Role of MRI in evaluation of various Sellar and Para-sellar pathologies.

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Learning objectives

1. To describe the structural anatomy of the sellar and the para-sellar region in brief.
2. To describe suitable Indications, Advantages and limitations of MR imaging as compared to other imaging modalities in evaluation of sellar and para-sellar pathologies.
3. To evaluate patients suspected of having sellar and para-sellar pathologies by using MRI and its modified sequences.
4. To define the differentiating features of various simulating para-sellar masses with help of basic MRI sequences and other tools like gradient images, diffusion images, MRI angiography, spectroscopy, etc.
5. To correlate retrospectively, post-operative histopathological findings with MRI diagnosis to help improve diagnostic accuracy.

In this poster we will review the contribution of MR imaging and its special sequences in the evaluation of various sellar and para-sellar pathologies.

The Aim is to improve the diagnostic accuracy of imaging and to provide the operating surgeon with the most accurate imaging diagnosis, the extensions and characteristics of the lesion along with severity of involvement of the normal anatomical structures.

Background

Normal Anatomy

Sella Turcica:

The sella turcica is component of the sphenoid bone with contribution from the basiocciput. Anteriorly bounded by the tuberculum sella and anterior clinoid processes, posteriorly by the dorsum sella and posterior clinoid processes, floor formed by the roof of the sphenoid sinus, and superior margin consisting of dural fold, the diaphragma sella. This dural extension lines the sella turcica, envelopes the pituitary gland and forms the incomplete superior border.

The sella turcica contains the pituitary gland, composed of the adeno and neurohypophysis. The dimensions of pituitary glands are highly variable, particularly its height. The gland undergoes dramatic changes in size and shape throughout life. A useful guide to the gland's height in relation to age is "Elster's rule" of 6,8,10,12: 6 mm for infants and children, 8 mm in men and postmenopausal women, 10 mm in women of childbearing age and 12 mm for women in late pregnancy or postpartum women. The
pituitary stalk has a normal thickness of 2 mm, and it should not exceed a maximum of 4 mm or the width of the basilar artery.

The neurohypophysis contains secretory granules containing vasopressin and oxytocin, which appear as the Bright spot on T1W MRI sequence. The absence of high signal is often associated with central diabetes insipidus or compressive pituitary gland lesions.

Para-Sellar Region:

Lateral to the sella turcica, are the venous sinusoids of the cavernous sinuses. They extend from the petrous segment of the temporal bone to the orbit and contain the cranial nerves III (oculomotor), IV (trochlear), V 1 (ophthalmic division of the trigeminal nerve, V 2 (maxillary division of the trigeminal nerve) and VI (abducens). The cavernous part of the internal carotid arteries and their meningohypophyseal trunks also travels through the cavernous sinuses. The internal carotid artery and the abducens nerves are the medial most structures and the other mentioned cranial structures travel along the lateral aspects of the cavernous sinus. The mandibular division of the trigeminal nerve (V 3) lies external to the cavernous sinus and exits through the foramen ovale vertically oriented beneath the Meckel's cave. Meckel's cave lies infero-lateral to the cavernous sinus.

The suprasellar cistern lies above the sella turcica with several critical structures traversing through it, including the circle of Willis, optic nerves and optic chiasma, hypothalamus, pituitary infundibulum and the infundibular and suprachiasmatic recesses of the third ventricle.

Role of Imaging modalities:

1. **X ray Skull**: primary baseline modality. Shows the bony margins of the sella and their destruction with sellar widening and condition of the surrounding bony structures. Radiation exposure present. Soft tissue cannot be studied, early changes not properly visible.
2. **CT Scan**: useful for the delination of the osseous margins of the sella and evaluating bony changes related to the pathological processes. CT Angiography can be used to evaluate the cavernous part of the internal carotid arteries. Though the post-contrast examination can be done, the detailed examination of the soft tissue in the sellar and the parasellar region is hindered by the artefacts from the adjacent bones. Involves radiation exposure.
3. **MRI**: provides detailed information about the contents of the sellar and para-sellar regions. Multi-planar views are possible and the different MR sequences help to reach accurate diagnosis in case of diagnostic delimma. Post-gadolinium enhanced MR sequences obtained with fat suppression are helpful to obtain contrast between pathology and surrounding structures. Dynamic contrast enhanced MR angiography helps in differentiation of
the pituitary microadenoma from rest of the normal parenchyma, which is otherwise not possible. There are no radiation hazards, but it is relatively costlier and needs expertise for interpretation.

