



HISTOPATHOLOGICAL SPECTRUM OF PARATHYROID LESIONS-A SIX YEAR STUDY

Pathology

Dr.S.Subitha * Assistant Professor,institute Of Pathology,madras Medical College.*Corresponding Author

Dr.M.Priyadharshini Assistant Professor, Institute Of Pathology,madras Medical College

ABSTRACT

Introduction: Pathological lesions of parathyroid glands encompass a wide range of lesions ranging from developmental anomalies to inflammatory disorders to neoplastic processes.

Aims and objectives: To study the frequency of various spectrum of parathyroid lesions .

Materials and methods: An retrospective study of All parathyroid specimens received in the Department of pathology,Madras Medical College,Chennai, India, for histopathological examination over a period of 6 years, from Jan 2011 to dec 2016, were included in the study.

Results: A total of 15 cases were examined in the study. The highest incidence of parathyroid lesions was seen in the second decade (n = 6, 40%) and showed a female predominance (66.6%). Non-neoplastic lesions accounted for 5 cases (33.4%) and neoplasms accounted for 10(66.6%) cases in which benign 9cases (90%) & malignant 1case (10%). The common non-neoplastic lesions were parathyroid hyperplasia(80%) followed by parathyroid cyst (20%). Benign neoplasms (90%) all cases were reported as parathyroid adenoma and one malignant reported as parathyroid carcinoma.

Conclusion: Histopathological correlation plays an vital role in addition to clinical, radiological and biochemical parameter for definitive diagnosis and treatment.

KEYWORDS

Parathyroid,,Non-Neoplastic,neoplastic.

INTRODUCTION

The parathyroid glands, the last major organ to be recognized in humans, were discovered in 1880 by Ivar Sandstrom, a Swedish medical student, as recounted by Aidan Carney in his delightful essay on the subject.¹⁵ There are usually four parathyroid glands arranged in two pairs usually close to the upper and lower poles of thyroid gland, but may be found anywhere along pathways of descent of third and fourth branchial pouches.⁴ The proliferative lesions of parathyroid glands represent the commonest causes of hyperparathyroidism in clinical practice and one of the challenging fields, both diagnostically and therapeutically; and also both for the clinician as well as the pathologist. The histological assessment of parathyroid gland is indispensable in the evaluation of hyperparathyroidism but strangely enough, only rarely, it is encountered by the surgical pathologist in routine practice. Despite a few limitations, the role of the pathologist in the appraisal of parathyroid pathology is worth mentioning.¹ In this regard, the sound knowledge of normal histology of parathyroid glands and the spectrum of pathologic lesions, in adjunct to awareness of the recent trend of immunohistochemical and the molecular genetic studies, is crucial to arrive at the best possible diagnosis.² The majority of pathological lesions of parathyroid gland present clinically with symptoms of hyperparathyroidism. Primary hyperparathyroidism has now become the third most common endocrine disorder.⁹ The term primary hyperparathyroidism refers to an inappropriate overproduction of parathyroid hormone (PTH) leading to abnormal calcium homeostasis and increased serum calcium levels with concomitant increase in PTH levels. Parathyroid hormone-related protein (PTHrP) levels remain normal. The primary hyperparathyroidism prevails in women with reported female to male ratio of 3-4:1. Primary hyperparathyroidism results from parathyroid adenoma in the majority of cases (80 - 85%), followed by hyperplasia (10 - 15%), multiple adenomas (4%), atypical adenomas and parathyroid carcinomas in rare cases (< 1%).⁷ Hence histopathological correlation is must for management of parathyroid lesions.

MATERIALS AND METHODS: This is a retrospective study conducted in the Department of Pathology, at Madras medical college, Chennai. The blocks and slides of all parathyroid lesions biopsied or excised over a period of six years, from Jan 2011 to Dec 2016, were retrieved and reviewed. All slides were stained with hematoxylin and Eosin stains. Biopsies with material inadequate for opinion were excluded from the study. The lesions were classified as non-neoplastic and neoplastic. The neoplastic lesions were further categorised as benign or malignant. Clinical history was obtained from medical records department of the hospital in all the cases.

Histopathological findings were correlated with clinical and radiological feature.

OBSERVATION:

Of the 15 parathyroid specimens received over a period of 6 years , non-neoplastic lesions accounted for 5 cases (33.4%) and neoplastic lesions accounted for 10 cases (66.6%); (Graph 1) in which benign(90%) and malignant (10%). The common non-neoplastic lesions were parathyroid hyperplasia(80%) followed by parathyroid cyst (20%). All Benign neoplasms (90%) were reported as parathyroid adenoma which showed an age predominance in the second to fifth decades of life and one malignant (parathyroid carcinoma) were reported.(TABLE:1)

TABLE:1: Age wise distribution of lesions

AGE (YEARS)	PARATHYROID CYST	PARATHYROID HYPERPLASIA	PARATHYROID ADENOMA	PARATHYROID CARCINOMA
11-20	-	2	2	-
21-30	1	1	3	1
31-40	-	1	2	-
51-60	-	-	2	-

