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Original Research Paper Radiology

Magnetic Resonance Evaluation of Non Vascular and Non Cystic Sellar, Suprasellar and Parasellar lesions

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ABSTRACT The pituitary gland and parasellar region is a complex crossroad of endocrine, neural, vascular and skeletal structures. Many clinical syndromes are a result of lesions involving the sella turcica and neighboring structures. MRI (Magnetic Resonance Imaging) has replaced CT as the primary imaging study of the sella and parasellar lesions. When used with thin sections, appropriate imaging parameters and contrast enhanced imaging MRI can demonstrate most pituitary adenomas especially small microadenoma and parasellar abnormalities noninvasively without ionizing radiation, exceeding the sensitivity of CT, because of its multiplanar capability, exquisite anatomic detail and characteristic tissue signal intensity.

KEYWORDS :

Aims and Objectives:

1) To study the imaging findings of various pathologies involving the sellar, suprasellar and parasellar region.
2) To formulate a criteria useful in distinguishing intra sellar lesions with or without supra sellar or para sellar extension, from suprasellar and parasellar tumors.
3) To study the diagnostic efficacy of MRI in sellar, suprasellar and parasellar lesions.

Materials and Methods: The study was conducted in our department from June 2014 to July 2016. Total number of cases included in our study were thirty.

Selection Criteria: Thiry patients with a clinical suspicion of disorder involving the sellar, suprasellar or parasellar region were evaluated by Magnetic Resonance Imaging of brain during the period of two years. All these patients were followed up to reach therapeutic or histological diagnosis. The symptomatic response of the patients to medical or surgical therapy was noted which helped in the retrospective confirmation of diagnosis. Imaging characteristics of various radiological modalities like X-rays, CT and MRI were recorded in all patients. Management and final diagnosis were also noted. The results were analyzed, studied and compared with similar studies of the past.

Exclusion criteria: All the cystic and vascular lesions found in sellar, suprasellar and parasellar location were excluded from the study.

The following technique was adapted for the examination:

The MRI scans was performed using 1.5T GE MRI scanner using standard head coil for acquisition of images. Axial, coronal and sagittal scans were obtained using multislice multiecho sequences with slice thickness of 2mm. The data acquisition was done using a matrix of 256 x 256. Apart from T1W and T2W images, special sequence like FLAIR and Diffusion Weighted were obtained in required cases with TR/TE of 6000 / 100 msec and 4295 / 112 respectively. Contrast (Gadolinium-DTPA) at dose of 0.1mmol/kg body weight was given wherever necessary. None of the patients had any adverse reactions following Gadolinium injections. Sedation was induced in restless patients.

Observation and Analysis: This study was carried out on 30 patients, comprising of 12 males and 18 females, between the age group of 10 years and 65 years. The peak incidence was in the 31-40 years age group; with 15 subjects in this group (50%). The average age of the subjects was 41 years. The overall gender ratio of female to male was 3 : 2. Headache (95%) and vision loss (65%) were the most common complaints. Vision loss correlated with involvement of optic chiasma by the mass. Menstrual complaints and galactorrhea were seen in prolactinoma (100%) and difficulty in eye movements and facial numbness or neuralgia with the involvement of III, IV, V1 and VI cranial nerves in the cavernous sinus (100%). The distribution of final diagnosis was as given in Table 1.

Table 1: Distribution of Final Diagnosis.

DIAGNOSIS	NUMBER	PERCENTAGE
Pituitary Microadenoma	8	26.67%
Pituitary Macroadenoma	7	23.33%
Meningioma	5	16.67%
Epidermoid Tumor	4	13.33%
Trigeminal Schwannoma	3	10%
Chondroid Chordoma	3	10%

Location of the lesion was of important consideration. Pituitary gland tumors had typical intrasellar origin. Suprasellar location was seen in meningiomas and epidermoid tumors and parasellar location in trigeminal schwannoma. Sellar invasion with involvement of clivus was classical for chordoma. Non visibility of pituitary gland separate from the lesion correlated frequently with an macroadenoma (100%) than with suprasellar or parasellar masses extending into sella. Parasellar mass involving the gasserian ganglion of trigeminal nerve in region of Meckel's cave with a frequent cerebello-pontine cisternal component giving a dumbbell configuration was diagnostic of trigeminal schwannoma.