**MR Sequences:**

- **T1W and T2W** spin echo sequences with small field of view focussing on sellar region in coronal and sagittal plane, slice thickness 3 mm, along with **fat suppressed T1W sequence** for better delineation of the pathology.
- **Post Gadolinium T1W sequence** to study the vascularity in details.
- **Dynamic gadolinium enhanced sequence in coronal plane** for diagnosis of pituitary microadenoma which is otherwise not visualised. The maximum image contrast between the normal pituitary tissue and microadenomas is attained about 30-60 seconds after the bolus injection of the intravenous contrast. Most microadenomas appear as relatively nonenhancing (dark) lesions within an intensely enhancing pituitary gland. The peak enhancement of the pituitary adenomas occurs at 60-200 seconds, usually after the most marked enhancement of the normal pituitary gland, and persists for a longer duration. Delayed scan (30-60 minutes after contrast injection) may demonstrate a reversal of the image contrast obtained at 30-60 seconds on dynamic scanning. This is because the contrast from the normal pituitary gland fades but diffuses into the microadenoma which stands out as a hyperintense focus. Dynamic contrast enhanced sequence is also helpful for evaluation of the macroadenomas, cavernous sinus involvement and differentiating recurrence/residual lesion from postoperative changes.
- **Magnetization Transfer Imaging** for assessment of the pituitary adenoma in patients with hyperprolactinemia. In this sequence the tissue contrast is quantified by magnetisisation transfer ratio (MTR). The MTR of prolactin secreting adenomas is significantly higher compared to normal pituitary gland and hence it has a high signal. On other hand, nonsecreting tumours have lower MTR and appear hypointense on MT sequence. This differentiation is necessary as prolactinomas are treated medically whereas non secreting adenomas are treated surgically. This sequence is also helpful in postoperative patients to access the residual tumor.
- **Diffusion Weighted Imaging** is used for earliest detected of acute pituitary infarction which show diffusion restriction and high Apparent diffusion coefficient (ADC) values, which can then be promptly managed. It can be used to access the consistency of macroadenomas which decides the type of surgery needed.
- **Gradient sequence** is used for presence of calcification or haemorrhage which shows blooming.
- **MR Spectroscopy** is used for assessment of biochemical nature of the lesion. Neoplastic lesions show raised choline levels. In cases of abscess, there are raised lactate levels.
Spectrum of Pathologies involving the Anatomical Structures in the Sellar and the Para-sellar region

Pituitary Gland

Congenital Abnormalities

- Pituitary Gland Hypoplasia
- Empty sella turcica
- Pituitary Duplication

Neoplastic lesions

- Microadenomas (size < 1 cm)
- Macroadenomas (size > 1 cm)
- Craniopharyngiomas
- Pituicytomas and Granular cell tumors
- Rathke’s cleft cyst.

Inflammatory lesions

- Abscesses and Infections

Non-Infectious Inflammatory lesions

- Lymphocytic Hypophysitis.
- Granulomatous Giant cell Hypophysitis.
- Sarcoidosis
- Infundibulo-Neuro Hypophysitis.

