Case Report

HEALTH SCIENCES
MEDICINE

DOI: 10.32322/jhsm.933066
J Health Sci Med 2021; 4(4): 516-519

Brief review of parathyroid adenoma; problems caused by water clear cells

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Cite this article as: Erdem H, Peker H. Brief review of parathyroid adenoma; problems caused by water clear cells. J Health Sci Med 2021; 4(4): 516-519.

ABSTRACT

Water clear cells; they can be seen in many tumors such as germ cell tumors, kidney tumors, lymphomas, sarcomas, thymic carcinomas, parathyroid carcinomas, paraganglioma. They may be primary or may occur as a result of metastatic conditions. Therefore, histopathologically differential diagnosis may be difficult or confusing. Clinical findings, radiological findings and histopathological evaluation may be required for differential diagnosis. Here, as immunohistochemically; a case with parathormone, CD10 positive and synaptophysin negative and CD10 positivity in the area where clear cells are dominant is presented.The case was reported as water clear cell (WCC) component dominant parathyroid adenoma with clinical, biochemical, radiological evaluation and histopathology and the differential diagnosis is discussed.

Keywords: Water clear cells, parathyroid, adenomas, hyperplasia, carcinomas, metastasis

INTRODUCTION

Parathyroid glands (PG) are defined as four glands in more than 80 % of normal adults. However, it can be seen in numbers ranging from 2 to 12 (1).

In light microscopy, the majority of the PG parenchyma consists of chief cells. Oxyphil cells and fat cells are also found in the stroma (2). There are publications that mention three types of epithelial cells (primary chief cells and transition phase cells between oxyphils) (1).

PG is one of the main organs involved in the regulation of calcium (Ca +2) metabolism synthesizes and releases the parathyroid hormone (PTH) (3). Therefore, when there is a parathyroid-related pathology, Ca and PTH level and parathyroid gland size may be clues.

Increase in parathyroid hormone level may occur for primary, secondary or tertiary reasons. This distinction is important for treatment. Primary hyperparathyroidism can develop hereditary (5-10%) or sporadic (90-95%). Parathyroid hyperplasia (PH) parathyroid adenoma (PA) or parathyroid carcinoma (PC) are among the causes (4).

Here, surgery was performed due to PA and the deceptive findings encountered in histopathological evaluation are presented.

CASE REPORT

A 61-year-old female patient. She has had complaints about the skeletal system since 2017. In her anamnesis, it was determined that she had been treated for peptic ulcer in 2018 and she was a patient with hypertension. The biochemical results were examined, the preoperative PTH was 136 pikogram (15-65), Ca 11.35 mg/dL (8.6-10.2) and P: 2.99 mg/dl (2.5-4.5). Parathyroidectomy was planned by the general surgery department due to swelling in the left lower pole in the vicinity of the thyroid in ultrasonography (USG) evaluation and focal radiotracer accumulation in the lower pole region of the left thyroid lobe in parathyroid scintigraphy. During the operation, the material for frozen was sent to the pathology department. It was interpreted as hypercellular parathyroid tissue in frozen evaluation. In the follow-up, a light brown nodular area of 1.2×1.5×1 cm in size, surrounded by a smooth capsule, with a diameter of 1 cm in a cross-sectional area, was observed macroscopically. Clear cells drew attention in the microscopic evaluation of this area. An immunohistochemical (IHC) study was performed in terms of metastasis. PTH, CD10 and synaptophysin were performed in the IHC study. PTH was uncertain. CD10 was positive and synaptophysin was evaluated as negative.

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Received: 05.05.2021 **Accepted:** 21.06.2020

The PTH (with IHC) study was repeated and weak positive expression was observed. Since the clear cells were CD10 positive, they were investigated for renal cell carcinoma. No mass lesion was observed in the patient's renal USG and there was no other malignancy in the history. Biochemically, PTH and calcium levels were compatible with hyperparathyroidism. In the postoperative period, PTH was measured as 59.4 and Ca 8.8. Since PTH and Ca were high in the initial biochemical evaluation and PTH antibody was positive in the second IHC study, this case was evaluated as water clear cell (WCC) component dominant PA.