Size of the lesion was the only criteria for differentiating pituitary microadenoma (< 10 mm) from macroadenoma (> 10 mm). Hormone secreting adenomas frequently presented early as microadenomas (66.7%), whereas non-functioning adenomas presented as macroadenomas (80%). Hormonally active adenomas had a certain topographic bias within the pituitary gland that paralleled the distribution of the normal secretory cells. All prolactinomas had a predilection to lateral sides within the gland, whereas an ACTH microadenoma was located more centrally in the gland (100%).

Majority of the tumors were hypointense on T1 weighted images (95%) and hyperintense on T2 weighted images (100%) and showed

less and late enhancement relative to the normal pituitary gland. Signal intensity similar to CSF with loss of high signal on FLAIR was seen in epidermoid tumors. However these tumors occasionally varied in their signal intensity depending on the lipid contents. Epidermoid tumors classically showed restricted diffusion on diffusion weighted images with an increased signal on ADC sequences.

Microadenomas were seen as non enhancing areas in the background of enhancing normal pituitary gland as these tumors accumulated contrast more slowly than in the normal pituitary gland. Macroadenomas showed moderate enhancement, whereas meningiomas were markedly and homogenously enhancing. Contrast enhancement was also helpful in differentiating solid from cystic/necrotic component within the lesion, with the solid areas of tumor showing enhancement, whereas the cystic/necrotic areas were nonenhancing.

Pituitary stalk deviation to the side opposite to the lesion is an important ancillary finding for diagnosis of microadenomas especially in the presence of a focal lesion within the pituitary gland. This, however, correlated with the size of the microadenoma with lesions > 6 mm (100%) showing this finding, whereas 1 case with size < 6 mm showing no deviation of midline stalk.

Normal pituitary gland usually had a flat or concave superior surface. Diaphragma sellae position or absence can be used to differentiate intrasellar masses with suprasellar components from suprasellar masses. Convexity of the superior surface of the gland or diaphragma sellae bulge was associated with underlying microadenoma. Non visibility of diaphragma sellae was frequently associated with macroadenomas having suprasellar extension compared to masses of suprasellar origin. Sellar floor erosion with extension into the sphenoid sinus was noted in 80% cases of macroadenoma patients with chordoma suggesting the high propensity macroadenomas of infrasellar extension and those of chordomas of sellar invasion. However, this finding was less commonly seen with meningioma or trigeminal schwannoma.

Cavernous sinus invasion and ICA encasement are the prime criteria determining the resectability and outcome of a tumor in sellar, suprasellar or parasellar location. Cavernous sinus invasion is to be considered if the percentage of encasement of ICA by the tumor is > 67% of its total circumference or if the carotid sulcus venous compartment is not depicted or if the line joining the lateral wall of the intracavernous and supracavernous ICAs is breached by the tumor. Also, enlargement of the sinus, involvement of lateral venous compartment, crossing of median intercavernous ICA line are other ancillary findings.Depiction of medial wall of cavernous sinus or medial venous compartment or non breach of the medial intercarotid line are considered as a definite sign of noninvasion.

Considering above criteria, cavernous sinus invasion and ICA encasement was noticed in 2 patients of macroadenomas (1 patient had bilateral involvement) and 1 each of meningioma (bilateral) and trigeminal schwannoma. Involvement of the III, IV, V1 and VI cranial nerves was inferred from clinical symptomatology of difficulty in eye movements and facial neuralgia or numbness and radiological evidence of cavernous sinus invasion. The presence of a parasellar mass in region of Meckel's cave with the above symptomatology suggested the diagnosis of a trigeminal schwannoma.

