HRCT of Pituitary Fossa Correlation of Clinical and CT Findings

KB SHAHID N IQBAL K J SIDDIQUI *J YAQOOB I ASLAM Z RAFIQ*
Radiology Department Fatima Memorial Hospital, Lahore.
Correspondence Dr. Kubaib Shahid, E mail: drnasiriqbal@hotmail.com

Purpose of the study was to correlate the clinical features with HRCT (High Resolution Computed Tomography) findings of pituitary fossa. Findings in a series of 30 patients, (22 female and 8 male) who underwent CT scanning of the pituitary fossa are reported majority of them had clinical suspicion of prolactinoma rest have other clinical signs of pituitary disease. Results showed 13 (out of 22) female patients with positive scan and 4 (out of 8) male patients with positive scan. In conclusion, this study conforms the usefulness of high resolution CT scanning of the sellar region in a specific settings.

Key words: HRCT pituitary fossa, adenoma

Diagnostic Imaging has under gone a profound revolution since the first computed tomography unit was conceived in 1971; CT is now an integral part of daily practice in neuro radiology, and has reached a relative technological maturity.

Today, however, MR. imaging has largely eclipsed CT as the preferred technique for the initial imaging evaluation of suspected pathologic conditions of the pituitary gland in cooperative patients. Notwithstanding this trend, high resolution CT continues to be used for pituitary imaging at many centers, when MR availability is limited, when MR findings are equivocal, or when specific requirements of a referring physician must be satisfied.

Purpose of study

The purpose of this study is:

To correlate the clinical features with findings of high resolution computed tomography of sellar lesions.

The findings in a series of 30 patients who underwent CT scanning of the pituitary fossa, using a 4th generation scanner, are reported.

Materials & methods

Twenty two females and eight males patients had CT scan of the pituitary fossa, performed before and after administration of intravenous contrast medium. This is a prospective study. The ages were sixteen to eighty four years. All examinations were performed on GE 9800 operated at 120 KV and 140 mA. Scans were done standard algorithm. Scans were obtained in direct coronal plane. The coronal scans were performed in supine position with extended neck.

Slice thickness was 3mm in precontrast scanning while post contrast images were taken with 1.5 mm slice thickness. 60 to 80 mls of water soluble iodinated contrast medium (Urovideo 60%) was used. Images were obtained in soft tissue and bone windows. Sagittal and axial reconstruction was made, where necessary.

Female patients

Out of 22 patients, 16 had elevated prolactin levels and were clinically suspected to have prolactinomas. Visual disturbances, elevated TSH level, acromegaly, enlarged pituitary fossa on plain x-ray of paranasal sinuses, cushing's syndrome and hypertension were found in one patient each.

Male Patients

Out of 8 male patients, three had visual field defect, two had impotence. Raised TSH levels, hypgonadism and cushing's syndrome were found in one patient each.

Results

1. Overall Assessment

	Male	Female
No. of cases	22	08
Normal	09	04
Abnormal	13	04
Tumour identified	10	02

2. Correlation of CT findings with clinical diagnosis

Sixteen female patients with sustained hyperprolactinemia were clinically suspected to have prolactinoma. Tumor was seen in 8. All 8 cases showed a hypodense lesion on contrast enhanced CT scans. One patient presented with visual disturbance was found to have macroadenoma. Other patients had elevated TSH, acromegaly, enlarged pituitary fossa on plain x-ray of paranasal sinuses, cushing syndrome, hypertension or visual field defects. Patient with acromegaly had 2cm sized macroadenoma. Out of 8 male patients, 3 had visual field defect, 2 had impotence. One had raised TSH levels, one had hypogonadism and one had cushing syndrome. Partially empty sella was found with patients having cushing's disease. Macroadenomas were found in 2 male patients with visual field defects. (Tables-1 & 2)

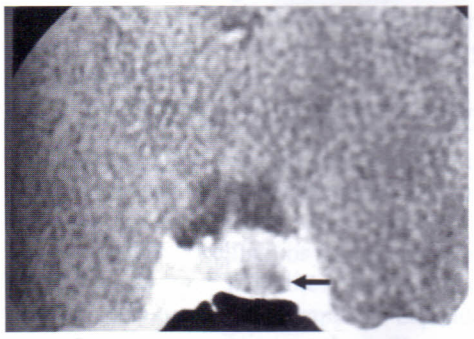
Table: 1 Male patients

Clinical Presentation	=n	HRCT Findings
Visual field defect	3	Macroadenoma 2 cases Partially empty sella 1 case
Impotence	2	Normal
Hypogonadism	1	Normal
Cushing's syndrome	1	Partially empty sella
Raised TSH level	1	Normal