DISCUSSION

Parathyroid hyperplasia is a proliferative lesion of parenchymal cells that results in an absolute increase in cell volume and weight. It typically involves all four glands; however, the involvement is usually not uniform.⁵ This disorder was first reported by Cope et al. in 1958.^{5,5} This condition can occur sporadically, but is more commonly seen in association with familial conditions like MEN syndrome, FIHP, neonatal severe hyperparathyroidism, familial hypo-calcemic hypercalcemia and familial hypercalcemic hypercalciuria. Classically, 10 - 15% of cases of primary hyperparathyroidism are attributed to chief cell hyperplasia. However, the relative frequency rate is quite varying from 1.3 to 84%, possibly, due to lack of precise defining criteria.⁶ our study reported 4 cases of parathyroid hyperplasia.

Parathyroid cysts usually arise from the lower glands but can be located in the upper region of the neck or in the mediastinum.^{16,19} In most cases they cause no symptoms other than those related to pressure. Their mean diameter is 4 cm.¹⁶ They are lined by cuboidal or low columnar epithelial cells and contain parathyroid tissue in their wall. Heterotopic salivary gland tissue can be found around the cyst.¹⁷ The cyst fluid contains assayable PTH.²⁰ The few reported cases of parathyroid cysts associated with hyperparathyroidism most likely

represent adenomas with cystic degeneration.¹⁸our study reported one case of parathyroid cyst which is similar to the study of Alejandro Román-González,Rangnekar N, et al¹³.

Parathyroid adenoma: There are no consistent morphologic criteria for the diagnosis of parathyroid adenomas. Although, by definition, an adenoma is a benign neoplastic lesion involving single gland in the majority of cases and perhaps rarely two or more glands may be involved, particularly in association of autosomal dominant endocrine disorders.^{7,8} consequently, the diagnostic modalities including histopathological features and genetic studies are flawed by the lack of a gold standard test to distinguish this entity from other challenging differential diagnoses of hyperplasia and even carcinoma. Furthermore, the lesions of parathyroid gland show significant overlap and precise diagnostic criteria are not available. Hence, the role of multi-disciplinary team approach in making the diagnosis is crucial and remarkable. The most universally acceptable criterion of adenoma is involvement of single gland but many pathologists presume that adenoma and hyperplasia cannot be distinguished histologically, if only one gland is submitted for histological assessment. Therefore, histological verification of at least one normal gland is mandatory to exclude the possibility of hyperplasia. However, some studies concluded that solitary parathyroid gland enlargement does not eliminate parathyroid hyperplasia, since 30 - 75% of patients with hyperplasia exhibit single gland enlargement.^{3,8} In our study were reported 9(90%)cases of parathyroid adenoma similar to the study of Jacqueline A. Wieneke and Alice Smith²¹(80%).

Parathyroid carcinoma: Parathyroid carcinoma is one of the rarest pathologies involving the parathyroid glands and in regard to primary hyperparathyroidism it accounts for only 1 - 2% of cases.^{3,9} Nevertheless, its frequency varies in different studies reflecting the racial and geographic differences. Another possibility behind it might be the lack of uniform diagnostic criteria for carcinoma. Parathyroid carcinomas may rarely arise in the background of pre-existing parathyroid hyperplasia, even in adenomas, sometimes in familial settings.^{10,11} The diagnostic difficulties among hyperplasia, adenoma in recurrent cases, render this assessment more complicated. Furthermore, the possibility of hyperplasia- carcinoma sequence has been questioned and is far from clear as yet. A few cases have been reported of the occurrence of parathyroid carcinoma in the setting of previous neck irradiation exposure.^{9,12} In contrast to the female preponderance in parathyroid adenoma, carcinoma occurs with almost equal male to female ratio. Moreover, it tends to occur roughly one decade earlier in comparison with adenoma. Some of the clinical features, which might help in distinguishing carcinoma from adenoma, are relatively high serum calcium and PTH levels in carcinoma. In addition, patients with parathyroid carcinoma have remarkable tendency to present with palpable cervical masses in 15 - 75% of cases with concurrent bone and kidney disease. Rarely, they may present as a non-functional mass.⁹In our study one case were reported as parathyroid carcinoma(image:1) in a 28 year female which was rare case as mention in study of Ryhänen EM, et al¹⁴.

CONCLUSION

An accurate diagnosis of the lesions of parathyroid gland has significant impact on the management of patients. The histological features should always be correlated with clinical,biochemical, radiological, immunohistochemical findings to achieve best possible categorization of the lesions.

GRAPH 1

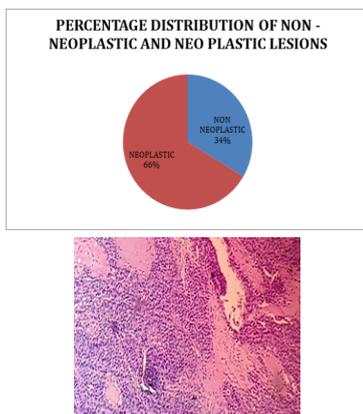


IMAGE:1: 10X (H&E) parathyroid carcinoma

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