Vascular and Ischemic Lesions

- Sheehan's Syndrome
- Pituitary Apoplexy

Metabolic disorders

- Diabetes Insipidus
- Hypermagnesemia
- Haemochromatosis

Pituitary Stalk Lesions

- Rathke’s cleft cyst
- Craniopharyngioma
- Germinoma
- Eosinophilic Granuloma
• Metastasis
• Lymphoma

**Optic Chiasmatic lesions**

• Glioma
• Demyelinating lesions

**Hypothalamic lesions**

• Glioma
• Hamartoma
• Eosinophilic Granuloma
• Germinoma

**Internal Carotid Artery Lesions**

• Aneurysm
• Ectasia

**Cavernous sinus lesions**

• Schwannoma
• Thrombophlebitis
• Carotico-Cavernous fistula

**Meningeal Lesions**

• Meningitis
• Meningioma

**Sphenoid sinus and skull base lesions**

• Sinusitis
• Squamous cell carcinoma
• Chordomas
• Chondrosarcomas
• Metastasis

**Imaging findings OR Procedure details**

**Our Population**
50 patients, between age group of 10 to 55 years, suspected of having sellar or para-sellar pathologies, were subjected for MR evaluation. The study period was of 1 year from April 2011 to March 2012.

**Protocols**

MRI machine : Philips Achieva 1.5 T

Position of patient : Supine

Sedation given if required.

Coil used: Head Coil

Sequences

- Basic T1W and T2W spin echo sequences with small field of view, slice thickness 3 mm, in sagittal and coronal plane along with T1W fat suppressed sequence.
- Post Gadolinium T1W sequence.
- Dynamic contrast enhanced sequence to diagnose pituitary microadenoma.
- Magnetization Transfer sequence
- Diffusion weighted sequence
- Gradient sequence
- MR Spectroscopy.

**Observations:**

The spectrum of cases in our study was as follows--

<table>
<thead>
<tr>
<th>DIAGNOSIS</th>
<th>PATIENTS</th>
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<td>4</td>
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<td><strong>Total</strong></td>
<td>50</td>
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**Pituitary Microadenoma (Fig.1)**

Defined as lesion upto 10 mm in size. They are the most common tumors of sella turcica. Found in adult patients, usually benign in nature. In general 25% patients with pituitary adenomas have nonfunctional tumors whereas 75% patients have clinical signs and symptoms of hormone excess. The most common of these functioning adenomas is prolactinoma and accounts for about 50%. The next most common hormonally active tumors are that produce growth hormone and ACTH. Other rare adenomas secrete TSH, gonadotrophin hormones or few are pleurihormonal adenomas. Non-functional adenomas present due to compression or invasion of structures adjacent to the lesion. Usually microadenomas appear T1W hypointense and T2W hyperintense. On T1W images, the adenomatous tissue appears isointense to adjacent temporal lobe grey matter, whereas normal pituitary gland appears isointense with temporal lobe white matter. Usually, the prolactin and growth hormone secreting adenomas have predilection for lateral position within the gland and ACTH, Thyroid stimulating hormone and luteinizing hormone/follicle stimulating hormone microadenomas tend to be centrally located. T2W hypointensity is seen more commonly in growth hormone secreting adenomas.
Fig. 1: Coronal Dynamic contrast enhanced MR image showing the hypointense pituitary microadenoma as compared to normally enhancing surrounding pituitary parenchyma.

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN

Pituitary Macroadenoma (Fig.2,3)

Defined as adenoma greater than 10 mm in size. Usually appear hypointense on T1W sequence and hyperintense on T2W sequence. 20-30% macroadenomas may show intratumoral haemorrhage. Cystic change can also be noted. They present because of the mass effect on adjacent structures. Superior extension into the suprasellar cistern is well demarcated due to the image contrast between the lesion and the adjacent hypointense CSF on T1W images. The cavernous part of the internal carotid aretries, anterior and the middle cerebral arteries can be well evaluated, eliminating the need for special angiography preoperatively. The degree of T2W hyperintensity of optic nerves is
correlated with the degree of the chiasmatic compression and the degree of the visual impairment. The involvement of the cavernous sinus also has to be studied, which decides the resectibility of the tumor. The medial wall of the cavernous sinus is very thin and usually not directly visualised, but the lateral wall is relatively thick and directly visible. Lateral extension and interposition of the abnormal tissue between the lateral wall of the cavernous sinus and the Internal carotid artery is the most reliable indicator of cavernous sinus invasion.

