 10000
RBC.....	4.93	Mil/Cumm	4.5 - 6
Hemoglobin.....	14.9	gr/dl	14 - 18
Hematocrit.....	43.4	%	39.7 - 52.2
MCV.....	88	fl	80.5 - 99.7
MCH.....	30	pg	27 - 34
MCHC.....	34	g/dl	31.5 - 36.2
Plateletes.....	288000	/Cumm	150000 - 450000
MPV.....	8.7	fl	7.4-10.4
R.D.W	13.0	%	11.6 - 14.4
Neutrophil.....	49.4	%	
LYMPH.....	39.7	%	
MONO.....	8.6	%	
EOS.....	2.2	%	
BASO.....	0.1	%	
TOTAL.....	100.0		100 - 100

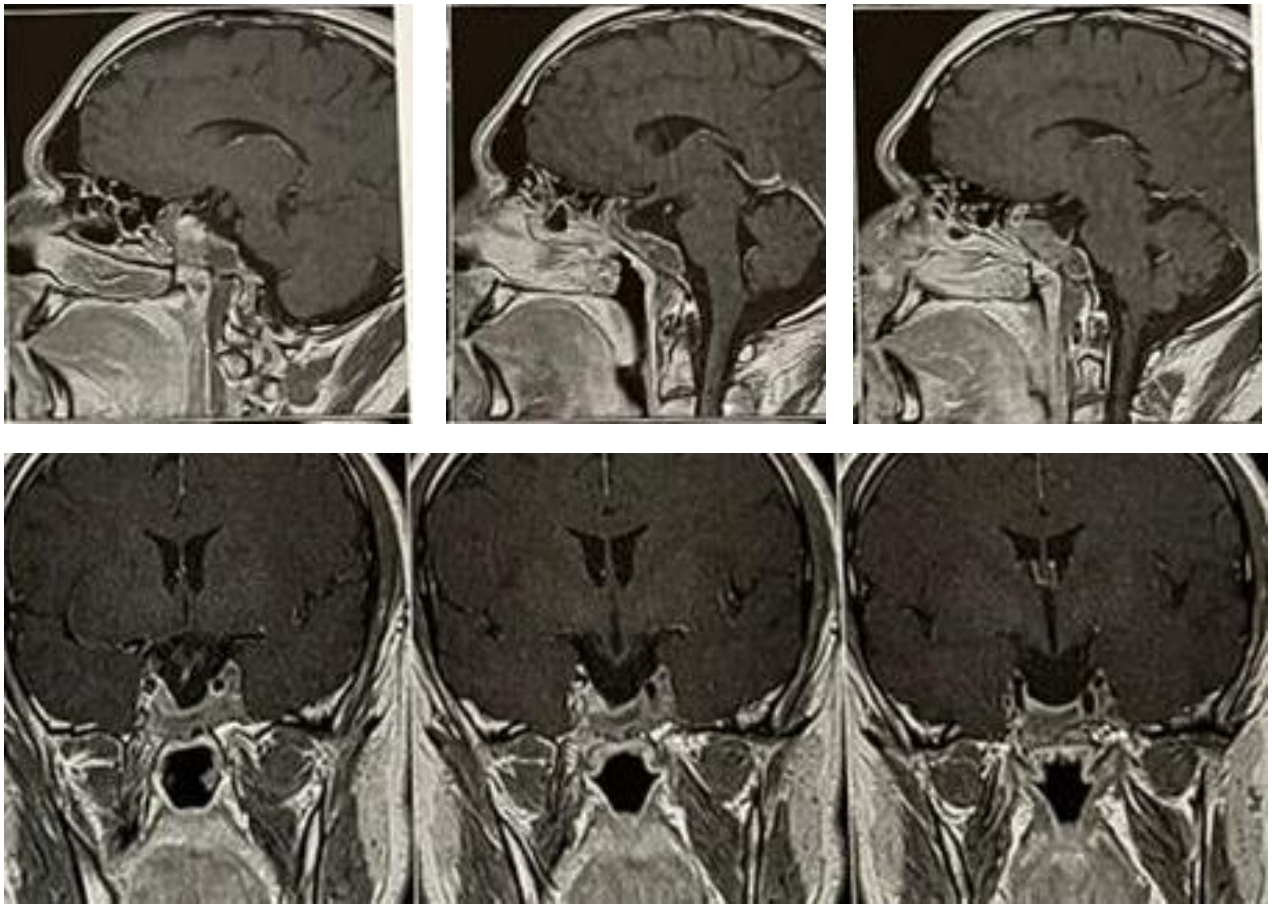
Comment : * CBC & diff. done by Laser Scattering method .

Biochemistry_Dpt.

Test	Result	Unit	Reference
Blood Urea Nitrogen(BUN),Serum	12	mg/dl	8 - 24
Creatinine,Serum.....	0.9	mg/dl	0.7 - 1.3

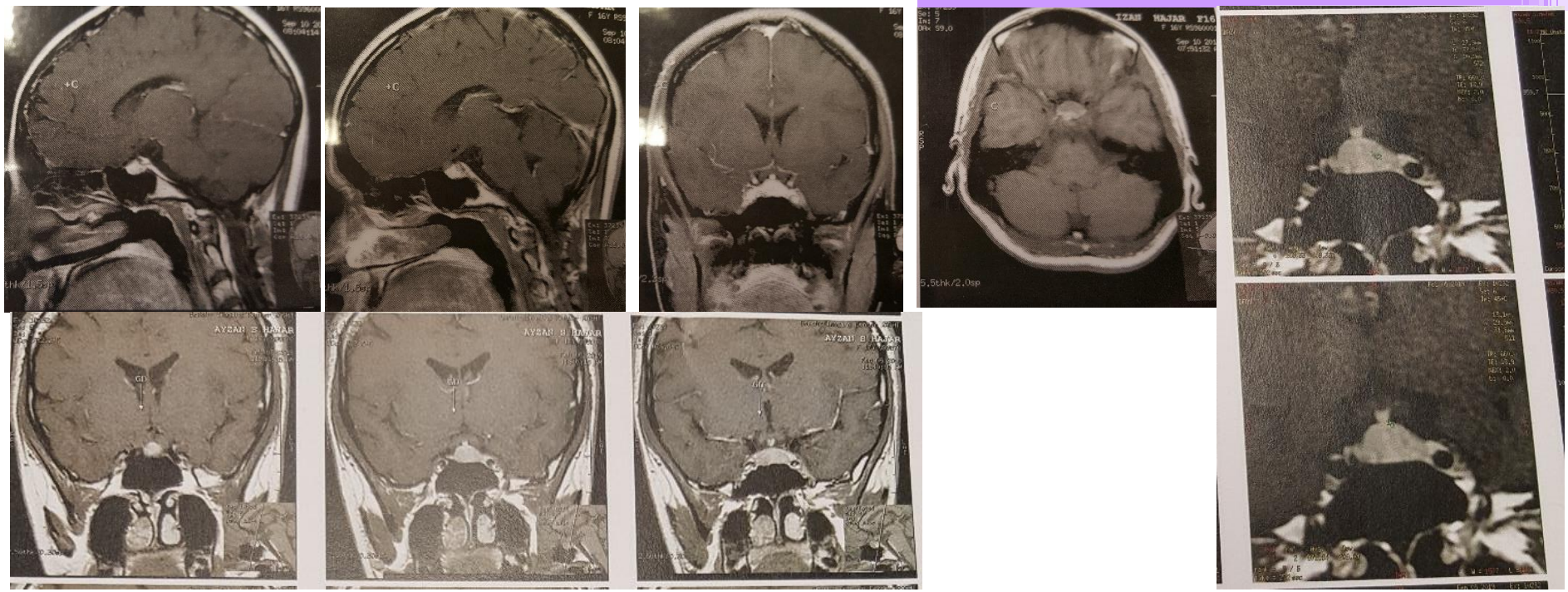
Hormone_Dpt.

Test		Result	Unit	Reference
T4,Total(CLIA).....		6.43	ug/dL	5.1 - 14.1
TSH(CLIA).....		3.22	uIU/mL	0.3 - 4.2
LH (CLIA).....		0.8	IU/L	Men : 0.57-12.07 Women : Follicular phase 1.8-11.78 Mid-Cycle peak 7.59-89.08 Luteal phase 0.56-14.0 Postmenopausal 5.16-61.99
FSH (CLIA).....		2.7	IU/L	Men : 0.95-11.95 Women : Follicular phase 3.03-8.08 Ovulatory peak 2.55-16.69 Luteal phase 1.38-5.47 Postmenopausal 26.7-133.4
Prolactin (CLIA).....	H	44.7	ng/ml	2.1 - 17.7
Testosterone,Total		1.75	ng/ml	Women : Up to 0.59 Men



Mimicking hypophysitis?

