PARATHYROID ADENOMA – CYTO HISTOLOGICAL VARIANTS (CLUSTER OF CASES)

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INTRODUCTION

Parathyroid adenoma is the most common cause of primary hyperparathyroidism. It is more common in females by the ratio of 4:1. Histologically parathyroid adenoma composed of different cell types, Chief cells and Oxyphilic cells. Chief cell parathyroid adenoma is the most common type. To study the Cytohistological variants of parathyroid adenoma in our tertiary care hospital. We are presenting three cases of Parathyroid adenoma (Chief cell, Oxyphilic and mixed types), who presented with nephrocalcinosis and swelling in front of neck. Parathyroid adenoma, Chief cell parathyroid adenoma, Oxyphilic parathyroid adenoma and mixed type of parathyroid adenoma.

Parathyroid adenoma is the most common cause for primary hyperparathyroidism.[1] Histologically parathyroid is composed of different cell types - Chief cells and Oxyphilic type. Chief cells are further categorized as conventional chief cells and water clear cells. Chief cell parathyroid adenoma is the most common type.

Normal parathyroid glands are too small to be detected on imaging (usually 5x3x1 mm), weighs 40 - 50mg, but in parathyroid disease typically results in enlargement of the glands allowing for visualization.[2]

Hyperparathyroidism is divided into primary, secondary, and tertiary hyperparathyroidism. Patients with primary hyperparathyroidism may present with clinical evidence of elevated serum calcium levels which include non-specific symptoms such as fatigue, pain and weakness as well as polydipsia, polyuria, and nephrolithiasis.[3] Gastrointestinal symptoms include constipation, anorexia, nausea, and vomiting. Extreme hyperkalaemia can lead to cardiac arrhythmias, coma and death. Most Parathyroid hyperplasia is the result of secondary hyperparathyroidism due to renal disease.[3]

Tertiary hyperparathyroidism is the autonomous secretion of parathyroid hormone in the setting of long-standing renal disease resulting in hyperkalaemia.

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These days most patients with hyperkalaemia are discovered incidentally on routine work-up for other reasons.[3]

The correct diagnosis of parathyroid adenoma is often arrived at by taking into account the pathologic findings, clinical settings, biochemical and radiological investigations.[4]

In recent years minimal invasive par thyroidectomy has challenged the traditional bilateral neck exploration for primary hyper-parathyroidism.[5] Primary hyper-parathyroidism, whether caused by an adenoma or hyperplasia, is surgically curable with a high rate of success.[6]

PRESENTATION OF CASES

We have three cases of Parathyroid adenoma. Three cases were found incidentally while patients presented with lower limb weakness and other follow up done during Biochemical investigations and Ultrasonography.

This is a retrospective analysis of parathyroid adenomas. Clinical data and details of biochemical, radiological and other investigations were obtained from the medical records. Histopathological findings were assessed from the Department of Pathology records.

During the study period of 2 years, there were three cases of operated parathyroid adenomas. One of them was incidentally detected parathyroid adenoma operated along with Nodular goitre. One case of parathyroid adenoma was associated with chronic calculus pancreatitis and Nephrocalcinosis. Diagnosis was based on the histopathological confirmation.

CASE 1

40 years old male came with weakness of both lower limbs. Routine blood investigations were normal for this patient and biochemical investigations showed raised parathyroid hormone levels of 82.3pg/ml (11.1-71.5pg/ml) and raised serum creatinine levels about 42.5gm/day (1-2gm/day).

Imaging Studies

Ultrasonography of neck showed 15x10mm heterogeneous hypo echoic lesion in posteromedial aspect of left thyroid.

Cytology

FNAC was done and cytosmears studied showed hyper cellularity with many tissue fragments, cohesive clusters, loosely scattered cells and bare nuclei. The cells are arranged in trabecular, cord like and some in follicular pattern. Individual cells are round to oval with moderate amount of eosinophilic cytoplasm and few cells with clear

cytoplasm. There is mild nuclear atypia with inconspicuous nucleoli. Background showed thick colloid like material at places. Features suggestive of parathyroid neoplasm/parathyroid hyperplasia. (Figure 1 & 2)

Gross

Gross specimen of parathyroid gland was measuring about 5x3x1cm and weighing 10gms and cut section showed grey white cystic areas and calcifications noted. (Figure 3 & 4)

Histopathology

Section studied shows tumour is variably cellular and subdivided by fibrous connective tissue extending from peritumoral capsule. Tumour is arranged in acinar, nests, lobular patterns. Individual cells are round to oval, showed moderate to abundant eosinophilic cytoplasm with round to oval vesicular nuclei and few cells are showing prominent nucleoli. (Figure 5 & 6)

Features suggestive of Parathyroid adenoma – Oxyphilic type.