The presence of visual loss correlated well with optic chiasma involvement (95%). This was noticed in most of macroadenomas and almost all of meningiomas and epidermoid tumors. This was because of the frequent suprasellar extension by macroadenomas and the preferential suprasellar location of meningioma and epidermoid tumors.

Discussion : The Magnetic Resonance Imaging (MRI) features of 30 patients with solid masses in Sellar, Parasellar and Suprasellar region were analyzed. Vascular and Cystic lesions were excluded. Masses of Pituitary origin constituted the bulk of the lesions.

Pituitary Microadenomas:

Pituitary Microadenomas are defined as pituitary lesion less than 10 mm in size[1]. 8 cases out of 15 met with this criterion and were labeled as microadenomas. GH-secreting tumors are significantly larger than that of the ACTH secreting microadenomas and Prolactinomas. Non-functioning microadenomas are of larger size than functioning adenomas as they present late.

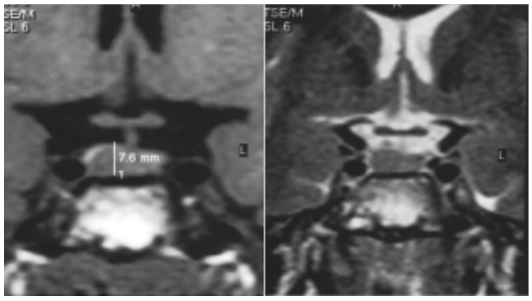

Figure 1: T1 and T2 hypointense lesion in the right lateral aspect of pituitary gland, causing convexity of the diaphragm sellae and minimal deviation of the infundibulum towards left side.

In our study, the average size of the lesion was larger than that described by Wu and Thuomas which possibly could be because of the late presentation. However, the Prolactinomas were definitely larger than the ACTH secreting microadenomas as described by them. Bony sella was normal in all cases.

According to Osborn, the sex ratio for prolactinoma is 4-5 : 1 with female predominance.[1] In the present series the gender ratio for prolactinoma (Figure 2) was 2 : 1 with female predominance. Overall gender incidence was 5 : 1 (female : male). As 75% of the microadenomas are hormone secreting and only 25% are non-functioning, symptomatology depends primarily on the hormone secreted by the tumor. 5 patients complained of headache, two female patients presented with menstrual irregularities and galactorrhea suggesting a prolactin secreting adenoma (Prolactinoma). 1 male complained only of headache, but showed moderately elevated serum prolactin levels while one patient also had excessive increase in weight gain suggesting increased ACTH producing adenoma (Cushing's disease).Rest of the microadenomas (50%) were non-functioning endocrinologically.

According to Wu and Thomas and Rao and Robles, hormonally active adenomas have a certain topographic bias within the gland that parallels the distribution of the normal secretory cells. Prolactinomas and GH microadenomas should have a predilection to lateral sides within the gland, whereas ACTH microadenomas tend to be located more centrally in the gland. [2,3]

In our study, 3 patients with clinical and laboratory evidence of increased prolactin levels, the microadenoma was situated in the lateral half of pituitary gland, one on the right side and other two on the left. Another patient with clinical and laboratory evidence of increased ACTH production was situated in the central half of the gland. This finding was of significance in our present study.

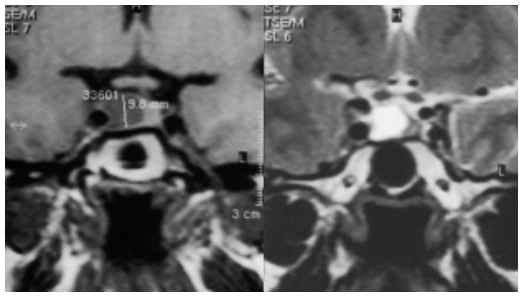

Figure 2 : A case of pituitary microadenoma (prolactinoma) appearing hypointense on T1 W and hyperintense on T2 weighted images with convex superior margins.