MR signs studied to look for cavernous sinus invasion include---

1. presence of normal pituitary between the adenoma and the cavernous sinus.
2. status of cavernous sinus venous compartments.
3. cavernous sinus size.
4. cavernous sinus lateral wall bulging
5. displacement of intracavernous internal carotid artery
6. Knosp-Steiner grade of parasellar extension (Fig.4).
7. percentage ICA encasement.

The accurate criteria for **noninvasion** include

- normal pituitary between the adenoma and the cavernous sinus.
- intact medial venous compartment.
- less than 25 % ICA encasement.

The involvement of the clivus is suggested by replacement of the normal hyperintense marrow signal on T1W sequence. Intra-sinus extension of the adenoma can be easily studied.
Fig. 2: Coronal T1W and Fat suppressed T2W MR images showing the pituitary macroadenoma.

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN

Fig. 3: Axial T1W and Angiography image showing the pituitary macroadenoma.

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN
Fig. 4: Knosp-Steiner classification of Cavernous sinus involvement.

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN

Craniopharyngioma

Location: sella turcica as well as suprasellar cistern of third ventricle.

Bimodal age of distribution: childhood/adolescence (Adamantinomatous)

elderly i.e. sixth decade (Papillary)

Adamantinomatous Type(Fig.5): comes as suprasellar mass in first two decades of life. Present due to compressive symptoms. They have solid and cystic components. Extensive peri-lesional inflammation and fibrosis are found. MR findings: Heterogenous
appearance, Cystic component hyperintense on T1W and T2W sequences. ADC values are higher. The solid component shows moderate enhancement and calcifications.

Papillary Type(Fig.6) : occur in adult patient. They are solid, without calcifications and often found within third ventricle.

Fig. 5: Sagital T1W, Fluid suppressed T2W and post contrast T1W images showing craniopharyngioma in child

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN

Fig. 6: Coronal T1W, T2W and Post contrast T1W images showing craniopharyngioma in adult.

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN

Rathke’s Cleft Cyst (Fig.7,8):

Location : predominantly intrasellar localised to the center of the gland, may be in the suprasellar cistern.
Origin: Remnants of squamous epithelium from Rathke's Cleft.

They become symptomatic due to pressure symptoms or due to intra-cystic haemorrhage.

Imaging findings: Mucoid contents-hyperintense on T1W and T2W sequence

Serous contents-Hyperintense on T2W sequence

(similar to CSF)

Sometimes solid intracystic nodule may be seen. The cyst walls usually do not enhance and there are no calcifications (to differentiate from craniopharyngioma).

Fig. 7: Sagittal T1W and coronal fat suppressed T1W images showing the Rathke's cleft cyst

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN
Fig. 8: Sagital fluid suppressed T2W and post gadolinium T1W image showing Rathke's cleft cyst

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN

Pituitary Gland Hypoplasia:

Unique finding seen in patients with short stature and growth hormone deficiency.

- Small sella turcica
- Small anterior pituitary gland
- Absence of usual high signal intensity from the posterior pituitary gland.
- Absence or hypoplasia of the distal pituitary stalk
- Anomalous high signal area in the proximal pituitary stalk.
- Optic nerve hypoplasia, Chiari 1 malformation, medial deviation of carotid arteries.
**Fig. 9**: T1W sagital image showing the ectopic posterior pituitary gland

**References**: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN

**Meningioma (Fig.10)**:

Location - Tuberculum sella, clinoid process, medial sphenoid wing, cavernous sinus.

Present due to compressive symptoms on adjacent vital anatomical structures.
MR imaging: T1W sequence - isointense to grey matter

T2W sequence - 50% isointense, 40% hyperintense

Homogenous intense contrast enhancement.

Other diagnostic clues --

- presence of CSF cleft around the lesion
- Separate visualisation of the pituitary gland from the lesion
- mass effect
- white matter buckling and edema
- thickening of dura - dural tail sign
- hyperostosis

Pattern of vascular encasement in meningioma: constriction of the lumen of the encased vessel (rare with pituitary adenoma)

Phosphorus MR spectroscopy - meningiomas have lower phosphate monoester peak than pituitary adenomas.