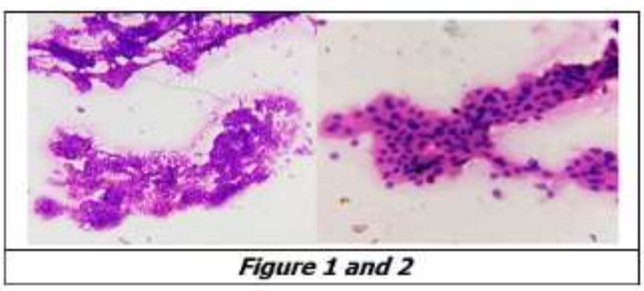
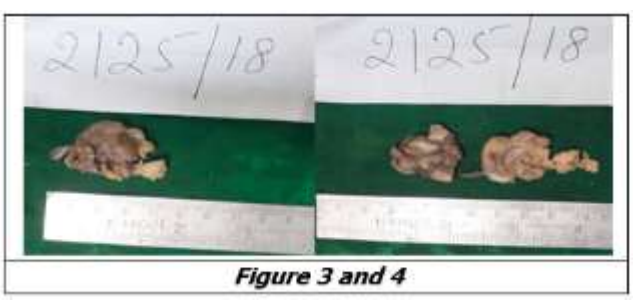


Figure 1 and 2



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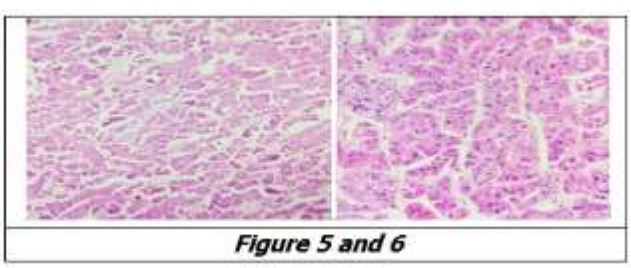

Figure 5 and 6

CASE 2

17 years female came with weakness of both lower limbs, routine blood investigations were normal for this patients and biochemical investigations shows raised parathyroid hormone levels of 988.4 pg/dl (11.1-71.5 pg/dl).

Imaging Study

Ultra-sonography of neck showed 1.3x1.0x1.7 cm hypoechoic lesion noted near upper lobe of left thyroid.

Cytology

Cytosmear study shows lymphocyte, neutrophils and cyst macrophages against proteinaceous background. Features suggestive of cold abscess (Figure 7)

Gross

Gross specimen of Parathyroid gland measuring 2x1 cm, cut section grey white to grey brown colour, whole Parathyroid gland was taken for section.

Histopathology

Section studied showed tumour is variably cellular**.** Tumour is arranged in sheets. Individual cells are round to oval with moderate to clear eosinophilic vacuolated cytoplasm with round to oval vesicular nuclei with prominent nucleoli (Figure 8 & 9)

Features suggestive of Parathyroid adenoma- Clear cell variant.

Cytohistological discrepancies were present for this case as in cytology reported as Cold abscess where as in histopathology reported as Parathyroid adenoma clear cell variant.

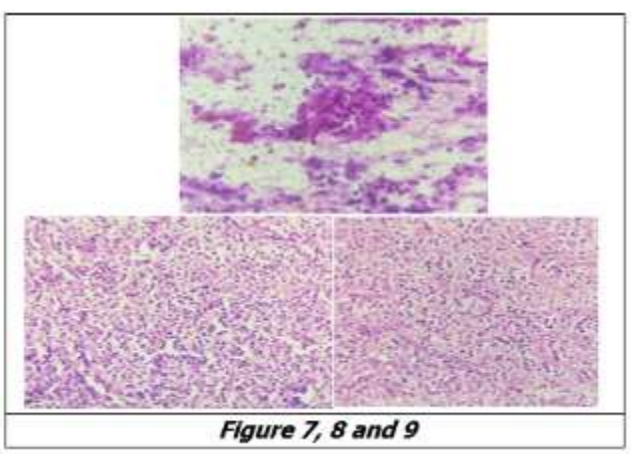

Figure 7, 8 and 9

CASE 3

40 years male came with complain of swelling in front of neck since one month, and patient also had history of weight gain and palpitations. Routine blood investigations were normal for this patient and biochemical investigations shows raised Parathyroid hormone levels about 90pg/dl (11.1-71.5pg/dl).

Imaging Study

Ultrasonography of neck showed cystic degeneration of left Parathyroid gland and nodular goitre on left side of neck.

Cytology

Cytosmears studied showed clusters of thyroid follicular epithelial cells in acinar pattern of benign morphology. Background showed colloid, few Hurthle cells, Cyst macrophages also noticed along with blood elements possibility of nodular goitre. (Figure 10 & 11)

Gross

Gross specimen of left thyroid measuring 4.5x2 cm, cut section grey brown homogenous with adjacent well circumscribed grey white area measuring 1x0.5 cm.