Case reports include histopathological evaluation. The patient was informed about the presentation.

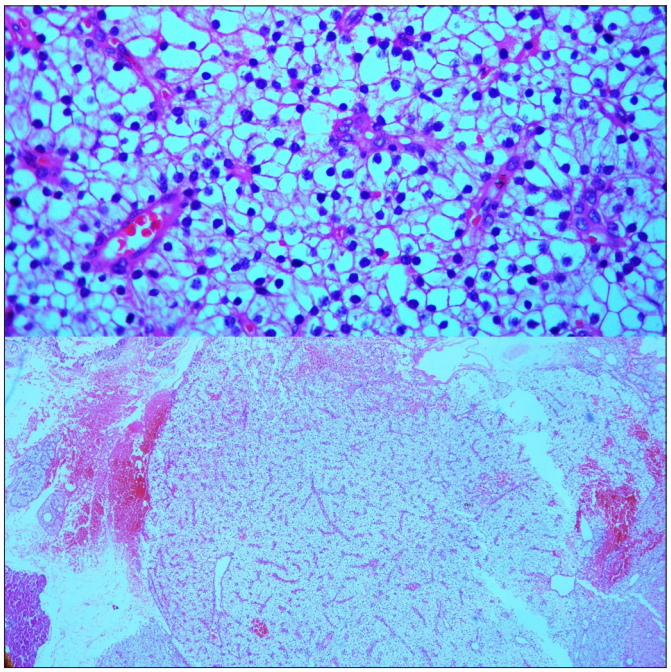

Figure 1. A nodular area with a clear cytoplasm and a prominent vascular network was observed. There is also an increase in cellularity in other cells. Normal parathyroid tissue is seen around (A:H&EX40 (down area), B:H&EX400 (upper area)).

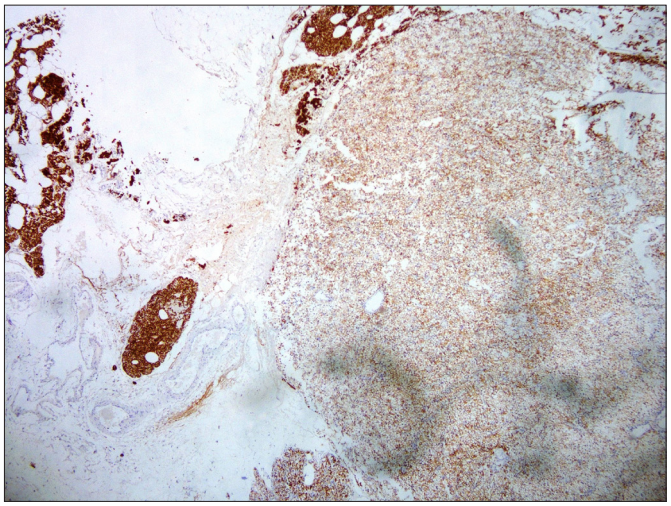

Figure 3. Weak positive staining with PTH was observed in the nodular area with these clear cells (PTH X100).

DISCUSSION

Mainly two types of cells are seen in PG. It has been reported that WCCs are not a component of the normal histology of the parathyroid gland, but transformed from the chief cells. WCCs are more likely to be seen with hyperparathyroidism, Roth reports (5).

One study suggested that all parathyroid parenchymal cells, including principal cells, oxyphilic cells and WCCs are variants of a single cell type (6). Most of the WCCA cases present with hyperparathyroidism (6).

Biochemical and clinical features were compared with the diameter of the adenoma (A) in a study (7). They suggested that the calcium level of WCCA cases did not rise until the A reached a significant size, and therefore had low endocrine activity (7).