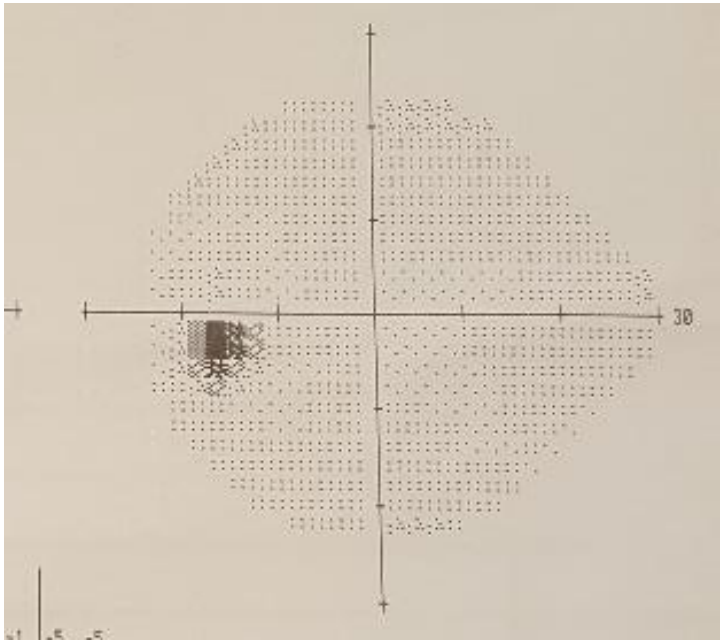
- 17-year-old female
- Headache, blurred vision, oligomenorrhea
- Primarily diagnosed with lymphocytic hypophysitis
- She underwent ETSS following no improvement after treatment with Hydrocortisone tab

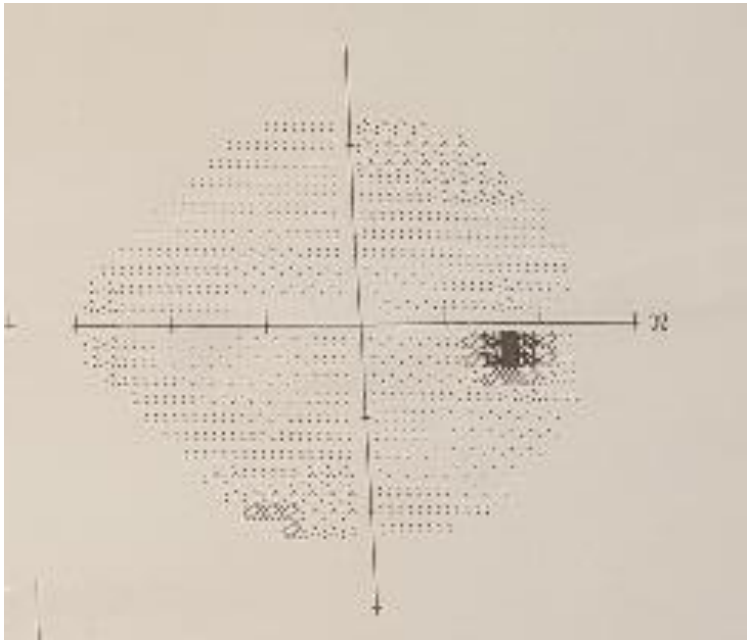


Upward bulging, generalized and minor enlargement of pituitary gland (19*12*10 mm) with homogeneous signal intensity and normal enhancement
In favour of pituitary hyperplasia; physiologic (menstruation, factation) or pathologic (end organ failure,...).

