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Differential diagnosis of thyroid nodules using fine-needle aspiration cytology and oncogene mutation screening: are we ready?

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Abstract

Thyroid nodules are a very common clinical finding, and although the majority of them are benign, thyroid carcinoma accounts for about 5-15% of nodules. Fine-needle aspiration cytology (FNAC) is actually used for the differential diagnosis of these lesions. Although in most cases this examination clearly distinguishes benign from malignant lesions, some fine-needle aspiration (FNA) samples fall into undetermined thyroid cytology categories, which according to the most recent classification of thyroid FNAC consist of 'suspicious for malignancy', 'suspicious for follicular or Hurtle cell neoplasm', and 'follicular lesion of undetermined significance/atypia of undetermined significance'. Moreover, some samples are insufficient for diagnosis. Taken together, these categories account for almost 20-30% of nodules. Owing to the high risk of papillary thyroid carcinoma, patients with lesions that are 'suspicious for malignancy' are currently subjected to lobectomy or total thyroidectomy. On the other hand, patients with 'atypia of undetermined significance' undergo repeated FNAs, and patients with 'suspicious for follicular or Hurtle cell neoplasm' are subjected to diagnostic lobectomy and subsequently, in the case of histological diagnosis of carcinoma, total thyroidectomy. Recent studies clearly indicate that molecular analysis of thyroid nodules can significantly improve the diagnostic power of cytology and drive the appropriate clinical management of these patients.