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Cytologic-Pathologic Correlation

Do repeatedly nondiagnostic fine needle aspirations of thyroid nodules predict malignancy risk?

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ABSTRACT

Fine needle aspiration biopsy (FNAB) is a common, minimally invasive, cost-effective, and rapid method to manage thyroid nodules, but nondiagnostic FNAB (ND-FNAB) is still a common problem due to high prevalence (2%-20%). Our purpose in this study is to investigate risk of malignancy of repeating ND-FNABs and correlation between clinical and ultrasound findings. Our cohort study included 75 patients who had 2 or more times ND-FNABs and, finally, undergone surgical resection. We evaluated demographic, clinical, ultasonographic, and pathologic features. Fifty-seven patients were female, and 22 patients were male. Seventy-five patients' histopathologic results were 76% (n = 57) benign and 24% (n = 18) malignant. Of malignant nodules, 94.4% (n = 17) were papillary carcinoma, whereas 5.6% (n = 1) were follicular carcinoma. We did not find any predictive factor for malignancy and any differences associated with clinical and ultrasonographic features between benign and malignant nodules. Reaspiration followed by surgery for appropriate patients is recommended.

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1. Introduction

Fine needle aspiration biopsy (FNAB) is the most accurate, cost-effective, minimally invasive, and rapid diagnostic technique to evaluate risk of malignancy in thyroid nodules [1,2]. A successful fine needle aspiration requires a specimen with adequate cellularity, high-quality preparation, an experienced aspirator, and cytopathologist [3,4]. Bethesda system for reporting thyroid cytopathology states that the rate of nondiagnostic fine needle aspiration biopsy (ND-FNAB) should ideally not exceed 10% [1]. Although most biopsies are adequate for a cytological diagnosis, 2% to 20% of FNABs are qualitatively and quantitavely inadequate to diagnose [1]. Because the risk of malignancy in thyroid nodules is 1% to 10%, the American Thyroid Association (ATA) and Bethesda system for reporting thyroid cytopathology suggest performing a repeat FNAB under ultrasound (US) guidance for ND-FNAB. The suggested waiting time for repeat FNAB to avoid reparative cellular atypia is at least 3 months [2,5,6]. The Bethesda system reports 1% to 4% risk of malignancy associated with ND-FNAB, but other series reported a range of 2% to 51% [6-9].

If second FNAB is nondiagnostic, the ATA, European Thyroid Association, American Association of Clinical Endocrinologist, and Associazione Medici Endocrologi recommend consideration for surgical resection [2,10].

Some factors, such as experiences of performers, operators, or pathologist; method and needle gauge used in FNAB; and intrinsic characteristics of the thyroid nodules, such as size, cystic component, and margin, may cause ND-FNAB [11,7,12,13].

The aim of this study was to evaluate risk of malignancy in patients with repeat ND-FNABs who are referred to surgery and to identify clinical and ultrasonographic characteristics of these nodules.

2. Materials and methods

Our study was a retrospective study. Seventy-five patients with nodular thyroid disease who were operated on because of twice or more repeated ND-FNABs were included in the study. Medical reports were obtained from records of council of endocrinologists, general surgeons, and pathologists between 2007 and 2012. The study was conducted at Yildirim Beyazit University Ankara Ataturk Education and Research Hospital. Informed consent was received from all

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patients before each biopsy. All patients signed for having their information used in this study. The study was received approval from the local ethical committee. Esaote color Doppler US (model: 796FDII; MAG Technology Co, Ltd, Yung-ho City, Taipei, Taiwan) and a superficial probe (model no: LA523 13-4, 5.5-12.5 MHz) were used for standard US. Localization, diameters (millimeters), halo, echogenicity, marginal regularity, type of calcification, and peripheral vascularization of the nodules were evaluated by using standard US. Repeat FNABs were performed under US guidance using a General Electric Logiq pro 200 (model no.: 2270968; GE Healthcare Korea, Seongnam-si, Gyeonggi-do, Korea) and a 5.5- to 7.5-MHz probe by an endocrinologist using a 25-gauge needle attached to a 10-mL plastic syringe. Total thyroidectomy or lobectomy was performed depending on the size of nodule and surgeon's discretion.

All of the statistical analyses were performed with SPSS 18.0 (SPSS, Inc, Chicago, IL) statistical software. Descriptive statistics were shown as frequency tables or the mean ± SD notation for qualitative and quantitative data, respectively. Relations between the qualitative data were examined with χ^2 test. Independent-samples t test was used to compare the continuous variables.

3. Results

In the cohort of 75 cases presented in this study, 53 patients (70.7%) were female, and 22 (29.3%) were male. The mean age was 47.9 ± 10.9 years.