According to Peck et al, most microadenomas on short TR / TE images (T1-weighted) were of low signal intensity relative to the normal gland. On long TR / TE images (T2-weighted), the pattern was more variable with an equal distribution of hypo, iso and hyperintense adenomas being identified relative to the normal pituitary gland.[4] T2 weighted images rarely added any practical information to the T1 weighted images, however, took considerable time to acquire. Hence, he recommended that T1 weighted images alone be used for evaluation for the diagnosis of pituitary adenomas, reserving T2 weighted images for postoperative patients or in those infrequent cases in which a suspected tumor cannot be detected on T1 weighted images alone. In present study all microadenomas were hypointense on T1 weighted images (100%). 5 cases were hyperintense on T2 weighted images and 1 case (Prolactinoma) was having iso and hyperintense areas displaying the semisolid nature of the lesion. [5]

Table 2 : Appearance of microadenomas on T1W images in our study compared to other studies.

Focal lesion	Wu and Thuomas[2]	Davis et al [6,7]	PRESENT SERIES
	Unenhanced T1	Unenhanced T1	Unenhanced T1
Hypointense	18 / 20 (90%)	1 / 3 (33.3%)	8 / 8 (100%)
Isointense	2 / 20 (10%)	2 / 3 (66.6%)	0 / 8 (0%)

Normal pituitary gland has a flat or concave superior surface. Convexity of the superior surface of the gland has been associated with underlying microadenomas. This finding however has its own drawbacks and can be seen in some normal patients also. Wolpert et al [8,9] studied the size, shape and appearance of the normal female Pituitary Gland. He suggested that convexity of the pituitary gland was a normal finding in only 18% of cases as compared to either flat or concave surface (total 82%).

Lateral deviation of Pituitary stalk on coronal images has also been shown to be of value in localizing the side of adenoma as well as confirm focal glandular abnormalities.Ahmadi et al. [10] found that 46% of patients [11 / 19 females (57%) and 12 / 31 males (39%) among randomly selected 50 patients] without gross clinical and associated radiologic evidence of pituitary disease had a more or less pronounced deviation of the pituitary stalk on MRI. Hence, its presence alone should not be used to conclude the presence of microadenoma at MRI. Also, Wu and Thuomas [ ]stated that infundibular tilt depended on the size of the microadenoma. In the present study, all lesions with $\geq$ 6 mm size had infundibular tilt on the side opposite to the lesion and 1 patient with lesion < 6 mm had midline stalk. In case 6 with 2 microadenomas measuring 8 mm (left side) and 4 mm (right side) had infundibular tilt towards right side because of the larger lesion on the left side. Thus, presence of stalk deviation definitely increases confidence of the diagnosis of microadenoma in presence of a focal lesion.

Sellar Floor erosion: Peck et al.[4] suggested that changes in the sellar floor are of little value in predicting the site of an adenoma. Wu and Thuomas [2] and Davis et al.[6,7] stated that MRI had poor predictability of sellar floor erosion (35% and 0% respectively), most likely due to its inability to distinguish the erosion of the thin dural lamina from the air containing sphenoid sinus. In the present study sellar floor erosion was absent in all cases of microadenoma.

Cavernous sinus, ICA invasion, Cranial Nerve and Optic chiasma involvement. These findings are rare with microadenomas and were not seen in this study. This was in consistent with the findings of Davis et al. [7] where none of the microadenomas showed these.

Pituitary Macroadenoma **:** There were 7 lesions which met with the size criteria of > 10 mm for macroadenoma of which the largest was 60 mm (GH secreting) and smallest 16 mm. the average size of non-functioning macroadenomas was 26 mm (maximum dimension in any plane taken as size of lesion). This result did not match with Hagiwara et al.[11] who quoted that non-functioning adenomas as clinically silent and often present late with large size as compared to endocrinologically active adenomas. The larger size in our case could be explained by the late presentation of the patient to our hospital.

