Role of core needle biopsy for patients with indeterminate, fine-needle aspiration cytology

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In this journal of *Endocrine*, Nasrollah et al. [1] reported a new core needle biopsy (CNB) technique for thyroid nodules classified as indeterminate in fine-needle aspiration (FNA) cytology. This new technique obtains core samples consisting of nodular tissue, extranodular parenchyma, and the nodule's capsule when it is present. They concluded that this technique is helpful to discern the nature of thyroid nodules classified as indeterminate on FNA.

In 1930s, large-needle biopsy using 14-gauge needle without ultrasound (US) had been used for diagnosis of thyroid nodules [2], but it showed no benefit in terms of its safety and efficacy as compared with those of FNA [3]. Therefore, in 1980s, FNA has been used as the standard technique for diagnosing thyroid cancer [4]. CNB has recently been reconsidered for use in the diagnosis of thyroid cancer because modern type, spring-activated CNB under US guidance improved both the safety and efficacy of this technique [5]. The patient comfort during and after CNB or tolerability of this procedure is well reported [6].

The majority of the recent guidelines have recommended CNB for patients with thyroid nodules with previously non-diagnostic FNA results [7–9] and in patients with suspicious lymphoma or anaplastic cancer [8, 9]. However, the American Thyroid Association guidelines recommend repeat FNA for patients with previously non-diagnostic FNA results instead of CNB [10]. Recently, Yeon et al. [11] retrospectively studied a large group of patients with non-diagnostic FNA results and concluded that CNB could reduce both the non-diagnostic and

inconclusive results. Their results also showed that CNB could prevent unnecessary diagnostic surgery in 96 % of the patients with repeated, non-diagnostic FNA results.

For indeterminate FNA results, F18-FDG-PET/CT or (99 m)Tc-MIBI scan may be helpful in patients with thyroid nodules in which malignancy is suspected on the basis of conventional diagnostic techniques [3, 4]. There are no guidelines recommending CNB. Therefore, repeated, indeterminate results of FNA cause patients to undergo diagnostic surgery [8]. As thyroid FNA has become widely used, unnecessary surgery has increased. In a recent study by Park et al. [12], they retrospectively reported the role of CNB for indeterminate thyroid nodules. Their results showed that CNB is superior to repeat FNA for previously non-diagnostic or indeterminate nodules. In another report on this topic by Na et al. [13], they again prospectively evaluated and suggested that CNB can effectively reduce inconclusive results compared with repeat FNA in nodules with previously non-diagnostic or atypia of undetermined significance (AUS)/follicular lesion of undetermined significance (FLUS) FNA results. This may be related to the larger tissue sample and the additional histological information obtained by CNB as compared with FNA. Choi et al. [14] verified the value of CNB in a large study population ($N = 191$) of patients with AUS and FLUS seen in previous FNA results.

In a recent study by Nasrollah et al. [1], 20 patients were diagnosed as follicular neoplasm without false negative results by new CNB technique including nodular tissue, extranodular parenchyma, and the nodule's capsule. On histology, all but one patient was diagnosed as having follicular adenoma, while the other patient was diagnosed with follicular carcinoma. Adenomatous nodules lack or have a thin fibrous capsule, while follicular neoplasms usually manifest as thick, encapsulated lesions [15]. In

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these cases, CNB may be useful for the diagnosis as it obtains the sample including the rim of the nodule as well as extranodular tissue. These preliminary data demonstrate the important role of CNB for differentiating adenomatous nodules from follicular neoplasm.

Given these considerations, CNB may help to determine the nature of indeterminate, follicular-patterned thyroid nodules. Larger, prospective studies will be required for a better understanding of the efficacy of CNB using thin-gauge needles as well as the importance of cutting within the nodule border.

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