ORIGINAL RESEARCH PAPER
Volume - 13 | Issue - 07 | July - 2024 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

PARATHYROID CARCINOMA MASQUERADING AS ADENOMA

Pathology

Dr. Preethi Postgraduate, Department Of Pathology, Shree Balaji Medical College And Hospital, Chennai, India.

Dr. Karthikeyan Selvaraj Associate Professor, Department Of General Surgery, Shree Balaji Medical College And Hospital, Chennai, India.

Dr. Barathiraja Assistant Professor, Department Of General Surgery, Shree Balaji Medical College And Hospital, Chennai, India.

Dr. J Thanka* Director And Professor, Department Of Pathology, Shree Balaji Medical College And Hospital, Chennai, India. *Corresponding Author

Dr. Shobana Associate Professor, Department Of Pathology, Shree Balaji Medical College And Hospital, Chennai, India.

ABSTRACT

Although parathyroid neoplasms are common and cause primary hyperparathyroidism (PTH), parathyroid carcinoma (PC) is a rare entity. At times, it can be difficult to diagnose, and it is commonly made after surgery. However, there are some clinical/biochemical features that should raise suspicion of parathyroid carcinoma, namely markedly elevated serum calcium and parathyroid hormone levels and a large parathyroid lesion with suspected ultrasonographic features of malignancy, that damages the kidney and bones. Rather than the tumor spreading, the majority of the clinical characteristics are caused by the impact of increased PTH secretion. It is not always simple to distinguish between parathyroid cancer and adenoma; nevertheless, even in typical situations, these features can mislead the practitioner and have a negative effect on treatment strategies and approaches. Patients will not get the best chance of recovery if a less-than-optimal method is taken. The best chance of cure is the complete surgical resection with the en-bloc excision at the initial operation, and they have a lower recurrence rate with a survival rate as high as 90% at 5 years and 67% at 10 years. Unfortunately, many patients do not receive a full resection, and a large percentage do not receive a diagnosis at the time of initial surgery. We are reporting a rare case of parathyroid carcinoma, highlighting the diagnostic challenges.

KEYWORDS

INTRODUCTION:

Parathyroid carcinoma is an uncommon endocrine cancer with just a few thousand documented occurrences globally and poses a diagnostic challenge for histologic examination. (1,2). Primary hyperparathyroidism (PHPT) is a relatively common endocrine disorder with an estimated prevalence of 1–7 cases per 1000 adult individuals. The commonest cause of PHPT is parathyroid adenoma (PA), accounting for about 85% of cases, followed by parathyroid hyperplasia (10–15%), and rarely parathyroid carcinoma (PC). The estimated prevalence of PC is 0.005% among all cancers, representing approximately 1% of PHPT cases. (3,4)

Parathyroid carcinoma commonly has an indolent and slow course, and most patients succumb to complications of relentless hypercalcemia rather than tumor invasion and spread. (5)

Case Report

A 45-year-old woman presented with complaints of swelling in the right side of her neck, multiple joint pains, and slurred speech. On examination, a single diffuse swelling was noted in the anterior aspect of the neck of size 2x2 cm. The swelling was lateral to the midline, more on the right side, with an ill-defined margin, smooth surface, and soft to firm consistency.

The serum calcium and parathormone levels were found to be increased. Ultrasound revealed a well-defined hypoechoic vascularized parathyroid mass, which is present in the right superior lobe. MRI of the brain revealed basal ganglia calcification bilaterally and expansion of bone with cortical thinning. There was a diffuse lytic area. An expansile lytic lesion was noted on the left side of the proximal ramus of the mandible. The lesion was well defined, measuring about 1.1x1.6x2 cm. The Tc99m sestamibi scan indicated the right superior parathyroid adenoma. Computed tomography (CT) of the abdomen revealed bilateral symmetrical nephrocalcinosis. A clinical diagnosis of parathyroid adenoma with hyperparathyroidism was made.