The peak incidence was in 41-50 years age group (60%) with average age group being more than that for microadenomas. This was in conformity with several authors [1,3] who stated that macroadenomas (Figure 3) being non-functioning presented later than microadenomas. Headache was the most common complaint seen in all 7 (100%) cases, followed by Vision loss in 4 (50%) of patients due to compression of the optic chiasma from suprasellar extension of the lesion. One patient had associated motor and sensory deficit in distribution of the III, IV, V_1, and VI Cranial Nerves, seen with extension of the lesion into the cavernous sinus. Only one patient had complained of big hands and feet and increased stature suggesting increased GH secretion. As majority of macroadenomas are non-functioning, they present with symptoms related to extension and not hormonal[1,3]Cappabianca et al[12] suggested that pituitary gland cannot be separately identified from the tumor in pituitary macroadenoma. This finding was in conformity in all 7 cases (100%) in the present study. All the lesions also had an extension into either suprasellar, parasellar or infrasellar region as depicted in table 3

Table 3: Extension of Macroadenomas in suprasellar, parasellar and infrasellar compartment.

Extension	Suprasellar	Parasellar		Infrasellar
		Right	Left	
No of cases	7	4	3	3

Suprasellar extension is the most common extension (100%) and was noticed in all macroadenomas. Most of the lesions were hypointense on T1W images and hyperintense on T2W images. According to Lundin and Bergstrom[15] the high signal intensity on T2 weighted images indicated an increase in the water content which together with the absence of enhancement points to the probability that the areas represents cysts or necrosis. T2 weighted images may be helpful in showing the probable cystic or necrotic nature of purely intrasellar tumors and demarcating cystic or necrotic areas from adjacent parts of the brain. Post contrast images are better in demonstrating thin, solid rims of tissue, separating these areas from CSF. Pituitary macroadenomas were also associated with marked sellar enlargement. All cases in this series showed sellar enlargement with erosion of the anterior or the posterior clinoid process and dorsum sella. Daniels et al[24]]stated that diaphragma sellae is not identified centrally in any case of pituitary macroadenoma. In Cappabianca et al. series, diaphragma sellae was not visible in any of the macroadenomas. Davis et al. noted similar findings in 7 / 8 (87.5%) of suspected macroadenomas and 5 / 6 cases (83.3%) of proven (surgically or medically) macroadenoma. In a different series by Davis et al.non identification of diaphragm sellae was noticed in all 3 cases (100%) of macroadenoma. In the present series in which the diaphragma sellae was not identified in all 7 cases.

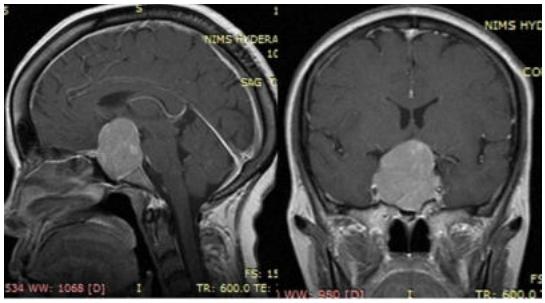

Figure 3 : Contrast enhanced T1W sagittal and coronal images of brain showing a large sellar lesion with suprasellar extension, compressing/displacing the optic chiasma and showing extension into the cavernous sinus in parasellar space.

Pituitary stalk was not separately identified from the tumor in any of the macroadenomas (100%). Cappabianca et al.reported non-visualization of the pituitary stalk in 15.2% of cases. He reported that visibility of the pituitary stalk was a less relevant diagnostic feature in differentiating macroadenoma from diaphragma meningioma.In the present series, sellar floor erosion was noticed in 6 / 7 cases (85%). Davis et al.identified this feature in 4 / 8 (50%) suspected and 4 / 6 cases (66.66%) of proved macroadenomas and in 3 / 3 cases (100%) macroadenomas a different series suggesting the high propensity of macroadenomas for infrasellar extension.

Cavernous Sinus, ICA and Cranial Nerve involvement: Different criteria have been used by various authors to determine cavernous sinus and ICA invasion. Cottier et al.[14]stated that cavernous sinus invasion was totally certain (PPV 100%), if the percentage of encasement of ICA by the tumor was $\geq$ 67%. It was highly probable if the carotid sulcus venous compartment was not depicted (PPV 95%) or the line joining the lateral wall of the intracavernous and supracavernous ICAs was passed by the tumor (PPV 85%). Cavernous sinus is definitely not invaded (NPV 100%), if the percentage of encasement of the intracavernous ICA $\leq$ 25% or the line joining the medial wall of the intracavernous and supracavernous ICAs was not passed by the tumor.

