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Opinion Article

Molecular Markers in Cystic Papillary Thyroid Carcinoma: Clinical Features and Management

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DESCRIPTION

Thyroid cancer is the most common endocrine malignancy, with Papillary Thyroid Carcinoma (PTC) being the predominant histological type. PTC typically presents as a solid tumor, but there are less common variants, such as Cystic Papillary Thyroid Carcinoma (CPTC). CPTC is characterized by cystic changes within the tumor and poses unique challenges in diagnosis and treatment.

Epidemiology

Papillary thyroid carcinoma accounts for approximately 80%-85% of all thyroid cancer cases. Within this majority, cystic variants are relatively rare. The exact incidence of CPTC is difficult to determine due to its rarity and the variability in reporting. However, it is estimated that cystic changes occur in about 10%-15% of all PTC cases. CPTC is observed more frequently in women than men, consistent with the overall gender distribution of thyroid cancers. It typically presents in patients between the ages of 30 and 50.

Clinical presentation

The clinical presentation of CPTC can vary but often includes a palpable neck mass. Due to its cystic nature, the tumor may be mistaken for a benign thyroid cyst, leading to diagnostic delays. Symptoms such as a rapidly enlarging neck mass, hoarseness, dysphagia, or symptoms related to local compression may prompt further investigation. Occasionally, patients may present with cervical lymphadenopathy, indicating potential metastatic spread.

Diagnostic approach

Diagnosing CPTC involves a combination of clinical evaluation, imaging, and cytological examination.

Thyroid ultrasound is the primary imaging method for the for evaluating thyroid nodules. CPTC appears as a cystic or partially cystic lesion with solid components. Features suggestive of malignancy include irregular margins, microcalcifications, and increased vascularity within the solid components.

Fine-Needle Aspiration Biopsy (FNAB) is potential for obtaining cytological samples from the nodule. In CPTC, the cystic fluid may be aspirated, and the presence of atypical cells, papillary structures, or psammoma bodies can indicate malignancy. However, the cystic nature may result in insufficient or inconclusive samples, necessitating repeated aspirations or further diagnostic procedures.

Molecular testing markers such as BRAF mutations and RET/PTC rearrangements are common in PTC and can aid in diagnosis when cytology is inconclusive. Identifying these mutations can also provide prognostic information and guide therapeutic decisions.

Treatment strategies

The management of CPTC follows the general principles for treating PTC but may require adjustments due to its cystic nature.

The primary treatment for the CPTC is surgical resection. The extent of surgery depends on the tumor size, location, and presence of lymph node involvement. Options include lobectomy (removal of one thyroid lobe) or total thyroidectomy (removal of the entire thyroid gland). Total thyroidectomy is preferred for larger tumors, multifocal disease, or when there is evidence of lymph node metastasis.

Radioactive Iodine (RAI) therapy may be considered as a postoperatively, particularly for the patients with higher-risk features such as large tumor size, extra thyroidal extension, or lymph node metastasis. RAI helps to remove any residual thyroid tissue and treat metastatic disease.

In thyroid hormone suppression therapy, following surgery, patients are typically placed on thyroid hormone replacement therapy. The goal is to suppress Thyroid-Stimulating Hormone

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(TSH) levels, as TSH can stimulate the growth of any remaining cancer cells.

Long-term follow-up is essential to monitor the recurrence. This includes periodic neck ultrasound, serum thyroglobin levels, and, when indicated, diagnostic whole-body RAI scans. Regular follow-up helps to detect recurrence early, improving the chances of successful treatment.

Prognosis

The prognosis for CPTC is generally favorable, similar to other forms of PTC. The overall 10-year survival rate for PTC exceeds 90%. However, the cystic nature of CPTC can pose challenges in initial diagnosis and complete surgical excision. Despite these challenges, with appropriate treatment, patients with CPTC can expect excellent outcomes. Factors influencing prognosis include tumor size, extent of invasion, lymph node involvement, and the presence of distant metastases.

Cystic papillary thyroid carcinoma, though a rare variant of PTC, requires careful consideration in its diagnosis and management. The cystic nature of the tumor can complicate the diagnostic process, making a combination of imaging, cytology, and molecular testing potential. Treatment primarily involves surgical resection, with additional therapies such as RAI and thyroid hormone suppression as needed. With vigilant monitoring and appropriate therapeutic strategies, patients with CPTC can achieve favorable outcomes. Continued research and awareness are essential to improve diagnostic accuracy and optimize treatment protocols for this unique subtype of thyroid cancer.