Histopathologically, 76% of nodules (n = 57) were benign, and 24% (n = 18) were malignant. Of malignant nodules, 94.4% (n = 17) were papillary carcinoma, whereas 5.6% (n = 1) were follicular carcinoma (Table 1).

Demographical and clinical factors, ultrasonographic characteristics, and histopathologic findings were investigated (Figs. 1-6). In addition, the relation of these features with benign and malignant histology was analyzed. We found no significant differences between benign and malignant histologies with respect to age, sex, nodule size, thyroid-stimulating hormone levels, and thyroid status. Ultrasound findings such as presence of solitary or multiple nodules, macrocalcification/microcalcification, halo marginal regularity, localization, cystic component, and echogenicity did not differ between malignant and benign nodules (Table 2).

There was no difference in size of nodule between benign and malign histologies ($P = .15$). Besides, nodule size greater than 3 cm was not associated with malignancy ($P = .18$) (Table 3).

4. Discussion

In the last 2 decades, FNAB has gained widespread acceptance as a diagnostic tool in the management of thyroid nodules [3,6,14]. Several authors have shown its remarkable sensitivity and specificity compared with other tools (radiology and laboratory tests) used in the diagnosis of thyroid nodules [3,14]. In general, thyroid nodules that are diagnosed as benign are managed clinically, and neoplastic and malignant ones undergo surgical excision [14]. However, there is no consensus about the management of thyroid nodules, which are

Table 1
Histopathologic findings

Histopathologic (postsurgical) findings	N = 75 (%)
Benign	57 (76.0%)
Malignant	18 (24%)
Papillary carcinoma	17 (94.4%)
Follicular carcinoma	1 (5.6%)
Lenfovascular invasion	1 (5.6%)
Capsular invasion	5 (27.8%)
Extracapsular invasion	1 (5.6%)
Multicentricity	6 (33.3)

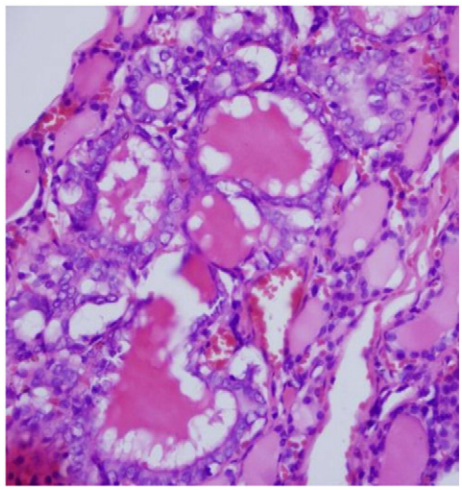

Fig. 1. Papillary thyroid microcarcinoma (original magnification ×400).

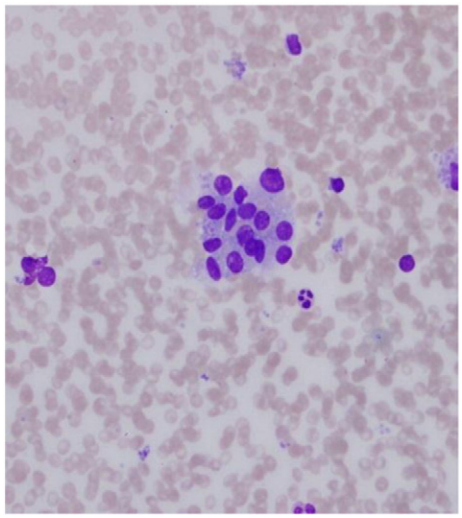

Fig. 2. Rare follicular epithelial cells (original magnification ×200, May-Grünwald-Giemsa).

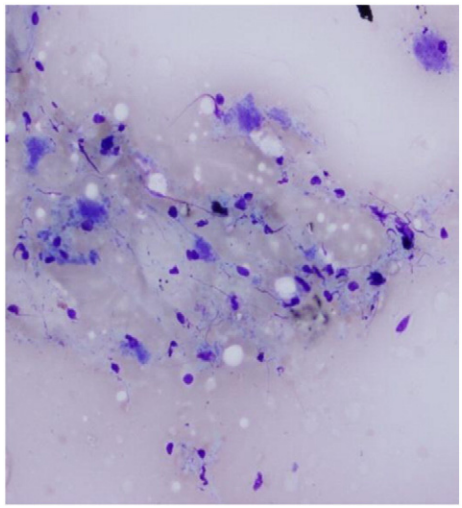

Fig. 3. Degenerated cells and macrophages (original magnification ×200, May-Grünwald-Giemsa).

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