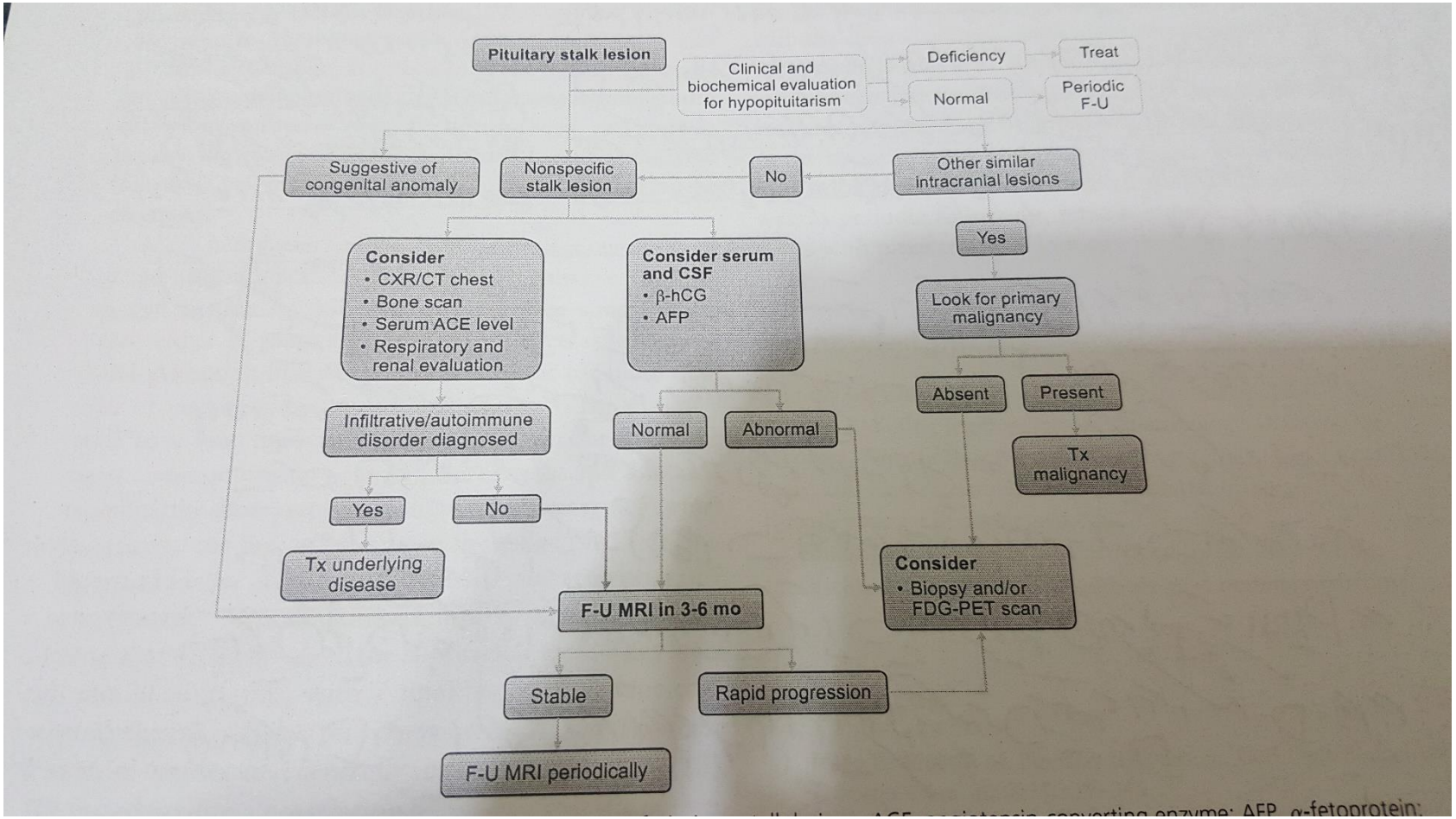
Lab test

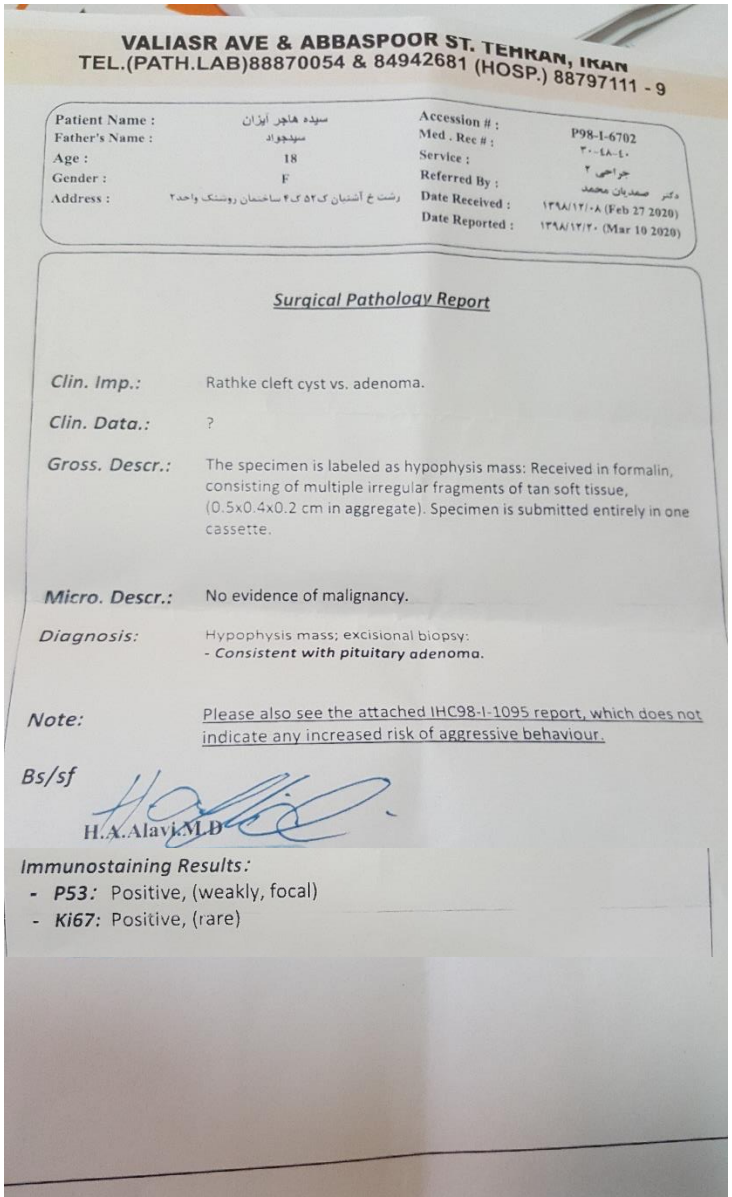
TSH: 1.74 (0.25-.055)
Prolactin: 37.8 (3.25)
ACTH: 12.7 (7.2-63.3)
Cortisol: 10.2 (3.7-19.4)
IGF-1: 408.8 (120-580)
T4: 8.5 (4.87-11.72)


30



FSH: 3.8 (3-8)
LH: 11.4 (1.8-11.8)


Pituitary stalk lesion
Clinical and biochemical evaluation for hypopituitarism
Deficiency
Treat
Normal
Periodic F-U
Suggestive of congenital anomaly
Nonspecific stalk lesion
No
Other similar intracranial lesions
Yes
Look for primary malignancy
Absent
Present
Tx malignancy
Consider
• CXR/CT chest
• Bone scan
• Serum ACE level
• Respiratory and renal evaluation
Consider serum and CSF
• β-hCG
• AFP
Infiltrative/autoimmune disorder diagnosed
Normal
Abnormal
Yes
No
Tx underlying disease
F-U MRI in 3-6 mo
Consider
• Biopsy and/or FDG-PET scan
Stable
Rapid progression
F-U MRI periodically



VALIASR AVE & ABBASPOOR ST. TEHRAN, IRAN
TEL.(PATH.LAB)88870054 & 84942681 (HOSP.) 88797111 - 9

Patient Name :	سیده هاجر ایزان	Accession # :	P98-I-6702
Father's Name :	سیدجواد	Med . Rec # :	۳۰-۰۱۸-۰۱۰
Age :	18	Service :	جراحی ۲
Gender :	F	Referred By :	دکتر صمدیان محمد
Address :	رشت خ آشتیان ک ۵۲ ک ۴ ساختمان روشنک واحد۲	Date Received :	۱۳۹۸/۱۲/۰۸ (Feb 27 2020)
		Date Reported :	۱۳۹۸/۱۲/۲۰ (Mar 10 2020)

Surgical Pathology Report

Clin. Imp.: Rathke cleft cyst vs. adenoma.

Clin. Data.: ?

Gross. Descr.: The specimen is labeled as hypophysis mass: Received in formalin, consisting of multiple irregular fragments of tan soft tissue, (0.5x0.4x0.2 cm in aggregate). Specimen is submitted entirely in one cassette.

Micro. Descr.: No evidence of malignancy.

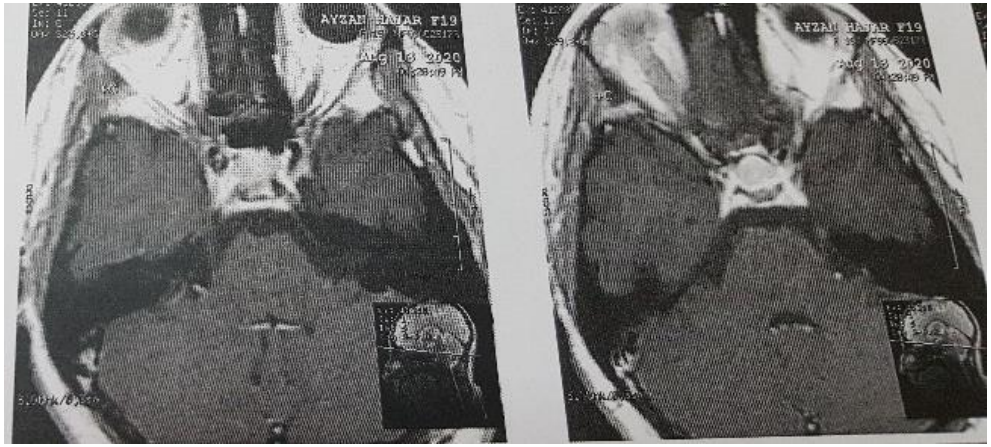
Diagnosis: Hypophysis mass; excisional biopsy:
- ***Consistent with pituitary adenoma.***

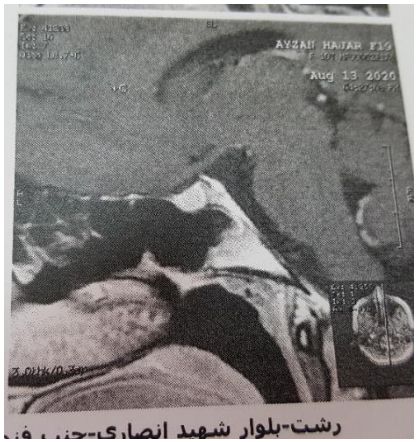
Note: Please also see the attached IHC98-I-1095 report, which does not indicate any increased risk of aggressive behaviour.

