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Optimal timing for a repeat fine-needle aspiration biopsy of thyroid nodule following an initial nondiagnostic fine-needle aspiration

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Abstract

BACKGROUND: In the case of a nondiagnostic thyroid fine-needle aspiration (FNA) biopsy result, recent guidelines from the Bethesda system recommend repeat thyroid FNA after 3 months to prevent false-positive results. We aimed to examine our institutional data to determine whether the 3-month period affects the diagnostic yield of repeat biopsies.

METHODS: A retrospective review of patient records over a 5-year period at our institution was performed. Patients who required repeat FNA due to nondiagnostic results were included. The time between the FNA biopsies, adequacy of the FNA specimens, as well as the surgical pathology diagnosis were analyzed.

RESULTS: We identified 317 patients who required a repeat FNA. Of these, 96 (30.3%) patients had repeat FNAs less than 3 months after initial biopsy, while 221 (69.7%) patients had repeat FNAs in greater than 3 months. One hundred five patients were referred to our clinic with an initial nondiagnostic biopsy from an outside institution. Repeat FNA was nondiagnostic in 35 patients (11.04%) in the total study population. There was no difference in satisfactory diagnostic yield between repeat FNAs performed greater than 3 months (201 patients, 90.95%) or less than 3 months (81 patients, 84.38%) after the initial biopsy ($P = .117$). Of the 35 patients with repeat nondiagnostic biopsy, 17 patients underwent diagnostic lobectomy and 3 (17.6%) patients were found to have malignant disease.

CONCLUSIONS: Early (<3 months) repeat FNA does not affect diagnostic yield of the subsequent sample. Patients with suspicious thyroid nodules could therefore receive a repeat FNA as soon as needed, rather than waiting 3 months. The shortened biopsy interval would alleviate stress on patients with benign nodules and expedite surgical intervention in patients with malignancy.
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Due to its high accuracy and cost effectiveness, fine-needle aspiration (FNA) has been an essential tool in the diagnosis of thyroid cancer. Despite this, up to 20% of FNAs can lack a definitive diagnosis due to inadequate sampling, and these nodules can have up to a 4% risk of malignancy.[1,2] Therefore, it is essential that a repeat biopsy be performed within an appropriate time interval to rule out the presence of malignancy.[3] The Bethesda System for Reporting Thyroid Cytopathology recommends a repeat biopsy be performed for these nodules no sooner than 3 months after the initial biopsy. This 3-month interval is recommended to prevent false-positive results due to inflammatory or reparative changes.[2] Delaying a repeat biopsy can put significant stress on the patient as they await the recommended 3-month time interval to undergo the repeat procedure, and may delay surgical intervention in patients with malignant lesions.

The aim of our study is to determine if the recommended 3-month waiting period is necessary to accurately obtain a diagnostic result and determine if false positives were seen in patients who had repeat biopsy sooner than the 3-month interval. To achieve this, we performed a retrospective review of our experience at a tertiary care referral center.

Methods

Patients

A retrospective analysis of our endocrine surgery database was performed under institutional review board approval. Between 2009 and 2014, we reviewed all thyroid FNA biopsies performed by one endocrine surgeon at Tulane University Medical Center. The location of the thyroid lesion and the date of FNA biopsy were recorded.

A false-positive result was classified as a positive malignant cytological result with a benign surgical pathology result. A nondiagnostic FNA biopsy was defined as an inadequate number of follicular cells in the specimen as defined by the Bethesda criteria for adequacy: less than 6 groups of benign follicular cells with each group composed of at least 10 cells.[4] All cytology samples were interpreted by board-certified cytopathologists at our institution.

Technique

FNA was performed under ultrasound guidance on all patients with suspected thyroid lesions by the senior author, with the presence of a cytopathology technician on site to confirm adequacy of the sample. A 25-gauge needle was used for the FNA as we and others have described before.[5,6]

Patients who underwent repeat biopsy of the same thyroid nodule were identified. The interval between biopsies of the same lesion was determined. A repeat FNA biopsy with a time interval of less than 3 months was considered an early FNA biopsy, while a repeat FNA biopsy with a time interval of greater than 3 months was considered a late FNA biopsy. We then recorded the FNA results and any subsequent surgical pathology diagnoses.

Statistical analysis

Fisher's exact test was applied for the categorical variables, while a 2-tailed Student t test was applied for the continuous variables. A univariate logistic regression model was used to calculate odds ratio and 95% confidence interval. The statistical analysis was carried out using SAS software, Version 9.2 (SAS Institute, Inc., Cary, NC). The results were considered statistically significant if the 2-tailed P value was less than .05. All values were expressed as means ± standard deviation, ranges or absolute numbers.

Results

The study consisted of 317 patients with initial nondiagnostic FNA biopsy. From 1,068 thyroid FNA biopsies performed over the 5-year period, we had 212 nondiagnostic results. A total of 105 patients were referred to our clinic with an initial nondiagnostic biopsy result from an outside institution. The average age of the patients was 53.51 (±14.54) years with the majority of the patients being female (82.9%). The difference between the results of repeat FNA biopsies in the early group and repeat FNA biopsies in the late group was not statistically significant ($P = .117$), as shown in Table 1. Eighty-nine percent of the

Table 1 Diagnostic yield of repeat FNA by timing in a total of 317 patients

	FNAs repeated within 3 months		FNAs repeated after 3 months		
Results of FNA repeat	No.	%	No.	%	Total
Nondiagnostic	15	15.6%	20	9.1%	
Adequate	81	84.4%	201	90.9%	
Total patients	96	30.3%	221	69.7%	317

Diagnostic yield of FNA biopsies in relation to the time interval between procedures.
FNA = fine-needle aspiration; No, number; %, percentage