



## Case report

## A parathyroid carcinoma mimicking thyroid carcinoma; A case report

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## ABSTRACT

**Introduction and importance:** Parathyroid carcinoma is an extremely rare endocrine neoplasm. Most of the patients present with severe hyperparathyroidism with altered serum calcium levels.

**Case presentation:** We describe a patient who presented with a neck mass and secondary hyperparathyroidism. Ultrasound (USG) suggested a tumor located near the lower pole of the thyroid gland. USG guided FNAC suggested parathyroid neoplasm. CT scan showed tumor infiltration of the parathyroid gland. The patient underwent total resection of the tumor along with total thyroidectomy and right central compartment clearance. The biopsy of the mass confirmed the parathyroid carcinoma infiltrating the thyroid gland.

**Clinical discussion:** Parathyroid carcinoma is a rare endocrine carcinoma. Due to its location, it is often misdiagnosed as thyroid carcinoma. It can present with problems related to bones, kidney stones, psychiatric problems and many others. Serum calcium, Parathormone level, Ultrasound neck, CT scan and MIBI scan are the imaging study for early diagnosis of Parathyroid carcinoma. Complete removal of tumor followed by regular follow up with serum calcium and Parathormone level will help to improve the survival of Patient.

**Conclusion:** Diagnosis of parathyroid carcinoma is very challenging due to the limited contribution of imaging. It mimics thyroid carcinoma due to the origin of the tumor from the lower pole of the thyroid area. It is extremely important for suspicion of parathyroid tumor in case of neck mass who have an abnormality in serum calcium and parathormone level. Total resection of the tumor with a negative margin is important to control hyperparathyroidism and increase the survival.

## 1. Background

Parathyroid carcinoma (PC) is an extremely rare endocrine neoplasm that occasionally presents with secondary hyperparathyroidism. The annual incidence rate is approximately 11 cases per 10,000,000 persons [1]. Most PC occurs in the inferior parathyroid gland [2]. The primary diagnosis of parathyroid carcinoma is difficult and suspicion is needed in patients of neck mass with altered calcium level. Patient of PC have varying presentation with elevated level of calcium, neck mass, kidney stone and chronic kidney disease. The best way of treatment is complete surgical excision and strict follow up to prevent the recurrence [3] (Fig. 1).

We report a case of parathyroid carcinoma with secondary hyperparathyroidism which is rare in our practice. This work has been reported in line with the SCARE 2020 guidelines [4].

## 2. Case presentation

A 64 years/male patient presented at Charak Memorial Hospital, Pokhara, Nepal with the history of painless neck swelling for 1-year located in the inferior aspect of right side of neck. Swelling in the neck was initially small in size comparable to the size of pea seed. However, since last 6 months, the neck mass has been increasing progressively. He was a known case of Chronic Kidney disease (CKD) stage V, diabetic Mellitus type II, dilated cardiomyopathy, polycystic kidney disease with hypothyroidism for 10 years. He had past history of CABG surgery 5 years back. There were no complaints of dysphagia, hoarseness, palpitation. Ultrasound of the neck showed multiple heterogenous exophytic nodules in the right lobe of the thyroid.

CT scan of the Neck revealed a heterogenous mass located at right paratracheal region with no cervical lymphadenopathy (Fig. 1 A). USG guided fine needle aspiration cytology was suggestive of parathyroid neoplasm. A technetium-99m sestamibi (or MIBI) scan was performed which showed tumors arising from the right lower parathyroid gland

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and infiltrating the thyroid gland. Laboratory findings showed serum calcium level 5.5 mg/dl, serum phosphate 6.6 mg/dl, and Parathyroid hormone level 1167 pg/ml. The final impression of Right lower parathyroid carcinoma infiltrating the thyroid gland was made. A staging CT scan of the chest, abdomen, and pelvis showed multiple lymphadenopathies in the chest and abdomen and features of polycystic kidney disease. Diagnostic laparoscopy of abdominal lymph nodes revealed reactive changes.

The patient underwent complete resection of the tumor which was infiltrating the lower part of the thyroid gland. Grossly the tumor was hard. We found level six lymph nodes were enlarged. We performed total tumor resection with total thyroidectomy and right central compartment clearance. All other remaining parathyroid gland were explored and right upper, left upper hyperplastic parathyroid gland and half of the lower left gland were removed. Histopathology examination of specimen shows chief cell with nuclear atypia and infiltration of thyroid gland (Fig. 1B). The resected margin was negative. His parathyroid hormone level was reduced to 200 pg/ml after 24 h of surgery. Post-operative recovery was uneventful and was discharged from the hospital on the 7th post-op day. His disease remained stable at 12 months of follow-up.