Bs/sf

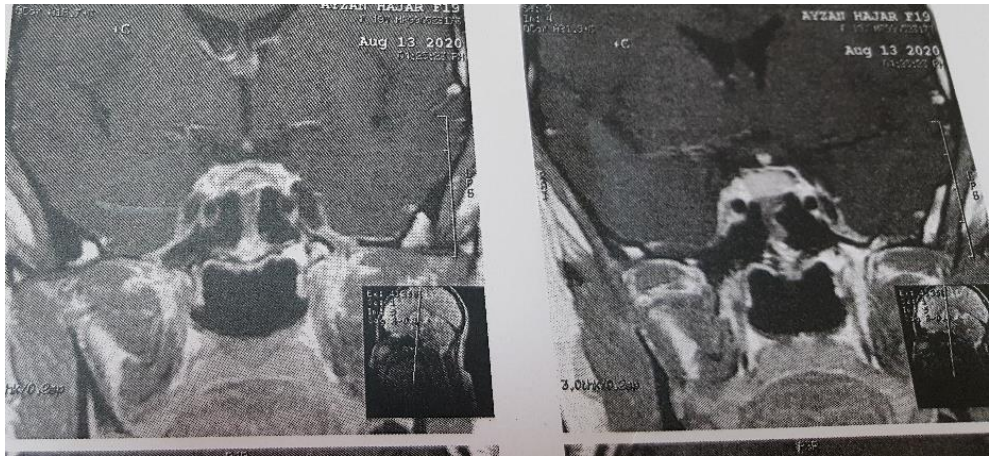
H.A.Alavi,M.D

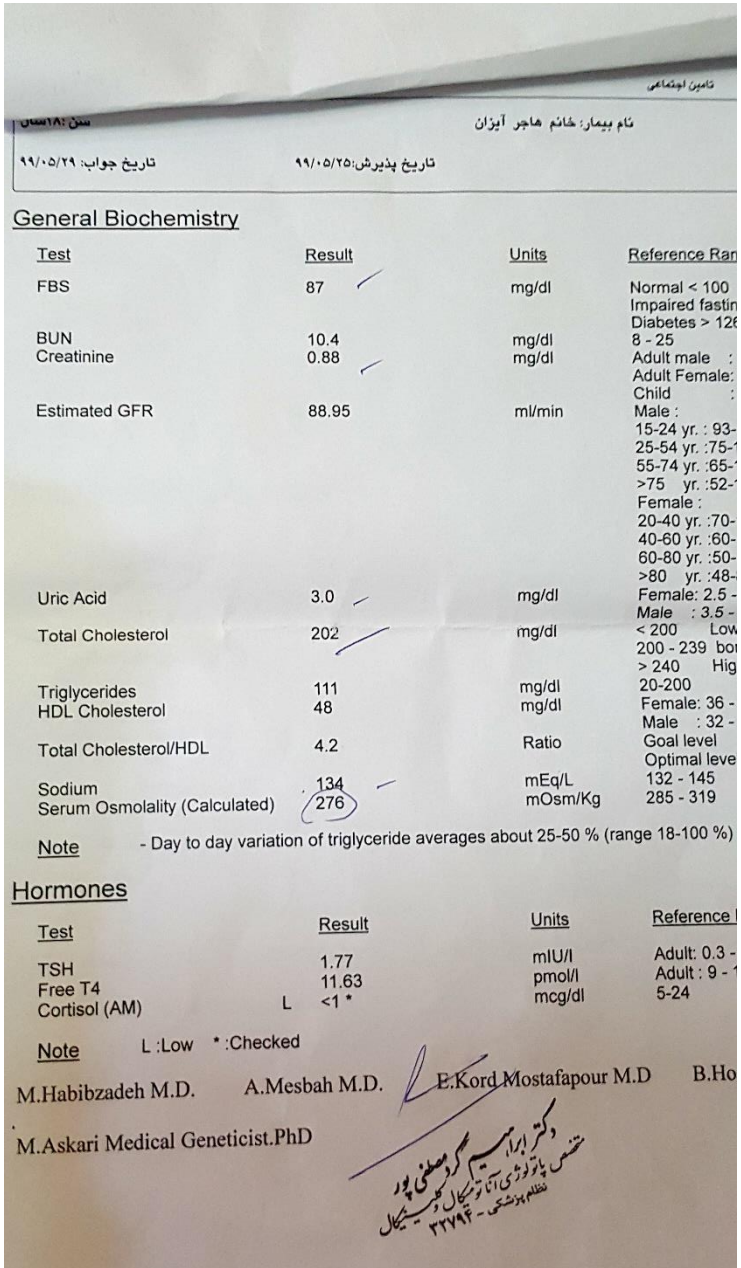
Immunostaining Results:
- ***P53:*** Positive, (weakly, focal)
- ***Ki67:*** Positive, (rare)





رشت-بلوار شهید انصاری-جنب فر





تامین اجتماعی

نام بیمار: خانم هاجر آیزان

سن :۱۸سال

تاریخ پذیرش:۹۹/۰۵/۲۵

تاریخ جواب: ۹۹/۰۵/۲۹

General Biochemistry

Test	Result	Units	Reference Ran
FBS	87	mg/dl	Normal < 100 Impaired fastin Diabetes > 12
BUN	10.4	mg/dl	8 - 25
Creatinine	0.88	mg/dl	Adult male : Adult Female: Child :
Estimated GFR	88.95	ml/min	Male : 15-24 yr. : 93- 25-54 yr. :75- 55-74 yr. :65- >75 yr. :52- Female : 20-40 yr. :70- 40-60 yr. :60- 60-80 yr. :50- >80 yr. :48-
Uric Acid	3.0	mg/dl	Female: 2.5 - Male : 3.5 -
Total Cholesterol	202	mg/dl	< 200 Low 200 - 239 bo > 240 Hig
Triglycerides	111	mg/dl	20-200
HDL Cholesterol	48	mg/dl	Female: 36 - Male : 32 -
Total Cholesterol/HDL	4.2	Ratio	Goal level Optimal leve
Sodium	134	mEq/L	132 - 145
Serum Osmolality (Calculated)	276	mOsm/Kg	285 - 319

Note - Day to day variation of triglyceride averages about 25-50 % (range 18-100 %)

Hormones

Test		Result	Units	Reference
TSH		1.77	mIU/l	Adult: 0.3 -
Free T4		11.63	pmol/l	Adult : 9 -
Cortisol (AM)	L	<1 *	mcg/dl	5-24

Note L :Low * :Checked

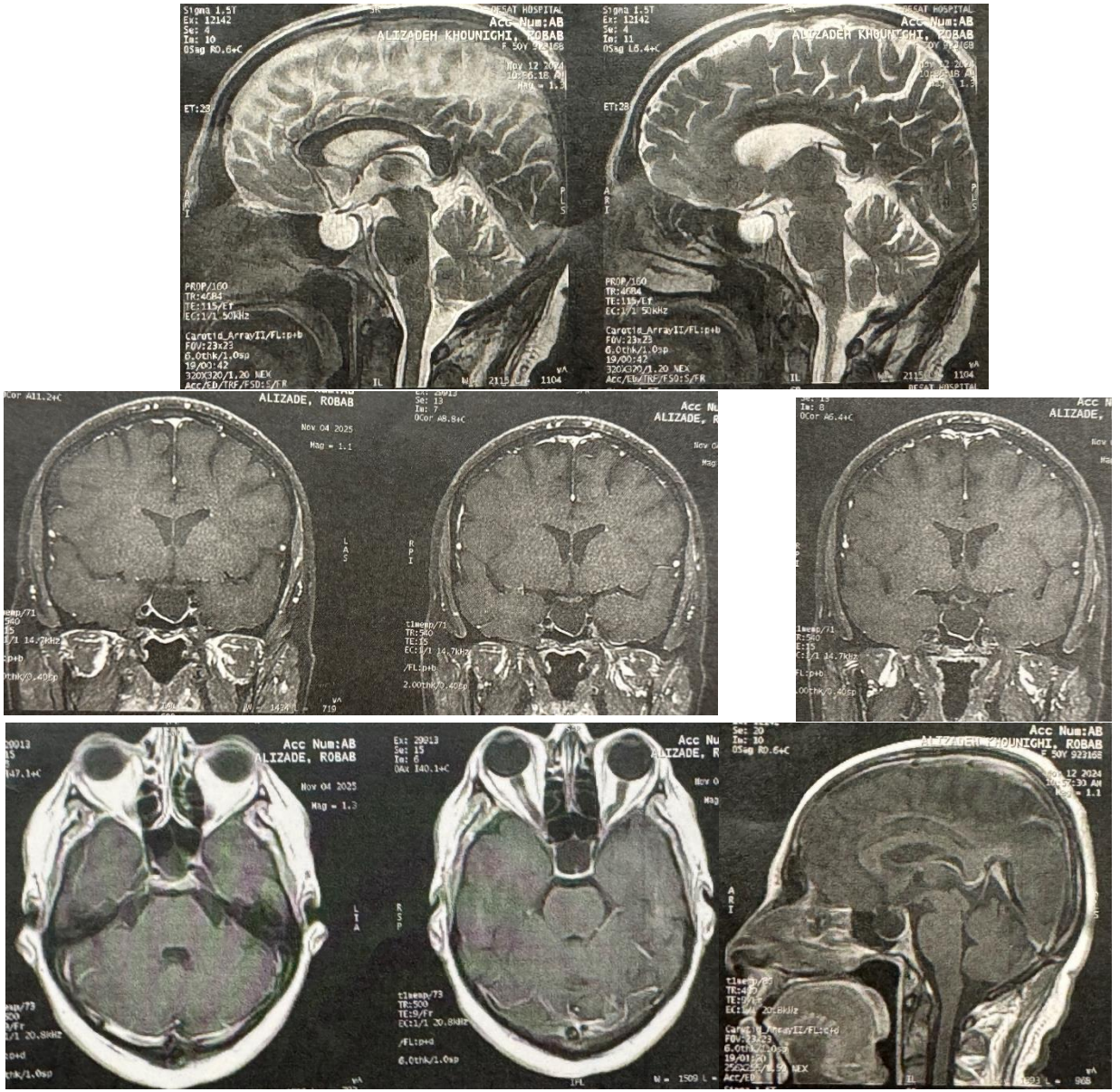
M.Habibzadeh M.D. A.Mesbah M.D. E.Kord Mostafapour M.D B.Ho