In another study, an A with a diameter of 6×2.5×2.cm was presented, but preoperative Ca and PTH values were not available in this study (8). When WCCA was searched on

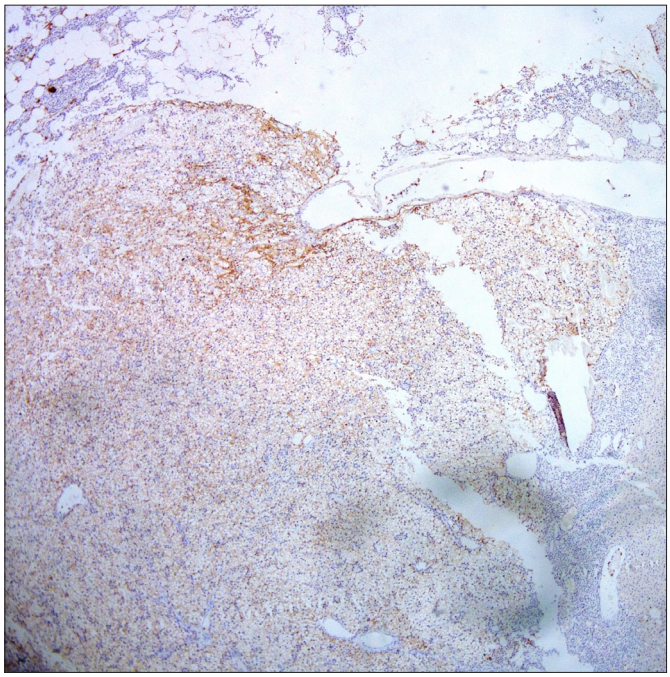

Figure 2. Clear cells were positive, other areas were negative with CD 10 (CD10 X100).

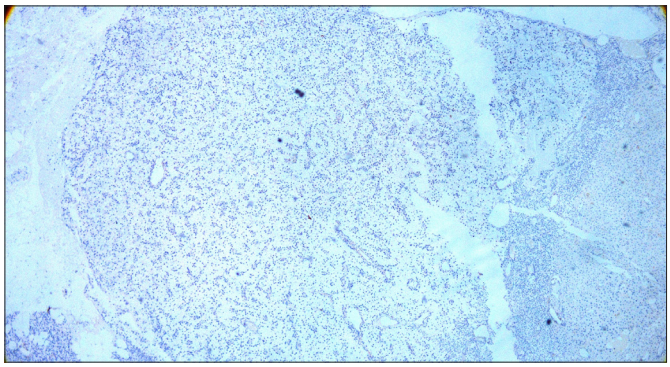

Figure 4. Synaptophysin was negative in the nodular area with clear cells (internal control staining available) (Synaptophysin X40).

the favorite search engine, 35 titles were seen. About 20 cases were reported as As.

PA should be considered in this age group due to its prevalence, especially postmenopausal (8).

The etiology of most PA is unknown. A small proportion of cases may be associated with hereditary multiple endocrine neoplasia. External radiation exposure of the head and neck region during childhood and long-term lithium use also in the etiology of PA is thought to take place (1,8).

PA consists of cells but may have variants. These; oncocytic (oxyphilic variant) A, parathyroid lipoadenoma (hamartoma), clear cell A, atypical PA. In the differential diagnosis of parathyroid adenoma, it should be considered in cases of hyperplasia, PC and metastatic events as well as variants.

PC is a malignant neoplasia that develops from parathyroid parenchymal cells (1,8). These tumors are extremely rare and account for less than 1% of primary HPT cases. And the age of diagnosis is reported to be 56, and it is common in men and women (1). Neighboring tissue invasion, vascular invasion (capsular and/or extracapsular), perineural invasion and/or proven metastasis constitute the criteria for malignancy and are diagnostic for malignancy other than at least one of these criteria (1,9).

PH is seen at a rate of ~ 10-15 %. Growth in all glands may be asymmetrical. In total of all glands are 1-3 grams. Normalization of enlarged glands the gland structure is not visible. There may be diffuse, nodular, or diffuse/nodular patterns. Major cell hyperplasia sometimes can be clear cell hyperplasia. The oil is not visible or reduced. There may be mitotic activity. They can be clonal.

As in our case, more pronounced water clear cells, more analysis and more distinct, nodular from larger network can be found in differential diagnosis of WCCA. Paraganglioma, metastatic renal cell carcinoma, clear cell sarcoma, rare clear cell type tumors, germ cell thymic carcinoma tumors (seminoma and dysgerminoma) and parathyroid carcinoma should also be considered (1,8).

With the exception of paraganglioma zellballen structures and rosettes, differential diagnosis can be made. Histological features and immunohistochemical studies are important in metastatic renal cell carcinoma (1,8).