Fig. 10: Axial T1W, T2W and Post Gadolinium images showing the cavernous meningioma on right side.

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN

Germinoma and Teratoma:

Location: suprasellar cistern or pituitary fossa, pineal gland, posterior third ventricle.

Age group: Germinomas - children and young adults

Earliest symptom: Diabetes insipidus, visual field defects
They are very rapidly infiltrative.

**MR Imaging:** Loss of normal bright signal of posterior pituitary

Homogenous and only rarely cystic

**T1W sequence:** mildly hypointense

**T2W sequence:** isointense to grey matter

Marked contrast enhancement present.

**MR Spectroscopy:** prominent lipid peaks

**Teratomas:** Heterogenous signal, with fat or calcifications

**Epidermoid and Dermoids:**

Benign, slow growing inclusion lesions.

Slow expansile growth is characteristic, they tend to insinuate within and around adjacent neural structures, confirming to the space within which they are situated. They become symptomatic due to compression of adjacent neuro-vascular structures.

**Epidermoids:**

- **Age group:** Adulthood (2-4 decade)
- **Location:** Basal cisterns and are lateral in position
- **MR Imaging:** slightly Hyperintense to CSF on T1W and T2W sequences.

Proton density and Fluid attenuation inversion recovery sequences - Epidermoids are hyperintense to brain and CSF whereas arachnoid cysts remain isointense to CSF.

Diffusion weighted sequence - epidermoids show restricted diffusion, whereas arachnoid cysts show facilitated diffusion.

Usually do not show any contrast enhancement, calcifications rare.

**Dermoids:**

- **Age group:** Paediatric age
- **MR Imaging:** Fatty component - Hyperintense on T1W sequence.

and areas of dense calcifications.

**Chiasmatic and Hypothalamic Gliomas** (Fig.11):
Age group - childhood, (first decade)

Association with neurofibromatosis.

MR imaging: isointense on T1W sequence and hyperintense on T2W sequence. Calcification and haemorrhage are uncommon, contrast enhancement is variable. They invade the brain along the path of the optic radiations and hence T2W imaging of the entire brain is necessary.

Fig. 11: Sagittal post gadolinium T1W and axial T2W image showing the chiasmatic glioma

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN

Chordomas (Fig.12):

Derived from remnants of the primitive notochord.

Age group: commonly third decade.

Location: in relation to clivus. They are locally invasive and destructive.

MR Imaging: T1W sequence iso-hypointense

T2W sequence extremely hyperintense

Septations of fibrous connective tissue are seen
Fig. 12: Sagital pre and post gadolinium images showing the chordoma involving the clivus.

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN

Schwannoma (Fig.13):

Location: parasellar egion

Origin: Sensory nerves, commonly fifth cranial nerve.

MR Imaging: T1W sequence isointense to brain

T2W sequence Hyperintense enhances intensely
Fig. 13: Axial T1W and T2W images showing the left sided trigeminal schwannoma

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN

Metastasis:

Metastasis in the pituitary gland is extremely rare, seen in disseminated malignancies of breast and bronchogenic carcinomas.

They present with pituitary gland enlargement, but without enlargement of the pituitary fossa.

Tuber Cinereum Hamartoma:

They are sessile or pedunculated masses attached to the posterior hypothalamus between the pituitary stalk and mamillary bodies. They have potential for slow growth.

MR Imaging: T1W sequence - isointense to grey matter

T2W sequence - variable signal intensity.

No contrast enhancement

Short TE MR Spectroscopy: raised myo-inositol and low N acetylaspartate compared to thalamus and amygdala.

Pituitary Pathologies:
Inflammatory lesions - Infections, Pituitary abscess, parasellar infections

Non Infectious Inflammatory lesions -

- Lymphocytic Hypophysitis
- Infundibuloneurohypophysitis
- Granulomatous Giant Cell Hypophysitis
- Sarcoidosis
- Tolosa-Hunt syndrome

Fig. 14: Sagittal T1W and T2W images showing the anterior pituitary hyperplasia.