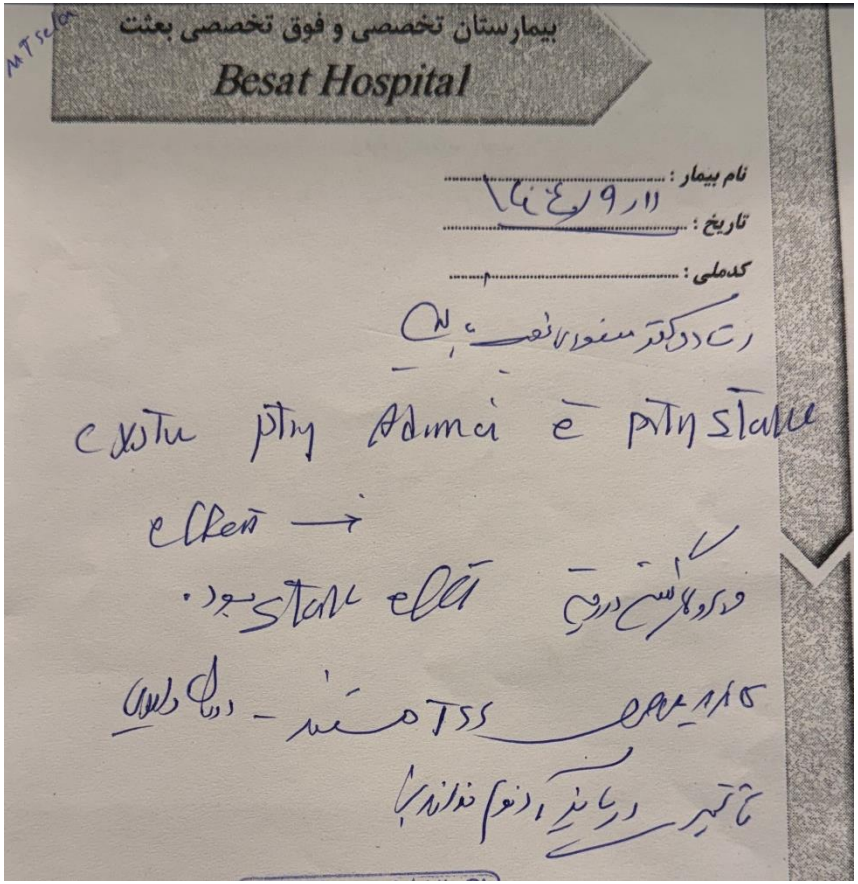
M.Askari Medical Geneticist.PhD

دکتر ابراهیم کرد مصطفی پور
متخصص پاتولوژی آناتومیکال و کلینیکال
نظام پزشکی - ۳۲۷۹۴

Empty sella?

- A 51 year-old-woman
- Previous history of seizure
- Visual impairment


Acc Num:AB
ALIZADEH KHOUNIGHI, ROBAB
ALIZADE, ROBAB
Nov 04 2025


بیمارستان تخصصی و فوق تخصصی بعثت

Besat Hospital

نام بیمار :

تاریخ :

کدملی :

بیمارستان فوق تخصصی بعثت نهاجا

مرکز تصویر برداری پزشکی

علی زاده خونیقی - رباب

1404/08/13

51

عنوان خدمات:

MRI BRAIN

(with and without contrast)

REPORT:

The interhemispheric fissure is centered on the midline.

Multiple area of high signal intensity on T2WI & FLAIR sequence are seen in deep and periventricular white matter of both cerebral hemisphere without mass effect in favor of small vessels ischemic changes (FAZEKAS II).

The other part of cortex and white matter show normal signal intensity.

The cerebello pontine angle area appears normal on each side.

The internal acoustic meatus has normal width.

The orbital contents are unremarkable.

No evidence of restriction in DWI sequence is seen.

After contrast injection no abnormal enhancement is seen.

MRI HYPOPHYSIS

(with and without contrast)

REPORT:

Cystic lesion with rim enhancement and pressure effect on stalk about 18x18mm is seen at sellar region.

Obvious pituitary gland is not seen.

Otherwise study is unremarkable.

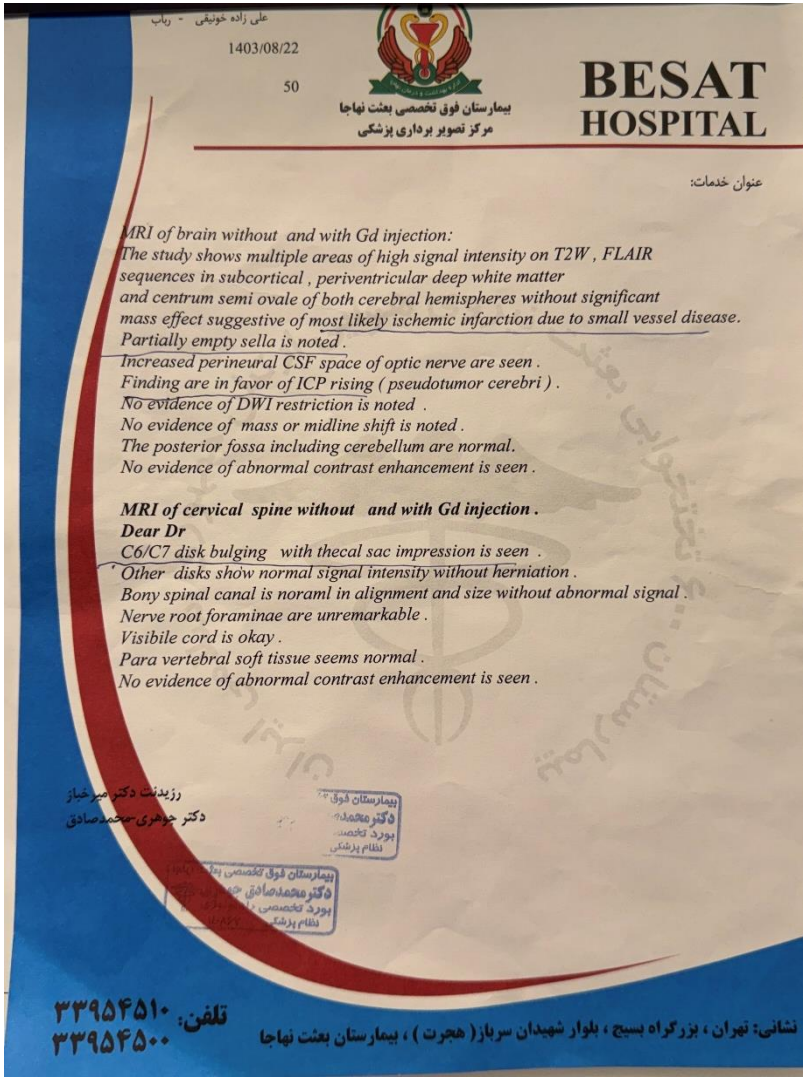
دکتر مرادی-حمید

دکتر برومند

بیمارستان فوق تخصصی بعثت نهاجا
رادیولوژی اورژانس

نشانی : تهران – بزرگراه بسیج – بلوار شهیدان سرباز (هجرت) – بیمارستان بعثت نهاجا

تلفن :۳۳۹۵۴۵۱۰- ۳۳۹۵۴۵۰۰



علی زاده خوئیقی - ریاب

1403/08/22

50

بیمارستان فوق تخصصی بعثت نهاجا
مرکز تصویر برداری پزشکی

BESAT HOSPITAL

عنوان خدمات:

MRI of brain without and with Gd injection:
The study shows multiple areas of high signal intensity on T2W , FLAIR sequences in subcortical , periventricular deep white matter and centrum semi ovale of both cerebral hemispheres without significant mass effect suggestive of most likely ischemic infarction due to small vessel disease.
Partially empty sella is noted .
Increased perineural CSF space of optic nerve are seen .
Finding are in favor of ICP rising (pseudotumor cerebri) .
No evidence of DWI restriction is noted .
No evidence of mass or midline shift is noted .
The posterior fossa including cerebellum are normal.
No evidence of abnormal contrast enhancement is seen .

MRI of cervical spine without and with Gd injection .
Dear Dr
C6/C7 disk bulging with thecal sac impression is seen .
Other disks show normal signal intensity without herniation .
Bony spinal canal is noraml in alignment and size without abnormal signal .
Nerve root foraminae are unremarkable .
Visibile cord is okay .
Para vertebral soft tissue seems normal .
No evidence of abnormal contrast enhancement is seen .

رزیدنت دکتر میر خباز
دکتر جوهری-محمدصادق

بیمارستان فوق تخصصی بعثت نهاجا
دکتر محمدصادق جوهری
برد تخصصی رادیولوژی
نظام پزشکی ۱۰۸۷۱

تلفن: ۳۳۹۵۴۵۱۰
۳۳۹۵۴۵۰۰

نشانی: تهران ، بزرگراه بسیج ، بلوار شهیدان سرباز(هجرت) ، بیمارستان بعثت نهاجا

- Misdiagnosed with pituitary adenoma
- Referred as an ETSS candidate
- Further evaluations revealed:
  - Empty sella

High Ki 67, cavernous sinus invasion?

