Diagnostic Relevance of Fine Needle Aspiration Cytology for Follicular Lesions of the Thyroid: Retrospective Study

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Aim. To determine diagnostic relevance of cytologic subclassification of follicular lesions of the thyroid and its role in the therapeutic approach.

Methods. We performed a retrospective analysis of the data of patients who underwent thyroid surgery at the Sisters of Mercy University Hospital, Zagreb, between March 1995 and February 2001, and had a report of preoperative fine needle aspiration (FNA) biopsy of thyroid follicular lesion, which comprises cellular follicular lesion, “suspicious for follicular neoplasm,” or follicular neoplasm.

Results. Out of 110 patients with preoperative FNA biopsy diagnosis of follicular lesion, 86 (78%) had a lesion corresponding histologically to a neoplasm. However, a malignant tumor was found in only 6% of the patients. In the diagnostic categories of cellular follicular lesion and lesion “suspicious for follicular neoplasm,” the rate of malignancy was even lower, 3% and 4%, respectively. We found significant difference between FNA and histologic findings in distinguishing non-neoplastic from neoplastic thyroid lesions in the category of cellular follicular lesion and follicular neoplasm.

Conclusion. Due to the low malignancy rate in patients with FNA biopsy diagnoses of cellular follicular lesion or lesion “suspicious for follicular neoplasm” of the thyroid, we suggest close clinical follow-up of such patients, rather than immediate surgical intervention.

Key words: adenocarcinoma, follicular; biopsy, needle; thyroid diseases; thyroid neoplasms

Fine-needle aspiration biopsy of the thyroid is a rapid, minimally invasive, and cost-effective first line procedure in the evaluation of thyroid nodules (1). The main goal of thyroid fine-needle aspiration is to distinguish nodules that require surgery from those that do not, thereby decreasing the number of diagnostic surgical procedures (2-6). However, fine-needle aspiration of the thyroid gives indeterminate results for neoplasm in 5-29% of patients (7) and surgical excision, with its attendant high cost and potential morbidity, is usually required to fully evaluate such patients.

The most controversial is the management of patients with follicular lesions of the thyroid. The diagnosis of follicular thyroid carcinoma can be made only by histopathological identification of cellular infiltration into blood vessels or follicle capsule, or by detection of distant metastasis. Cytologic diagnosis has its limitations because cytologic findings in aspirates from adenomatoid nodules, follicular adenomas, well-differentiated follicular carcinomas, and papillary carcinomas of the follicular variant or with a prominent follicular component are often very similar (4,8-12).

We report our experience with fine-needle aspiration biopsy specimens classified as “cellular follicular lesion,” “suspicious for follicular neoplasm,” or “follicular neoplasm” of the thyroid during a 6-year period. Our aim was to determine the diagnostic relevance of cytologic subclassification of thyroid follicular lesions in relation to the therapeutic approach.

Patients and Methods

Patients
We performed a retrospective search of data of all patients who underwent thyroid surgery at the our hospital between March 1995 and February 2001 and had records of preoperative fine-needle aspiration of the thyroid. Fine-needle aspiration diagnoses included cellular follicular lesion, “suspicious for follicular neoplasm,” or follicular neoplasm of the thyroid.

There were 19 men and 91 women. The mean age of patients was 47.2 ± 12.8 years (median 47; range 17-76 years) (Table 1).

Methods

Routine percutaneous fine-needle aspiration biopsy was performed under ultrasound control by cytopathologist using a 23-gauge needle attached to a 10-mL syringe. Aspirated material was smeared onto glass slides, air-fixed, stained by May-Grün-
wald-Giemsa method, and examined with light microscope. Fine-needle aspiration results were compared with the histologic diagnoses, which were used as “gold-standard.”

Statistical analysis was performed with Fisher’s exact test and, where appropriate, Mehta and Patel’s computational algorithm (13). A p value of < 0.05 was considered significant.