According to Lundin and Bergstrom, cavernous sinus invasion was likely when the area corresponding to the cavernous sinus was expanded and showed enhancement equal to that of the intrasellar part of the tumor. Davis et al. suspected cavernous sinus invasion on the basis of displacement of the lateral margin of the cavernous sinus, displacement of the cavernous ICA, or a change in intensity pattern of the cavernous sinus tissue to one similar to the adjacent sellar mass. He noticed cavernous sinus invasion in 4 out of 8 (50%) suspected and 3 out of 6 (50%) proved macroadenomas and 1 out of 3 (33.3%) cases of macroadenoma in 2 different series. In the present series, total encasement of ICA was seen in 3 (40%) patients of macroadenoma of which 1 was bilateral. Both patients showed obliteration of carotid sulcus venous compartment and crossing of lateral intercarotid line by the tumor on involved side. Depiction of medial wall of cavernous sinus or medial venous compartment or if medial intercarotid line was not breached by the tumor was considered a definite sign of noninvasion. Enlargement of the sinus, involvement of lateral venous compartment, crossing of median intercavernous ICA line were other ancillary findings.

Optic Chiasma Compression was identified convincingly in patients (80%) particularly well on T1 weighted images than on T2 weighted images. All these patients presented with visual impairment. The high incidence of Optic Chiasma Compression was related to frequent suprasellar extension noted with macroadenomas.

Meningioma: Meningiomas of the sellar region are less common than in the parasagittal and convexity locations. However, sellar meningiomas frequently are symptomatic because of the involvement of the olfactory groove, optic nerves, chiasm, carotid arteries and cranial nerves, as well as extension along the tuberculum sella, sphenoid wing, diaphragma sella and cavernous sinus. There were 5 patients of meningioma with 2 in 31-40 years and 3 in 41-50 years age group. The male to female ratio was 2:1.Headache and vision loss were the most common presenting complaints seen in all 5 patients. Vision loss was due to involvement of the optic chiasma by the tumor. One patient also had motor and sensory complaints related to II, III, V_1 and VI cranial nerves because of extension of the lesion into the cavernous sinus. This patient also had vomiting and convulsion. Cappabianca et al.stated that epicenter of the lesion helps in differentiating a diaphragma sella meningioma from pituitary macroadenoma. The lesion is centered in sella in macroadenoma while its epicenter is suprasellar in cases of meningioma. This findings was consistently noted in the present study where all cases of meningioma were centered suprasellar. All the patients (100%) had extension of the tumor to the parasellar region of which 3 were on left side and 2 bilateral. One patient also had intrasellar extension.

According to Osborn, Rao and Robles and Sartor et al. [1,3,16] meningiomas are isointense with brain on T1 weighted images and isointense to hyperintense on T2 weighted images. They showed homogenous enhancement on contrast administration. Cappabianca et al.[12] suggested that pattern of enhancement can differentiate macroadenomas from diaphragma sella meningioma with macroadenomas showing moderate heterogenous enhancement and meningiomas show marked homogenous enhancement and this finding was consistently noticed in all our study. It was also found that pituitary gland was always well visualized in all patients of meningioma but never in macroadenoma. The pituitary gland was displaced downward by the meningioma against the floor of the sella and was visible due to its signal, which was different from that of the tumor. In our study, this finding was noted in 80% of meningiomas. In one patient, the meningioma extended into the sella and infrasellar location into the sphenoid sinus and was invading the gland making it non visible. Only one patient (20%) of invasive meningioma showed bony sellar enlargement, however, displacement of pituitary stalk was a less reliable finding for differentiation. Daniels et al.showed that diaphragma sellae is displaced downwards in tuberculum sella meningioma and upwards in macroadenoma. In the present series, diaphragma sellae was displaced downwards in 4 cases and was not identified in 1 in whom the tumor extended into the sella involving the pituitary gland.