- A 51-year-old male
- Decreased libido
- Blurred vision
- weakness

سن : 51

نام پزشک: دکتر صمدیان

شماره پاتولوژي: DP-03-8744

CLINICAL INFORMATION: Pituitary tumor R/O pituitary adenoma

SPECIMEN: Pituitary tumor

GROSS DESCRIPTION:

Received specimen in formalin consists of multiple pieces of tan-brown, soft tissue totally measuring 3x1.4x0.3cm.
Summary of specimen M/1 Embedded 100%

MICROSCOPIC DESCRIPTION:

Please see the diagnosis.

DIAGNOSIS:

PITUITARY TUMOR, RESECTION:

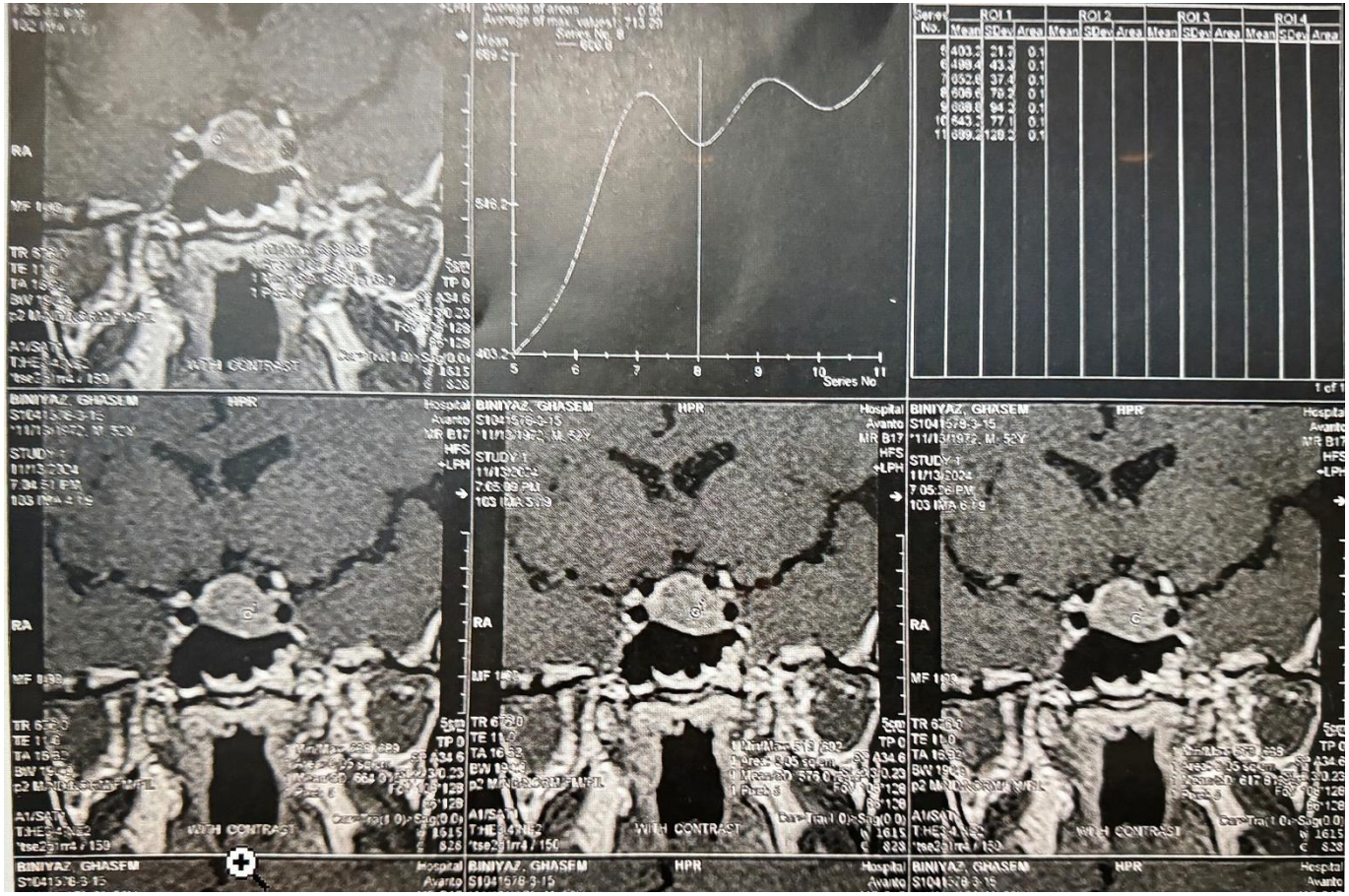
-HISTOLOGICAL FINDINGS AND IHC RESULTS ARE THAT OF PITUITARY NEUROENDOCRINE TUMOR/PITUITARY ADENOMA IN FAVOR OF GONADOTROPH ADENOMA
-MIB-1 INDEX (KI67 LABELLING INDEX): POSITIVE IN 5.5% OF TUMOR CELLS

Note:

Please see IHC report NO: DP-03-8745.

بدون مهر پاتولوژیست فاقد اعتبار است

F.Kosari MD M.Tavangar MD F.Azadi MD S.Mostaghni MD G.Shekarkhar MD


RA
WITH CONTRAST
Series No
ROI 1
ROI 2
ROI 3
ROI 4
BINIYAZ, GHASEM
HPR

تاریخ جوابدهی: 26/09/1403
نام پزشک: دکتر صمدیان

سن : 51
شماره پاتولوژي: DP-03-8745

CLINICAL INFORMATION: Pituitary tumor R/O pituitary adenoma

SPECIMEN: Paraffin Block No: DP-03-8744, Deghat Pathology Laboratory, Tehran.

IHC MARKERS:
Immunohistochemical staining was done using antibodies against the following markers:

Markers:	**Description of reaction:**
1 – Synaptophysin:	Positive in nearly all tumor cells
2 – Chromogranin:	Positive in nearly all tumor cells
3 – GH:	Negative in tumor cells
4 – Prolactin:	Negative in tumor cells
5 – ACTH:	Negative in tumor cells
6 – TSH:	Negative in tumor cells
7 – FSH:	Positive in some tumor cells
8 – LH:	Negative in tumor cells
9 – GATA3	Negative in tumor cells
10 – SF1	Positive in rare tumor cells
11-CAM5.2:	Positive in few tumor cells with no significant fibrous body
12 – P53:	Negative
13 – Ki67:	Positive in 5.5% of tumor cells

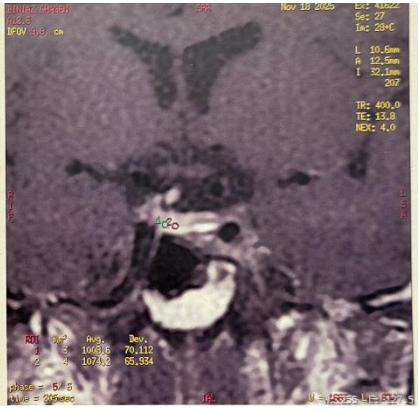
INTERPRETATION:
-HISTOLOGICAL FINDINGS AND IHC RESULTS ARE THAT OF PITUITARY NEUROENDOCRINE TUMOR/PITUITARY ADENOMA IN FAVOR OF GONADOTROPH ADENOMA
-MIB-1 INDEX (KI67 LABELLING INDEX): POSITIVE IN 5.5% OF TUMOR CELLS

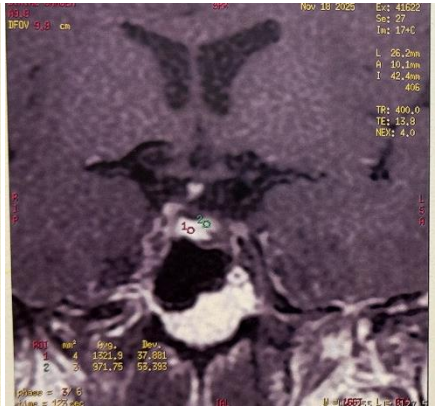
Note:
Please see pathology report NO: DP-03-8744.