Nuclear pleomorphism and nucleoli may be useful in differential diagnosis in clear cell sarcoma. For thymic carcinoma, the spindle of the cells and the presence of epithelioid cells are important. Lymphocytes on polygonal cells and septa are an important finding for seminoma (residual) (1,8).

In terms of parathyroid carcinoma, a decrease in expression of parafibromine, Bcl-2a, retinoblastoma (Rb) and p27 PGP9.5, as well as vascular and distant organ metastasis may help (1,8).

In this case, PTH was slightly positive and synaptophysin was negative. Cellular atypia and invasion were not present.

Histological appearance with the immune profile, widespread positivity for GATA3, focal weak positivity for parathyroid hormone and negativity for PAX8, thyroglobulin, TTF1, synaptophysin, chromogranin, and S100 were also present in the Flea and Arc study (10). GATA-3 was not studied in this study (since it is not in our laboratory).

In an article that caused a similar confusion in the literature, RCC marker positivity was detected in intrathyroidal parathyroid carcinoma, but the differential diagnosis was made with extrarenal positivity for RCC marker and other histopathological, clinical and immunohistochemical findings (11).

In case, no clinical finding suggestive of a kidney tumor was found. In terms of RCC, other markers such as vimentin, CAIX, SDH, PAX8 were not needed.

We could not find any literature on CD10 positive PA in search engines. For this reason, we considered as abnormal staining.

We did not perform any additional immunohistochemical studies since we found sufficient histopathological findings, postoperative biochemical and clinical follow-up results and immunohistochemical PTH positivity.

CONCLUSION

Parathyroid adenomas are important in terms of both clinical and differential diagnosis. In this differentiation, metastatic conditions should not be forgotten and should be excluded. The shortest way to do this is to evaluate the results of all relevant sections together.

ETHICAL DECLARATIONS

Informed Consent: Written informed consent was obtained from all participants who participated in this study.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Can N, Ozyılmaz F, Taştekin E. Pathological Approach to Parathyroid Diseases. Türkiye Klinikleri J Med Pathol-Special Topics 2018; 3: 107-20.
2. Bilezikian J.The Parathyroids: Basic and Clinical Concepts.3st ed. San Diego: Academic Press; 2015.
3. McCann LM, Beto J. Roles of calcium-sensing receptor and vitamin D receptor in the pathophysiology of secondary hyperparathyroidism. J Ren Nutr 2010; 20: 141-50.
4. Marini F, Cianferotti L, Giusti F, Brandi ML. Molecular genetics in primary hyperparathyroidism: the role of genetic tests in differential diagnosis, disease prevention strategy, and therapeutic planning. A 2017 update. Clin Cases Miner Bone Metab 2017; 14: 60-70.
5. Roth SI. The ultrastructure of primary water-clear cell hyperplasia of the parathyroid glands. Am J Pathol 1970; 61: 233-48.
6. Miettinen M, Clark R, Lehto VP, Virtanen I, Damjanov I. Intermediate-filament proteins in parathyroid glands and parathyroid adenomas. Arch Pathol Lab Med 1985; 109: 986-9.
7. Kanda K, Okada Y, Tanikawa T, et al. A rare case of primary hyperparathyroidism with clear cell adenoma. Endocr J 2004; 51: 207-12.
8. Arık D, Dündar E, YılmazE, Sivrikoz C. Water-clear cell adenoma of the mediastinal parathyroid gland. Turk Patoloji Derg 2019; 35: 157-61.
9. Duan K, Mete O. Parathyroid carcinoma: diagnosis and clinical implications. Turk Patoloji Derg 2015; 31: 80-97.
10. Pirela D, Treitl D, El Hussein S, Poppiti R, Mesko T, Manzano A. Intrathyroidal clear cell tumor of parathyroid origin with review of literatüre. Case Rep Pathol 2016; 2016: 7169564.
11. Vila Duckworth L, Winter WE, Vaysberg M, Moran CA, Al-Quran SZ. Intrathyroidal parathyroid carcinoma: report of an unusual case and review of the literature. Case Rep Pathol 2013; 2013: 198643.