A right superior parathyroidectomy was carried out using a standard Kocher's collar incision. Blood samples collected before pre-incision showed serum calcium levels of 12.5 mg/dl and serum parathormone levels of 2594 pg/mL. It was found that 10 minutes after surgery, both the levels of the serum parathormone and serum calcium decreased to 323.3 pg/mL and 11.7 mg/dl, respectively. The frozen sections showed a hypercellular parathyroid lesion. On regular processing, parathyroid measured 4x2x2 cm and weighed 15 grams. A bulging, lobulated, fleshy, well-circumscribed, vague nodule measuring 3x2 cm was noted. Immediate postoperative period parathyroid hormone level came down to 53.5 pg/mL. Histopathological examination revealed a capsulated tumor composed of cells arranged in trabeculae and sheets (Figure 2). The cells were relatively monomorphic, with clear cytoplasm. Few cells showed pale eosinophilic cytoplasm. There were variable numbers of oncocytes, with occasional mitosis. A few areas showed moderate nuclear atypia. Vascular invasion in the capsule and pericapsular soft tissue was seen, along with a few tumor emboli (Figures 3 and 1). A final diagnosis of parathyroid carcinoma pT1 Nx was made with an extension limited to soft tissue.

DISCUSSION

Parathyroid carcinoma (PC) is a rare malignancy. The diagnosis of PC is dependent on postoperative histopathological analysis, which can often be difficult [4]. PC accounts for 0.1% to 5% of all PHPT cases (4). With an incidence of 0.005% among all cancers in the United States, parathyroid carcinoma is among the rarest tumors. (5)

Because the condition is incredibly rare in the general population, the incidence and prevalence of the disease are often expressed as the percentage of individuals who present with primary hyperparathyroidism. Incidence in men and women is equal in the fourth to fifth decades of life. (6)

PC can occur sporadically or in conjunction with inherited endocrine disorders, including familial isolated hyperparathyroidism (FIHP), multiple endocrine neoplasia type 1 (MEN1), multiple endocrine neoplasia type 2A, and hyperparathyroidism jaw tumor syndrome (HPT-JT). (5)

There have been cases of multiglandular involvement; however, these tumors are typically solitary and originate from a single gland. The inferior glands on the right and left have been determined to be the most frequent locations (6).

Intraoperatively, an indurated mass invading neighboring structures

such as the ipsilateral thyroid lobe, trachea, muscularis of the oesophagus, and/or the recurrent laryngeal nerve suggests the clinical diagnosis of PC.(7)

Grossly parathyroid carcinomas are gray-white, firm in consistency, and frequently have a thick fibrous capsule. They can be either confined or overtly invasive, in contrast to parathyroid adenomas, which are soft, reddish-brown confined tumors with a thin fibrous capsule. Parathyroid carcinomas can vary in size, ranging from tiny 1 cm tumors to massive tumors of several centimeters in diameter. (8)

The criteria for the microscopic diagnosis of PC were developed by Schantz and Castleman in 1973. (9) However, there are criteria that have been suggested as guidelines for distinguishing between the two entities. Chang et al. have suggested useful (absolute and relative) histopathological criteria for the diagnosis of parathyroid carcinoma and have proposed that one absolute or four relative criteria be required to make a diagnosis of carcinoma rather than adenoma (6). The absolute criteria are: (i) invasion of surrounding soft tissue or surrounding vital structures; (ii) vascular invasion; (iii) perineural invasion; and (iv) histologically documented regional or distant metastasis. The relative criteria are: (i) capsular invasion without extension into surrounding soft tissues; (ii) mitotic rate > 5 mitotic figures per 10 high power fields; (iii) broad intratumoral fibrous bands separating the tumor into nodules; (iv) coagulative tumor necrosis; (v) diffuse sheet-like monotonous cells; (vi) diffuse cellular atypia; and (vii) macronucleoli present in many tumor cells. (8)

There is no consensus clinical and pathological staging approach for PC that is widely acknowledged because the illness is rarely discovered before or even during surgery.

So far, no marker has demonstrated complete sensitivity and specificity. (4) With no gold standard test, pathological identification of parathyroid cancer remains difficult. The greatest chance for an accurate diagnosis is a multidisciplinary approach that takes into account all clinical, biochemical, and structural elements of the illness. (4)

The cornerstone of treatment for parathyroid cancer is surgery. En bloc excision of the tumor, the ipsilateral thyroid lobe with grossly clean margins, and the surrounding implicated tissues is the gold standard of care, with special emphasis paid to preventing tumor spilling. (9)

There have been reports of five- and ten-year overall survival rates of 77-100% and 49-91%, respectively. Generally speaking, hypercalcemia-related consequences are more closely linked to mortality than tumor burden. (5)

CONCLUSION:

As a rare clinical condition, parathyroid cancer necessitates multidisciplinary assessment and care. It is best to pursue complete surgical excision of parathyroid carcinomas after confirming that intraoperative parathyroid hormone levels have returned to normal. An intraoperative examination of the other three parathyroid glands is essential before a frozen section examination. Careful examination of tissue with proper inking for the margins is important. Capsular and vascular invasion should be studied after adequate sampling of the tissues received. An entire tissue examination is recommended. The treatment of choice is an en-bloc resection of the tumor. Though it's observed that the course of PC is variable, most patients have local recurrences or distant metastases and die from unmanageable hypercalcemia. We are presenting this case of parathyroid carcinoma to highlight the important histological findings in arriving at the diagnosis.

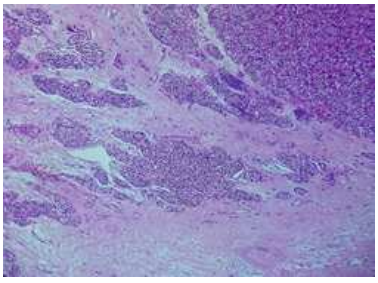

Figure 1 – Select of right superior parathyroid specimen showing capsular invasion focus (H&E- 20x)

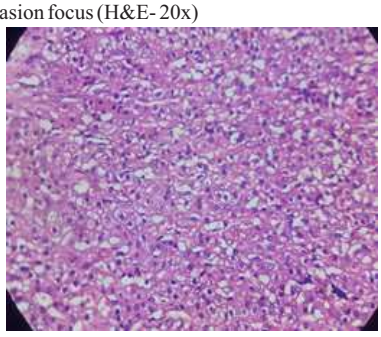

Figure-2- The tumor cells were relatively monomorphic, with clear cytoplasm. Few cells showed pale eosinophilic cytoplasm.

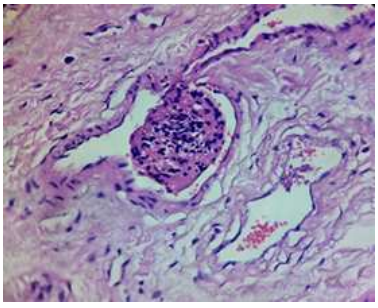

Figure 3 – Select of right superior parathyroid specimen showing vascular invasion focus (H&E- 40x)

REFERENCES

1. Sawhney S, Vaish R, Jain S, Mittal N, Ankathi SK, Thiagarajan S, Chaukar D. Parathyroid carcinoma: a review. Indian Journal of Surgical Oncology. 2022 Mar;13(1):133-42.
2. Sali AP, Motghare P, Bal M, Mittal N, Rane S, Kane S, Patil A. Parathyroid carcinoma: a single-institution experience with emphasis on histopathological features. Head and Neck Pathology. 2021 Jun;15:544-54.
3. Mukherjee S, Arya AK, Bhadada SK, Saikia UN, Sood A, Dahiya D, Behera A. Parathyroid carcinoma: an experience from the Indian primary hyperparathyroidism registry. Endocrine Practice. 2021 Sep 1;27(9):881-5.
4. Fernandes JM, Paiva C, Correia R, Polónia J, da Costa AM. Parathyroid carcinoma: From a case report to a review of the literature. International journal of surgery case reports. 2018 Jan 1;42:214-7.
5. Cappellacci F, Medas F, Canu GL, Lai ML, Conzo G, Erdas E, Calo PG. Parathyroid carcinoma in the setting of tertiary hyperparathyroidism: case report and review of the literature. Case Reports in Endocrinology. 2020 Dec 2;2020.
6. Givi B, Shah JP. Parathyroid carcinoma. Clinical oncology. 2010 Aug 1;22(6):498-507.
7. Marcocci C, Cetani F, Rubin MR, Silverberg SJ, Pinchera A, Bilezikian JP. Parathyroid carcinoma. Journal of Bone and Mineral Research. 2008 Dec 1;23(12):1869-80
8. Forde R, Mitchell A, Duncan K, Gibson TN. Parathyroid carcinoma: a case report and review of the literature.The West Indian Medical Journal. 2015 Jun;64(3):305.
9. Cetani F, Pardi E, Marcocci C. Update on parathyroid carcinoma. Journal of endocrinological investigation. 2016 Jun;39:595-606