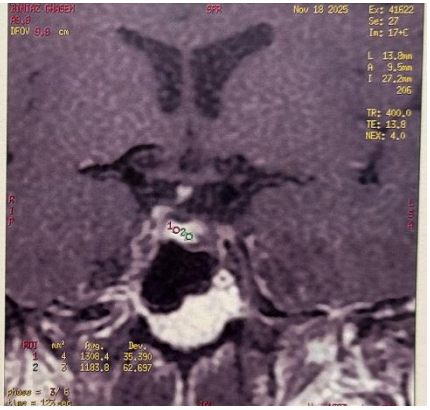
بدون مهر پاتولوژیست فاقد اعتبار است

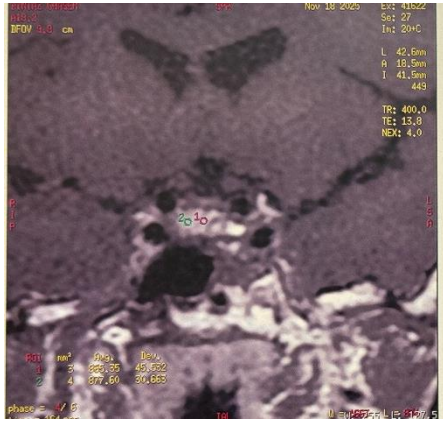
F.Kosari MD M.Tavangar MD F.Azadi MD S.Mostaghni MD G.Shekarkhar MD

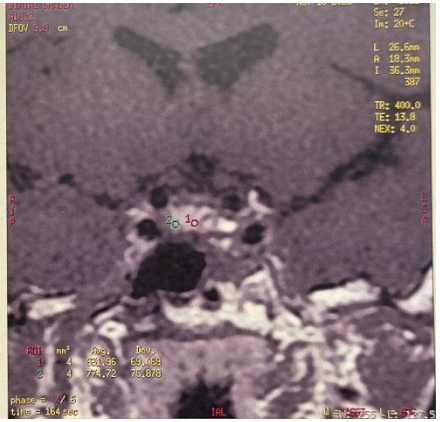

Nov 18 2025
Ex: 41622
Se: 27
Im: 28+C
L 14.3mm
A 12.3mm
I 25.2mm
401
TR: 400.0
TE: 13.8
NEX: 4.0
ROI nm² Avg. Dev.
1 4 897.92 64.817
2 4 946.64 43.767


Nov 18 2025
Ex: 41622
Se: 27
Im: 28+C
L 10.6mm
A 12.5mm
I 32.1mm
207
TR: 400.0
TE: 13.8
NEX: 4.0
ROI nm² Avg. Dev.
1 3 1068.6 70.112
2 4 1072.2 65.334


Nov 18 2025
Ex: 41622
Se: 27
Im: 17+C
L 26.2mm
A 10.1mm
I 42.4mm
406
TR: 400.0
TE: 13.8
NEX: 4.0
ROI nm² Avg. Dev.
1 4 1221.9 37.881
2 3 971.75 53.393


Nov 18 2025
Ex: 41622
Se: 27
Im: 17+C
L 13.8mm
A 9.5mm
I 27.2mm
206
TR: 400.0
TE: 13.8
NEX: 4.0
ROI nm² Avg. Dev.
1 4 1308.4 35.390
2 3 1183.8 62.697

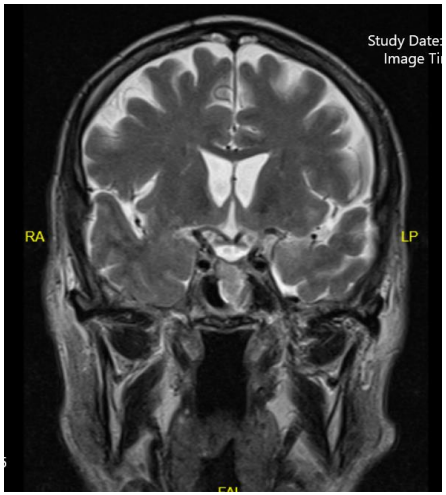

Nov 18 2025
Ex: 41622
Se: 27
Im: 20+C
L 42.6mm
A 18.5mm
I 41.5mm
449
TR: 400.0
TE: 13.8
NEX: 4.0

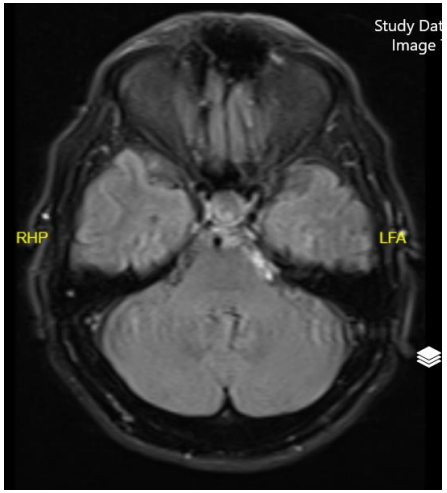

Se: 27
Im: 20+C
L 26.6mm
A 18.3mm
I 36.3mm
387
TR: 400.0
TE: 13.8
NEX: 4.0
ROI nm² Avg. Dev.
1 4 881.96 63.068
2 4 774.72 75.678

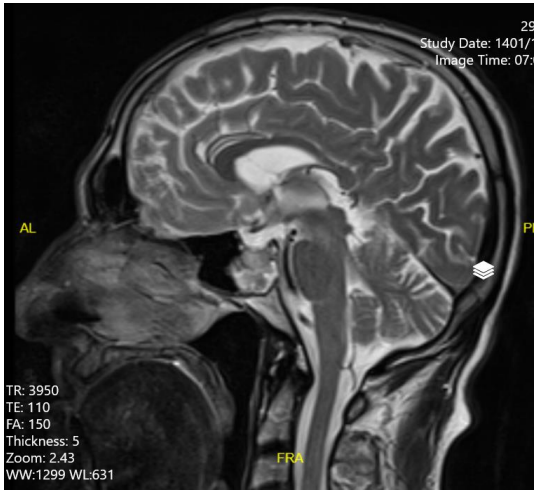
TSH oma

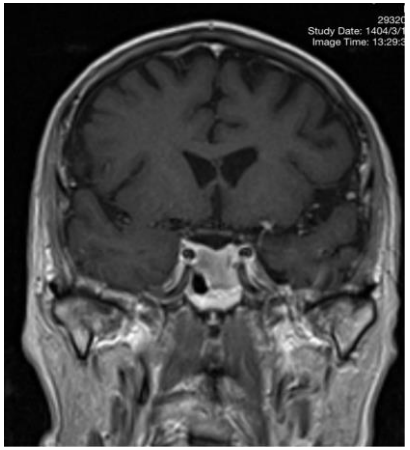
- 74-year-old male with weight loss 40 kg since a year ago and retro orbital headache
- He has been diagnosed as TSHoma
- Had been undertaking Metimazole
- Referred to perform ETSS
- TSH: 2.42
- PMH: CAG +
- DH: Metoral
- Plan: surgery

MRI:
Pituitary macroadenoma 21*17mm with heterogeneous enhancement









TSH: 18.70 (0.3-4.2)
T3: 1.35 (0.58-1.93)
T4: 10.80 (5.1-14.1)
Cortisol: 10.29 (5.1-23)
IGF-1: 68.9 (41-179)
Testosterone: 9.01 (0.86-7.88)
FSH: 3.18 (0.95-11.95)
LH: 3.63 (0.57-12.07)

TSH: 35.0 (0.16-7.59)
T3: 2.12 (0.93-2.4)
T4: 9.29 (4.89-14.1)
Cortisol: 11.4 (3.7-19.4)
IGF-1: 63.0 (32-216)
Testosterone: 3.16 (2.5-10)
FSH:2.17 (1.5-12.4)
LH: 4.58 (1.24-7.8)

T3: 1.46 (0.6-1.8)
T4: 7.63 (5.1-14-1)
TSH: 36.54 (0.17-8.9)

T4: 10.80 (5.1-14.1)
T3: 1.35 (0.58-1.93)
TSH: 18.70 (0.57-12.07)
Prolactin: 5.2 (2.11-17.7)
Testosterone: 9.01 (0.86-7.88)
Cortisol :10.29 (5.1-23)
IGF-1: 68.9 (41-179)

Index	Patient	Normal
T3 RU	39.0%	25-35%
T4RIA	19.0	4.0-13.0ug/dl
FTI	7.4	1.0-4.5
T3RIA	215.0	80-200 ng/dl
Free T3		1.6-3.7 pg/ml
Free T4		0.84-2.1 ng/dl
TSH(IRMA)	1.6	0.3-3.5 mIU/L
Anti-TPO		0-100 IU/ml

THYROID SCAN:
Multinodular goiter with high uptake, and prominent functioning nodules in both lobes and also a cold nodule in upper pole pf the right lobe.