Hirsch et al. [17] categorized meningiomas on the basis of their relationship with cavernous ICA as follows:

Category 1	Tumors that do not completely encircle the cavernous ICA – tumor dissected without injury, sacrifice or grafting of the artery in 91%.
Category 2	Lesions completely encircle the artery but do not narrow the lumen – tumor dissected from ICA without arterial injury in 61%.
Category 3	Lesions which completely encircle the artery and narrow the lumen – tumor difficult to dissect free from the artery.

In our study, only 1 patient (33.3%) showed total encasement of intracavernous ICA which was bilateral with narrowing of the lumen on right side. This patient underwent partial resection with radiotherapy, although carotid encasement is not a common finding in Meningioma.

Epidermoid Tumours: There were 4 patients diagnosed with Epidermoid (Figure 4). No age or gender predilection was noted. Apart from headache and visual symptoms, one patient also had motor complaints because of engulfment of right 3rd cranial nerve in prepontine cistern. All the lesions had suprasellar location.

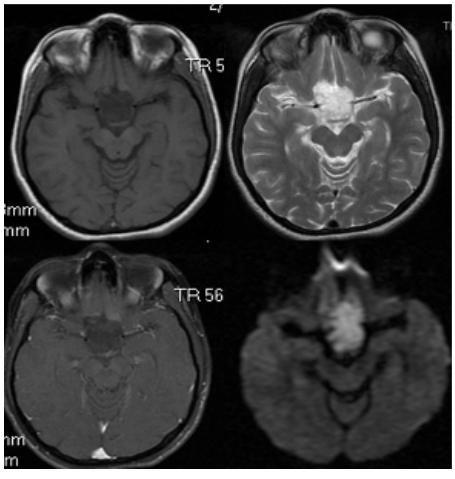

Figure 4: A known case of suprasellar epidermoid lesion appearing hypointense on axial T1W and hyperintense onT2W images, not enhancing on the post contrast images. DWI shows restricted diffusion.

Aprile et al.[18]had suggested that the MR behavior of the content of epidermoid cysts depends on theamount of lipids present i.e., on T1-weighted sequences, if the presence of lipids is low, the content appears similar to CSF, whereas if it is high, its signal is clearly different from that of CSF. In Chen et al.[18] series all epidermoid tumors (8 patients) showed either equivalent or slightly high signal intensity relative to CSF on T1-, T2, and proton density–weighted images and were not enhanced after contrast infusion. All four patients in the present series had hypointense signal on T1 and hyperintense signal similar to CSF on T2. 3 of these lesions (75%) had signal intensity similar to CSF on T1 whereas 1 (25%) had slightly higher signal intensity than CSF on T1. In our study, 2 cases of epidermoid tumors had total loss of signal on FLAIR while other two had a signal in between that of brain tissue and CSF on FLAIR. According to Chen et al.[18] Diffusion-weighted imaging has been shown to be a useful method to differentiate Epidermoid tumors from arachnoid cysts, by revealing the solid nature of Epidermoid tumors as opposed to the fluid properties of arachnoid cysts. Epidermoid lesions showed restriced diffusion, hence appeared sharply hyperintense relative to the brain and CSF on DW imaging in his study. Same results were replicated in our study. It has been described that epidermoid tumors are confined to cisternal spaces and insinuate along the basilar CSF cisterns. They typically encase and engulf arteries and cranial nerves. In our study, 2 (50%) patients had the typical finding of insinuation into the suprasellar CSF spaces. In 1 patient the lesion engulfed the 3rd cranial nerve in the prepontine cistern, which was responsible for his motor complaint (difficulty in eye movements, ptosis and diplopia).