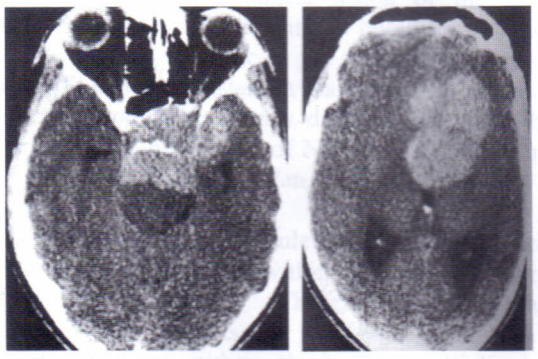
Table: 2 Female patients

Clinical Presentation	=n	HRCT Findings	
Hyperprolactinemia	16	Macroadenoma Macroadenoma Normal	1 case 7 cases 8 cases
Visual disturbance	1	3 x 2.5 cm sized macroadenoma	
Raised TSH level	1	Empty sella with normal pituitary gland	
Acromegaly	1	Macroadenoma	
Enlarged pituitary fossa on x-ray PNS	1	Empty sella with normal pituitary gland	
Cushing's syndrome	1	Normal	
Hypertension with visual defects	1	Normal	

In both males and females patients there were 5 tumors with extrasellar components, three had suprasellar extension while parasellar extension was seen in two patients. Bony erosion was seen in two tumors with suprasellar extension and one with parasellar extension.



Direct coronal scan of pituitary fossa, arrow shows a microadenoma.



Large enhancing pituitary adenoma with extra sellar extension

Discussion

High resolution computed tomographic images of the sella and suprasellar regions give valuable diagnostic information. There is evidence that direct coronal scanning gives better resolution than reconstructed coronal and sagittal images[1,7].

Examination in the axial plane gives a much higher radiation dose to the eyes than coronal scanning. Direct coronal scanning may not be possible in patients who can not extend their neck or where dental fillings cause significant artifacts[2].

The results confirmed the usefulness of the CT scanning in the diagnosis of sellar lesions. All microadenomas show no enhancement on the post contrast scan while in literature enhancing microadenomas have also been described[5,6]. All the macroadenomas showed diffuse or patchy enhancement on post contrast scan. As the tumour enlarges it pushes normal pituitary tissue around it and the stalk away from it giving rise to the appearance of stalk displacement. Slight slanting of the stalk may however be seen with normal pituitary glands

Deviation of stalk was noted in 6 out of 20 cases, but in no case was it the only abnormality. The term "empty sella" is used to descried two conditions; primary empty sella and empty sella secondary to treated pituitary tumor. The sella is not really empty but contains cerebrospinal fluid (CSF) and a flattened or shrunken pituitary gland which may just be a very thin strip of tissue along the floor of the fossa. The etiology of primary empty sella is unknown but it has been suggested that a long standing slight rise in CSF pressure together with a congenitally defective diaphragma sellae may be responsible. Tumors can coexist with an empty sella and have been reported in literature.

The terms secondary empty sella is applied to cases where pituitary tumors have been treated by surgery, implantation or external radiation therapy.

It is important to distinguish between enlargement of a fossa due to empty sella or due to empty sella or due to a tumour on plain radiograph. CT clearly demonstrates the CSF within the sella as well as the stalk reaching down to the floor of the fossa.

HRCT of the sella gives very good information about the bone erosion associated with sellar mass. Images of bone window should be acquired in every case. CT has been reported to be more sensitive than plain radiography and conventional tomography.

Amongst the difficulties of interpretation of thin slices CT scans are sometimes apparent lucencies within the pituitary gland which may be artifactual in nature[3]. If doubt exists relevant slice should be repeated. Still lucencies occur in so called "normal" pituitary gland and many "normal" glands were shown at post mortem to contain microadenomas.

Differential diagnosis of a pituitary tumor includes aneurysm of circle of Willus. Rathke's pouch cysts. Angiography is essential in such cases before surgery to avoid the potentially disastrous consequences of operating on an unsuspected aneurysm[4].

The extent of extrasellar extension can be defined accurately in HRCT and is of value in women with a known prolactinoma. Pregnancy should be avoided as increase in size of the gland during pregnancy may

compress the optic chiasma and cause visual defects. In such a case tumor should be treated before conception.

Conclusion

In conclusion, this study confirms the usefulness of high resolution CT scanning of the sellar region. The features of the lesion itself and associated abnormalities, like bony erosion and extrasellar extent can best be assessed by high resolution CT. Compared with the MR imaging, the bony abnormalities are better assessed by CT. Contrast enhancement helps to differentiate between aneurysm and other sellar space occupying lesions.

References

1. Taylor S: High resolution Computed tomography of the sella. Radiologic Clinics of North America 1982; 20: 207-236.
2. Swartz JD, Russel KB, Basile BA, et al: High resolution computed tomographic appearance of the intrasellar contents in women of childbearing age. Radiology 1983; 147: 115-117.
3. Chambers el al: Regions of low density in contrast enhanced pituitary gland. Normal and pathological processes. Radiology 1982; 144: 109-113.
4. Mindel JS, Sachoey VP, Kline LB, et al: Bilateral intracavernous carotid aneurysm mimicking a prolactin-secreting pituitary tumor. Surg Neurol 1983; 19: 163-167.
5. David Sutton Text Book of Radiology and imaging 7th Edition (volume – II) 2003.
6. Elster A: Modern imaging of pituitary. Radiology 1993; 4: 411-414.
7. Roppolo HMN, Latchaw RE: The normal pituitary gland. Part II: Microscopic anatomy CT correlation. AJNR 1983; 4: 937.