### 3. Discussion

Parathyroid carcinoma is a rare endocrine malignancy [1]. Diagnosis of parathyroid cancer is challenging. It typically occurs at 45–59 years of age. It can occur sporadically or as part of a genetic syndrome. Recently, parathyroid carcinoma has been reported in Multiple endocrine neoplasia type 1 (MEN 1). De Quervain was the first person to describe the case which was initially thought to be nonfunctional [5]. However, the lesion revealed features of malignancy on macroscopic analysis. Later in 1938, Armstrong reported a case of Metastatic parathyroid carcinoma with features of primary hyperparathyroidism [6].

The typical picture is characterized by signs and symptoms of severe hypercalcemia, renal involvement in up to 80% of patients [7]. However Our patient presented at a later age with secondary hyperparathyroidism which is a rare presentation. Use of the different imaging techniques like USG neck, CT scan and MIBI scan increases the diagnostic accuracy [8]. In our case, right lobe of thyroid gland was involved by the tumor which mimicked thyroid carcinoma. MIBI scan is helpful to differentiate parathyroid lesion from thyroid cancer. Furthermore, histopathology identifies the type and origin of tumor. Complete resection of all malignant tissue increases the survival of patients. Disease recur frequently and is found in more than 50% of patients. Interval Follow up should be performed with serum calcium and parathyroid hormone level [9].

Major causes of mortality are related to the complications of hypercalcemia.

### 4. Conclusion

Our case had neck mass with chronic kidney disease and secondary hyperparathyroidism. Differentiation of parathyroid cancer was difficult due to same location at lower pole of thyroid area and early infiltration into the thyroid gland. Combination of ultrasound neck, CECT Neck and MIBI scan helped us to locate the origin of tumor. Total thyroidectomy and subtotal parathyroidectomy were performed for total clearance of tumor from neck. Serum calcium, parathormone level and imaging studies are the helpful to detect recurrence at follow up.

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### Ethical approval

No ethical approval is necessary.

### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

### Research registration

Not applicable.

### Guarantor

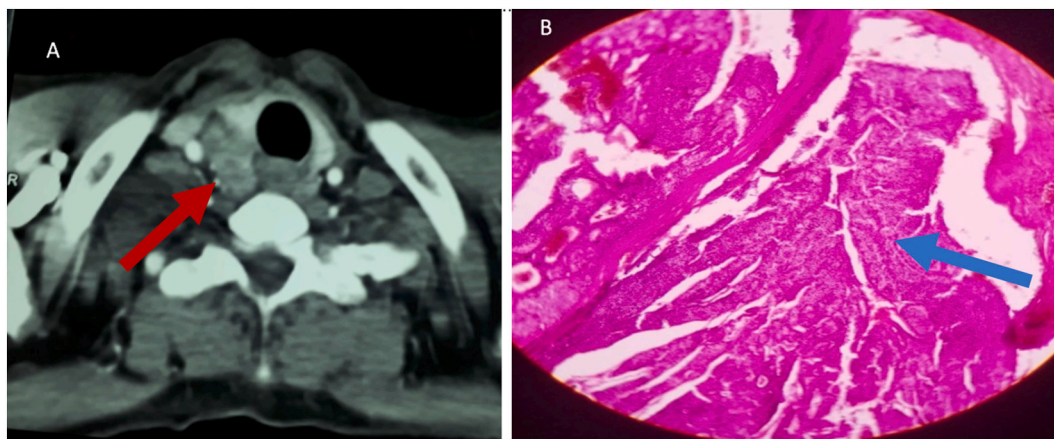
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### Disclaimer

No patient or author details are included in the figures.

### Provenance and peer review

Not commissioned, externally Peer reviewed.



**Fig. 1.** A. Computerised Tomography scan showing heterogenous mass located at right paratracheal region as shown by red arrow. B. Histopathology of Parathyroid carcinoma showing Chief cells with nuclear atypia with involvement of thyroid as shown by blue arrow. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

### CRedit authorship contribution statement

Sigdel B was responsible for the treatment of patients and the conceptualization of the study. All authors contributed to the collection of data, decided on methodology, and contributed to resources, validation. Sigdel B, Pokhrel A and K.C. S wrote the original draft of the report, and all authors contributed to reviewing and editing.

### Declaration of competing interest

We declare no competing interests.

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