Trigeminal Schwannoma : Tumors of the trigeminal nerve most often clinically present with facial pain, as was the case with our patients. Pain is usually described as burning in nature. Sensory paresthesias and a diminished corneal reflex was seen. Motor dysfunction of the muscles of mastication occurs late as the tumor enlargesto involve the third division of the trigeminal nerve. Growth within the cavernous sinus may further lead to dysfunction ofcranial nerves III, IV, and VI, and enlargement within the prepontine cistern may lead to compressive effects on cranial nerves VII, VIII, and IX. In our study, two female patients of 34 and 58 year age group and a male patient age 42 presented with complaint of facial numbness and neuralgia, diplopia, ptosis, headache vomiting and convulsion. Osborn has described similar symptomatology in trigeminal schwannoma and a female predominance of 1.5-2 : 1 as seen in the present study.[1]

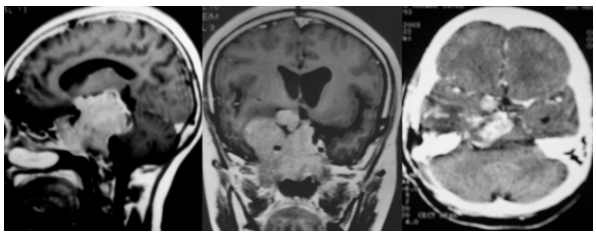

Figure 5: A case of right trigeminal schwannoma. Sagittal and coronal post contrast T1W images show a large homogeneously enhancing lesion with its epicentre in right cavernous sinus.. Axial post contrast CT image in the same patient.

Yuh et al. [20] described 2 cases of trigeminal schwannomas that had origin from the gasserian ganglion of the trigeminal nerve which is located anteriorly in the Meckel's cave. The ophthalmic division (V_1) which courses anteriorly through the lateral wall of the cavernous sinus and then through the superior orbital fissure was involved. All the lesions in the present study had likely origin from the gasserian ganglion of the trigeminal nerve in the region of right Meckel's cave and cavernous sinus. Also two of the lesions had a retrosellar component which extended to the right petrous apex and CP-angle cistern assuming a dumbbell configuration with compression of the brain stem and cerebral aqueduct. 1 patient had extension of the lesion into the sella, sphenoid sinus and base of middle cranial fossa. Trigeminal schwannomas (Figure 5) are usually hypointense on T1 and hyperintense on T2 weighted images. This was again in agreement with imaging findings of Yuh et al. A diagnosis of primary tumor of the trigeminal nerve in a Meckel's cave should be strongly considered in patients presenting with symptoms of trigeminal neuralgia or diplopia and absence of bone destruction. These tumors instead expand the Meckel's cave and displace the adjacent bony structure when large. Rao and Robles[76] have suggested that trigeminal schwannomas can erode the tip of the petrous apex. In the present study, one case showed erosion of the tip of right petrous apex whereas other two cases showed no such findings. The large size of the lesion could be a possible explanation for bony changes in the prior case.

Chordoma: Chordomas are the second most common tumor of the spine it occurs mostly in 5–6th decade with a male predominance. Chordoma occurs in the sacrococcygeal region (50%), sphenooccipital region (35%), and vertebrae (15%) and appear as expansile bone lesion with large soft tissue component. Calcifications are seen in approximately half of cases. We had 3 cases of chordoma. Our cases showed T1 hyperintensity which could represent hemorrhage, high protein content of myxoid, or mucinous collection. T2 hypointensity represented hemosiderin and fibrous tissue whereas T2 hyperintensity represented high water content. These findings were in accordance with those described for Chordoma by Erdem et al. and various other authors.[21] Commonly seen local recurrence of Chordoma as described by Erdem et al. was also noticed in one case. The final diagnoses in our study were based on histopathological correlation.

Conclusion:

MRI is a useful modality for better characterization of various pathologies involving the sellar, supra sellar and para sellar region. Based on various imaging parameters of size, location, pituitary stalk displacement, shape of superior surface of gland, visualization and displacement of diaphragm sellae and floor of sella erosion and correlating with the epicenter of the lesion in suprasellar or parasellar location, various pathologies can be correctly diagnosed in a non-invasive way. MRI is also useful in diagnosis of cavernous sinus involvement and internal carotid artery encasement.

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