

# Histomorphological Spectrum of Papillary Carcinoma of Thyroid in Oman

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## ABSTRACT

Thyroid cancer is the commonest endocrine malignancy and is the second most common cancer affecting young females in Oman. The diagnosis of Papillary Thyroid Carcinoma (PTC) is based primarily on histologic architecture and nuclear morphology in routine Haematoxylin and Eosin (H & E) stained slides. Whenever in doubt, immunohistochemistry may be helpful. This retrospective study included 115 cases of PTC diagnosed at a tertiary care center in Oman over 10 years period, from 2001 to 2010. Slides and blocks of these cases were retrieved from the pathology laboratory. Ninety five (95) were females and 20 were males. Papillary Thyroid Carcinoma (PTC) was most commonly seen in the 20 - 50 years of age. The commonest morphologic variant seen in this population was classical papillary variant in 44/115 (38%) followed by papillary micro-carcinoma (n=30/115, 26%) and follicular variant of papillary carcinoma (n=18/115, 15.6%). Out of the 30 micro-carcinoma cases, 18 were diagnosed incidentally in thyroids operated for multi-nodular goiter. Immunohistochemical marker CK-19 was positive in 29/31, HBME-1 and HMW-CK in 15/15 cases; CEA was in one case where it was reported negative. Immunohistochemical stains were useful in cases with atypical /doubtful morphology.

**Key Words:** *Papillary carcinoma. Thyroid. Immunohistochemistry.*

Thyroid cancer is the second most common cancer after breast carcinoma affecting females in Oman.<sup>1</sup> Thyroid carcinoma is more prevalent in females as compared to males and it is more common in the third and fourth decade.<sup>1</sup> Variation in frequency of thyroid tumors has been observed in various parts of the world. In iodine rich areas, higher frequency of Papillary Thyroid Carcinoma (PTC) has been encountered.<sup>2</sup> Papillary carcinoma is diagnosed mainly by its classical papillary structures and nuclear features. However, many other pathologies share similar structural changes.<sup>3</sup> Proper handling and reporting of carcinoma of thyroid is important as it required in staging and clinical management.<sup>4</sup>

The current study included 115 cases of PTC diagnosed at our center over a 10 years period. The specimens were evaluated on H & E stained sections from paraffin embedded tissue. Immuno-stains were performed only on cases where the reporting pathologist felt that the morphology was not typical. These were also retrieved from the archives and were also reviewed. Immunohistochemical panel included CK-19, HBME-1 and CK-HMW (34  $\beta$ -E12). CEA was performed only on one case. Four pathologists reviewed the cases independently. One senior resident was also involved who reviewed the

**Table I:** Morphological variants of papillary carcinoma of thyroid.

Classical papillary carcinoma	44 (38%)
Papillary micro-carcinoma	30 (18 cases picked up incidentally 26%)
Follicular variant of papillary	18 (15.6%)
Tall cell variant	2 (1.9%)
Sclerosing papillary	1 (0.9%)
Mixed (multiple patterns)	20 (17.5%)
Total	115 (100%)

cases with the pathologists and recorded the findings. Data analysis was done using SPSS version 20.

Ninety five patients were females and twenty were males. Male to female ratio was found to be 1:8.5. PTC was most commonly seen in patients aged 20 - 50 years. The age ranged from 12 to 71 years.

The commonest morphologic variant seen in the Omani population was classical papillary variant (38%) followed by papillary micro-carcinoma (26%) and the third most common pattern was follicular variant seen in 15.6% (Table I). There were two cases of tall cell variant and only one was a pure sclerosing variant. There were 20 cases in which the dominant pattern was classical papillary but also had clear cell, tall cell or trabecular areas in significant proportion (represented as minor component).

Incidental discovery of papillary micro-carcinoma was made in 18 out of these 30 cases; these were found in thyroids operated for multinodular goiter. Multi-focal tumor was seen in 55/115 (48%) cases and unifocal in 60 cases (52%). Extra-thyroidal extension was seen in 15 /115 (13%) cases. Capsular invasion was seen in 14 of 115 (12%) cases. Typical PTC nuclear features like nuclear inclusions were seen in 75/115 (65%).

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Thyroiditis was present in the background of 59 cases (51%). Lymph node metastases were seen in 29/115 cases (25%); in all these cases the tumor size was more than 4 cm.

There are many diagnostic challenges faced by a pathologist in reporting a PTC. One of these is the absence of typical nuclear features in some neoplasms.<sup>5</sup> This study showed that all cases had most nuclear features (nuclear grooves, overlapping and nuclear clearing) and 75 cases had typical nuclear inclusions. Immunohistochemical stains were not done in all cases, only when morphology was unclear but whenever used, have contributed to making an accurate diagnosis. This finding is also supported by the data reported by Cheung *et al.*<sup>6</sup>

CK-19 staining has been reported to be a good marker for PTC, especially in classical variant. However, one study demonstrated strong positivity in follicular carcinomas and denied the value of CK-19 in papillary carcinoma.<sup>7</sup> In this study, CK-19 was positive in majority of cases of papillary carcinoma, mostly in moderate or strong degree. HBME-1 is a marker which was shown to be present in thyroid tumors of follicular origin. Where CK-19 was negative HBME-1 was positive. High sensitivity and specificity of HBME-1 makes it a good marker for the diagnosis of papillary thyroid cancer.<sup>8</sup>

Lymph node metastases were seen in 29 of 115 cases, they were present when the tumor was multifocal or the tumor size was more than 4 cm and in two cases metastases were seen with extensive peri-thyroidal extension. International data also reports lymph node metastases to be more frequently seen, when there is multi-focality, size of tumor is large or extra-thyroidal extension of tumor is there.<sup>9</sup> Encapsulated unifocal small sized tumors have excellent prognosis.<sup>10</sup>

This data shows that PTC conventional / classic type is the most common variant in Oman. HBME-1 and CK-19

are useful immunohistochemical stains to confirm the diagnosis of papillary thyroid carcinoma. Metastatic disease is associated with multi-focality and when tumor size is larger than 4.0 cm.

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