T3: 1.46 (0.6-1.8)

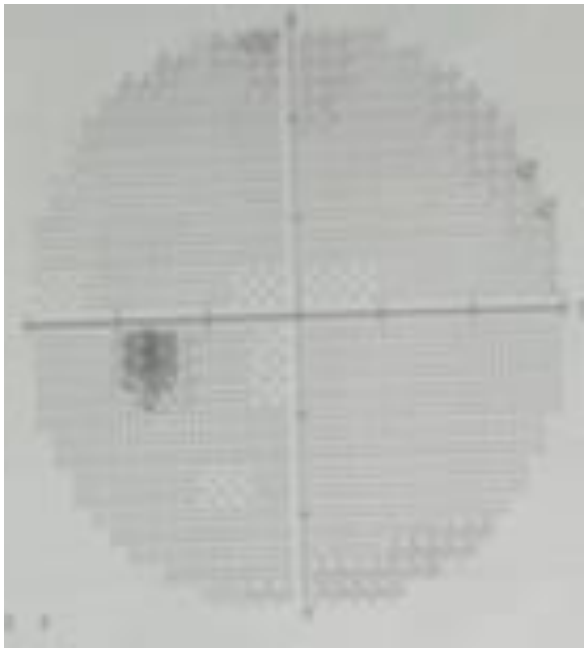
T4: 7.63 (5.1-14.1)

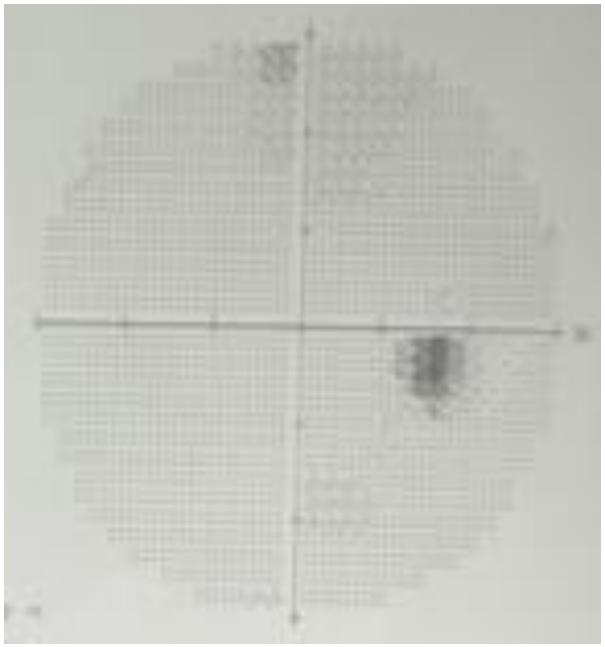
TSH:36.54 (0.17-8.9)

T4: 9.29 (4.89-14.1)

T3: 2.12 (0.93-2.4)

TSH:35.0 (0.16-7.59)



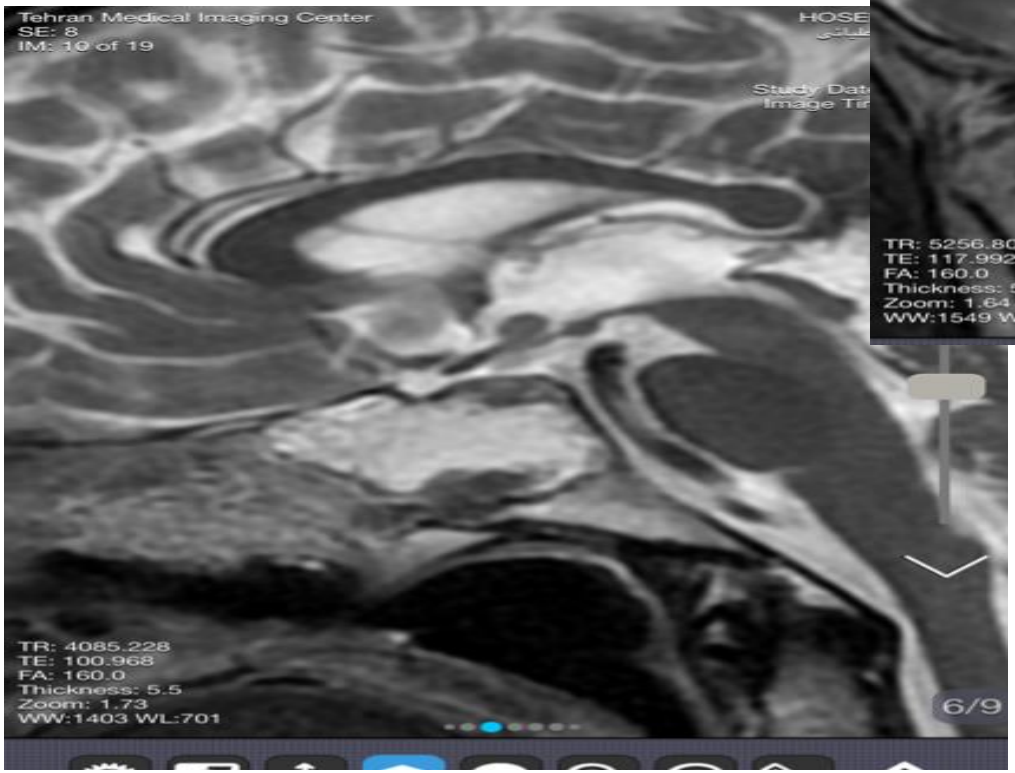


- He brought to the EMS department a week following the operation with asterixia and dysarthria and double vision

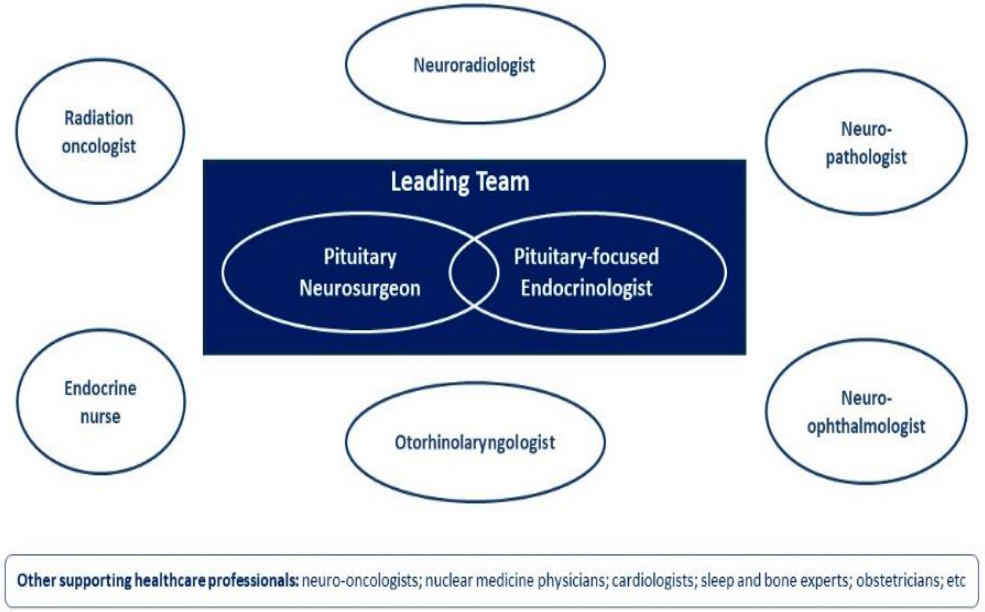
- History taking reveals he has not take Prednisolone pills after discharge

- Brain CT : NL
- LP :NL
- Na(8am). : 140
- Na(8pm). :115
- TSH. :NL
- T4. :NL


Tehran Medical Imaging Center
SE: 7
IM: 7 of 21
HOSEINI^HOSEIN
Age: 073Y
M
Study Date: 1404/7/22
TR: 5256.804
TE: 117.992
FA: 160.0
Thickness: 5.5
Zoom: 1.64
WW:1549 WL:774
5/9


Tehran Medical Imaging Center
SE: 8
IM: 10 of 19
TR: 4085.228
TE: 100.968
FA: 160.0
Thickness: 5.5
Zoom: 1.73
WW:1403 WL:701
6/9

Conclusion



- MDT is the gold standard for diagnosing and treating pituitary tumors.
- Strong evidence: reduced complications, improved outcomes, lower costs.
- Core collaboration: neurosurgeons + endocrinologists supported by imaging, pathology, ophthalmology, ENT, and radiotherapy.
- Despite barriers, establishing PTCOE and MDT systems is essential for high-quality, cost-effective, and safe care.