Parathyroid carcinoma; an updated mini-review on current trends

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Abstract
Parathyroid carcinoma is an infrequent endocrine disorder, commonly producing severe primary hyperparathyroidism. This is mainly a sporadic disorder, but it may occur in family primary hyperparathyroidism. Patients with parathyroid carcinoma regularly present with markedly elevated serum calcium and parathyroid hormone (PTH). Obviously, owing to the rarity of this cancer, there are no generalized procedures for its management; however, surgery remains to be the mainstay of treatment.

Keywords: Parathyroid carcinoma, Tertiary hyperparathyroidism, Neck radiation, Parathyroid adenoma, Parathyroid hormone


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Introduction

Behind of the thyroid, there are four glands named parathyroid which help the management of the calcium levels amid the human body (1). Parathyroid carcinoma is a scarce endocrine malignancy, accounting for an assessed 0.005% of all cancers (2). It was first explained by the Swiss surgeon Fritz De Quervain (3). In 1904, he illustrated a case of nonfunctioning metastatic parathyroid cancer, and 26 years later, Sainton and Millot explained the first case of operational metastatic parathyroid carcinoma (4). Additionally, Armstrong in 1938 explained another patient with metastatic parathyroid carcinoma and hypercalcemia (5), and in 1968, Holmes and colleagues (6) studied 50 cases of parathyroid carcinoma stated in the literature. It is commonly accepted that parathyroid carcinoma accounts for below 1% of cases of primary hyperparathyroidism (7), though, this number has been described to be higher in some studies, reaching up to 5% (8). Actually, parathyroid carcinoma frequently has an indolent growth with a trend for local invasion, and it appears with equal frequency in women and men (9). The age at demonstration for parathyroid carcinoma compared with adenoma is described to be a decade previous (10). It usually affects the ageing women and men and its clinical look is characterized by mild hypercalcemia, kidney manifestations, traditional classic bone disease and elevation of parathyroid hormone (PTH) and often subsequent in severe hypercalcemia (1).

It is noteworthy that, less than 10% of parathyroid carcinoma cases current as nonfunctional tumors (11). Though most patients with parathyroid carcinoma appear with hyperparathyroidism, a diagnosis of hyperparathyroidism ascribable to carcinoma may be problematic to arrive at preoperatively or even intraoperatively (12). In many situations, because of the rarity of the disorder and clinical topographies mimicking benign parathyroid pathology, preoperative diagnosis of parathyroid carcinoma is problematic. Furthermore, the pathologic diagnosis of malignancy is stimulating; nevertheless, severe hypercalcemia joined with high PTH levels and gross operative discoveries should arouse suspicion of parathyroid carcinoma. Hence, owing to its rarity and the paucity of large-scale available series of patients with parathyroid cancer, there still is an absence of understanding of the natural course and prognostic implications of this disorder. The aim of this review is to examine and summarize the accessible literature on parathyroid cancer.

Materials and Methods

For this review, we used a diversity of sources by searching through PubMed/Medline, Scopus, EMBASE, EBSCO and directory of open access journals (DOAJ). The search was conducted, using combination of the following key words and or their equivalents; parathyroid carcinoma, tertiary hyperparathyroidism, neck radiation and parathyroid adenoma.

Etiology and pathogenesis of parathyroid carcinoma

The etiology of parathyroid carcinoma is unidentified, and to date, no recognized predisposing factors have been recognized. Nevertheless, history of neck radiation is a recognized risk factor of head and neck carcinoma, and cases of patients with parathyroid cancer who earlier received radiation treatment to the neck have been designated (13). For example, In the describe by Koea and Shaw (14), 1.4% of the individuals with parathyroid cancer had prior history of neck irradiation; however, robust causal relationship between parathyroid (8). Other related factors previously designated contain secondary and tertiary hyperparathyroidism produced by chronic renal failure (15).

Carcinoma and radiation or way of life factors has not been explained. Other somatic gene mutations have been associated in the development of parathyroid carcinoma, counting abnormal expression of the retinoblastoma and p53 proteins. Likewise, the presence of an extra tumor suppressor gene on chromosome 13 in the vicinity of retinoblastoma gene has been suggested (16). But, no clinically significant deductions have been reached, and
In parathyroid cancers, hypercalcemia should be treated with vitamin D (when possible and to manage the metabolic problems of hypercalcemia). Consequently, the treatment of hypercalcemia is the primary mode of treatment for recurrence since it can offer noteworthy palliation for the metabolic derangement produced by hyperparathyroidism and permits hypercalcemia to become more therapeutically manageable. On the other hand, reoperation is hardly curative and eventual revert is likely. Chemotherapy and external ray radiation therapies have been generally unsuccessful in the treatment of parathyroid cancer. Usually, these patients need repeated operations that incline them to accumulate surgical risks with each interference.

As a matter of fact, the prediction of parathyroid carcinoma is quite adjustable. Indeed, no one characteristic correlates probably with consequence. Primary recognition and complete resection at the time of the early surgery carry the best prediction. The mean time between surgery and the first recurrence is about three years, though intervals of up to 20 years have been described. After the tumor has recurred, complete treatment is unlikely.

### Conclusion

Parathyroid cancer is a very infrequent endocrine malignancy, however, in patients with early hyperparathyroidism it is very essential, especially due to its mortality. Parathyroid cancer could appear equally between two genders but the occurrence of parathyroid cancer is rising worldwide despite its rare incidence, with youth and being female as two vital related factors. There is no accessible lifestyle factor associated with parathyroid cancer. Actually, the cause of parathyroid cancer is yet to be established and there is no data to verify causal further examination is still required. In the other words, the preoperative diagnosis of parathyroid cancer can be very challenging. Many patients experience surgery for an assumed parathyroid adenoma with suspicion for a parathyroid cancer being elevated only during surgery. In others, the diagnosis becomes evident only later pathological inspection of the excised gland. However, aggressive malignant tumor and most patients expire before possible metastatic disorder or renal insufficiency. In the same way, because of the rarity of parathyroid cancer, few investigators have sufficient numbers of patients to certification a large scale clinical experimental. Attempts to management tumor with chemotherapy have been upsetting but the only most effective treatment for parathyroid cancer is complete resection of the main lesion at the time of primary operation. Parathyroid cancer is not a radiosensitive tumor. In the same way, because of the rarity of parathyroid cancer, the primary resection can offer noteworthy palliation for the metabolic derangement produced by hyperparathyroidism and permits hypercalcemia to become more therapeutically manageable. On the other hand, reoperation is hardly curative and eventual revert is likely. Chemotherapy and external ray radiation therapies have been generally unsuccessful in the treatment of parathyroid cancer. Usually, these patients need repeated operations that incline them to accumulate surgical risks with each interference. As a matter of fact, the prediction of parathyroid carcinoma is quite adjustable. Indeed, no one characteristic correlates probably with consequence. Primary recognition and complete resection at the time of the early surgery carry the best prediction. The mean time between surgery and the first recurrence is about three years, though intervals of up to 20 years have been described. After the tumor has recurred, complete treatment is unlikely.

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relations between parathyroid cancer and any risk factor (28), though it may be some relatives with familial and irregular forms (12). Furthermore, parathyroid carcinoma is normally related to a prolonged clinical course, with numerous recurrences the majority of which happen locally. Owing to limited value of adjuvant treatments, the recommended therapy for relapses and metastases is similarly surgical resection, when technically possible. Additional multi-centric investigations are required in order to further comprehend this rare clinical entity, and to advance more effective therapy methods.

Author’s contribution
MRA is the single author of the manuscript.

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The author declared no competing interests.

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References