Histopathology

Section studied from the left lobectomy shows features of nodular hyperplasia. Adjacent parathyroid shows features of parathyroid adenoma consist of both oxyphilic and clear cell (Mixed). Tumour is arranged in sheets and lobular pattern. Individual cells are showing moderate to abundant eosinophilic cytoplasm with round to oval vesicular nuclei with prominent nucleoli and few cells are showing clear vacuolated cytoplasm with round to oval nuclei with prominent nucleoli. (Figure 12 & 13).

Parathyroid Adenoma-Mixed Type

Cyto histological discrepancies were present for this case as in cytology reported as Nodular goiter whereas in histopathology reported as Parathyroid adenoma Mixed variant.

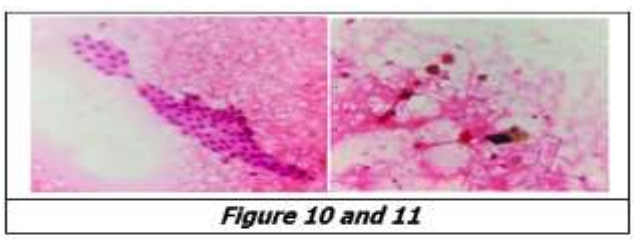

Figure 10 and 11

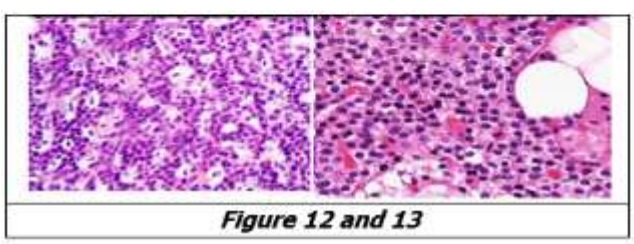

Figure 12 and 13

DISCUSSION OF MANAGEMENT

The incidence of Primary Hyperparathyroidism is 2.5/1000 individuals as reported in various articles from India.[4] Usually there is a female preponderance by 3:1, but Male preponderance is observed in our study. The age range of our patients was from 17 to 40 years.

In terms of location about 75% involve one of inferior glands, 15% involve one of the superior glands, and 10% occur in anomalous positions. Of the later, 70% are in mediastinum, 20% are in thyroid gland and remainder are in soft tissues behind oesophagus or in rare instance in wall of oesophagus itself. In our study the cases were found to be in head and neck region.

Majority of Primary Hyperparathyroidism cases present as adenoma (85%) followed by hyperplasia and carcinoma.[7] The symptomatic forms of Primary hyperparathyroidism are more common in India, whereas in developed countries, the asymptomatic form are more common.[8] In India, patients present at an advanced stage of Primary hyperparathyroidism and with associated Vitamin D deficiency.[9]

Even though chief cell parathyroid adenoma is most common, Oxyphilic cell adenomas were associated with higher pre-operative levels of serum calcium and PTH and higher rate of symptomatic disease. Oxyphilic cells do not appear until puberty and their number is also known to increase with age.[10]

Three of our cases presented with classic clinical and biochemical manifestations of hyperparathyroidism, whereas in one case, the parathyroid adenoma was incidentally detected. Three of our patients had lower limb weakness and nephrocalcinosis. One of our patient (patient 1) had pancreatic calculus in addition to nephrocalcinosis. After par thyroidectomy patient showed symptomatic improvement.

One of the studies showed association between renal stone and primary hyperparathyroidism[11] and their incidence was about 15-20%.[12]

One of our patients (patient 3) presented with thyroid swelling for the last 6 months which was increasing gradually. He was operated for the thyroid swelling which on postoperative histopathological examination showed Nodular goitre of thyroid and the parathyroid adenoma. Parathyroid adenoma was incidentally detected.

Authors have described Parathyroidectomy as an efficient and safe operation with excellent normalization of serum calcium and parathyroid hormone and a high rate of patient satisfaction.[13]

In this study, after parathyroidectomy, there was a significant reduction in the serum calcium and parathyroid levels in all patients. Parathyroidectomy improved the clinical Outcomes of Primary hyperthyroidism and possibly prevented further complications of pancreatitis. All of our patients showed significant improvement after surgery.

We have noted the association of chronic calculus pancreatitis and nephrocalcinosis in one patient with primary hyperparathyroidism. There was even one incidental case of parathyroid adenoma. In all these cases, there was high clinical suspicion which was aided by biochemical findings and was followed by Ultrasonography findings helped in confirming the diagnosis of parathyroid adenoma which was subsequently proved by histopathological examination. There was definitive indication for surgery in all these cases, and symptomatic improvement was noted after the surgery was performed.

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