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN
Fig. 15: Sagittal T1W and Fluid suppressed T2W images showing the post-partum pituitary enlargement.

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN

Empty Sella Syndrome (Fig.16):

Refers to finding of severely flattened but still present pituitary gland, and the superior portion of sella filled with CSF. Primary defect is the deficiency of the diaphragma sella which allows the suprasellar cistern to herniate inside the sella, exposing it to CSF pulsations and resulting in its expansion.
**Fig. 16:** Sagital T1W and T2W images showing the empty sella syndrome

**References:** RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN

**Aneurysms:**

Origin: cavernous part of the internal carotid artery or its supra-clinoid segment, occasionally anterior and posterior communicating arteries, basilar artery tip aneurysm.

MR Imaging: well defined with signal void on spin echo sequences due to rapidly flowing blood.

Clot inside the aneurysm appears multilamellated high signal on T1W spin echo sequence.

Hemosiderin in adjacent brain tissue appears hypointense on T2W sequence.

Gradient Echo sequence: demonstrates in flow enhancement inside the lumen of the aneurysm.

MR Angiography can be done for accurate characterisation.

**Pituitary Apoplexy** (Fig. 17):

Defined as acute degeneration in the pituitary adenoma., amy be accompanied by pituitary necrosis and haemorrhage.

MR Imaging: enlarged sella turcica containing pituitary macroadenoma, with heterogeneous signal intensity due to intratumoral haemorrhage. Diffusion scans may show restricted diffusion in cases of infarction.

**Fig. 17:** Sagital T1W and fluid suppressed T2W images and axial Gradient echo based image showing the pituitary apoplexy.

**References:** RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN
Sheehan's syndrome:

It is defined as the postpartum pituitary ischemic necrosis after complicated deliveries associated with haemorrhage and shock.

MR Imaging: similar to pituitary apoplexy, except for normal sellar size and absence of adenoma.

Carotico-Cavernous Fistula:

most are due to trauma, less frequently spontaneous.

MR Imaging: Angiography is diagnostic, which demonstrates the fistula.

The ipsilateral cavernous sinus, orbital veins, and petrosal sinus fill prematurely because of artero-venous shunting and are dilated.

Sphenoid Sinus pathologies (Fig.18):

Fig. 18: Axial T1W and T2W images showing the sphenoid sinus mucocele.

References: RADIOLOGY, GOVT. MEDICAL COLLEGE, NAGPUR, GOVT. MEDICAL COLLEGE, NAGPUR - Nagpur/IN

Conclusion

Advantages of MR Imaging:

1. Excellent tissue contrast
2. Large field of view
3. Better view of relationship between lesion and adjacent structures
4. Offers operator independent imaging in number of different planes for accurate characterisation of the lesion.
5. Basic and advanced MR sequences help to accurately diagnose the lesion based on its imaging characteristics.
6. Degree of involvement of cavernous sinuses by the neoplasms is judged accurately to decide for operability.
7. Early Bony involvement detected in infectious and neoplastic pathologies by noting the bone marrow signal intensity changes.
8. No radiation hazards.

Limitations of MR Imaging:

- Relatively costlier and not widely available
- Contraindicated in patients with metallic foreign bodies like aneurysmal clips, pacemakers, implants, etc
- Not possible in claustrophobic patients.
- Needs high expertise for accurate interpretation.

As seen earlier, the sellar and the para-sellar region hold complex neurovascular structures. MRI is the investigation of choice for the evaluation of the hypothalamic-pituitary lesions. MRI helps in the diagnostic differentiation of these lesions and provides useful information about the relationship of the pituitary gland with the adjacent anatomical structures to plan successful surgery or medical treatment.

The most recent advancement in the field of pituitary imaging is the use of intraoperative MRI during endoscopic pituitary surgery. It provides better visualisation of the intra and parasellar anatomy facilitating complete resection of the tumor. It can beautifully demonstrate the nerve compression and the residual tumor.

References


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