### Definition of the Diagnostic Categories for Follicular Lesions

**Cellular follicular lesion** is best described as “probably neoplastic.” Fine-needle aspiration of cellular follicular lesion shows relatively abundant, slightly atypical, follicular (or Hürthle) cells and scant colloid.

**Follicular neoplasm** is best described as “probably malignant.” It includes follicular adenoma and follicular carcinoma. Irregular microfollicles with nuclear overlap and central, dense colloid, in association with cytologic nuclear atypia, characterize follicular neoplasms.

Fine-needle aspiration reports of “suspicious for follicular neoplasm” include cytomorphologic features of cellular follicular lesion and follicular neoplasm.

### Results

Out of the 439 patients with thyroid lesions that were surgically excised, 110 (25%) were diagnosed by fine-needle aspiration as having follicular lesions of the thyroid, which include cellular follicular lesions, “suspicious for follicular neoplasm,” and follicular neoplasm (Figs. 1-3).

These fine-needle aspiration results were compared with histologic findings. In summary, out of 35 cellular follicular lesions found by fine-needle aspiration, 22 (62.9%) were histologically follicular adenomas, 12 (34.3%) nodular goiters, and one (2.8%) was malignant lesion (Hürthle cell carcinoma) (Table 2). Out of 27 fine-needle aspiration specimens classified as “suspicious for follicular neoplasm,” 21 (77.8%) were histologically follicular adenomas, 5 (18.5%) nodular goiters, and one (3.7%) was malignant lesion (Hürthle cell carcinoma) (Table 2). Out of 48 fine-needle aspirations classified as follicular neoplasm, 36 (75%) were histologically follicular adenomas (including one case of Hürthle cell adenoma), 7 (14.6%) nodular goiters, and 5 (10.4%) malignant lesions (follicular, papillary, Hürthle cell, medullar, and metastatic renal cell carcinoma) (Table 2). The differences among the three cytologic subcategories of follicular lesions were not significant (Fisher’s exact test, p = 0.192).

We found significant difference (Fisher’s exact test, p = 0.03) between fine-needle aspiration cytology and histology in their ability to distinguish non-neoplastic from neoplastic thyroid lesions where cellular follicular lesion and follicular neoplasm were concerned (Table 3).

### Discussion

Aspirates that showed highly cellular content with little or no colloid were originally considered characteristic of neoplasms, whereas smears from colloid nodules showed abundant colloid and a relative scarcity of follicular cells (14,15). Recent reports noted that the aspirates from nodular goiters with ad-
ence of these entities in the patient populations. Nodent entities may be explained by different preva-
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smears with a prior indeterminate cytologic diagnosis
showed 103 benign lesions (94%) and 7 malignan-
tic to those of Sidaway et al (21), who found that out
of 39 excised nodules with a prior indeterminate di-
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In conclusion, despite difficulties encountered in
the diagnosis of thyroid follicular lesions, fine-needle
aspiration remains a powerful screening tool. In our
series of 110 patients with indeterminate cytologic di-
agnosis, fine-needle aspiration biopsy findings in 86
(78%) of them correlated with histologically con-
firmed neoplasms in subsequent thyroidectomias.
However, only 6% of our patients had a malignant tu-
mor, meaning that 94% of them underwent an unnec-
esary operation. In the diagnostic categories of cellu-
ar follicular lesion and “suspicious for follicular neo-
plasm,” the risk of malignancy was even lower, 3%
and 4%, respectively. Accordingly, we suggest con-
servative medical management of cellular follicular
lesions or “suspicious for follicular neoplasm” and
low risk lesions (soft or cystic lesions, “hot” nodules
on radioisotope scan, and lesions that regress during
thyroid hormone suppression) (1), particularly in elderly pa-
tients and those at high surgical risk. Such patients
should undergo ultrasound examinations and fine-ne-
edle aspiration at 6-month intervals, rather than im-
mediate surgical intervention.

Table 2. Correlation between fine-needle aspiration cyto-
logic and histlogic findings in patients with thy-
roid follicular lesions

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Table 3. Correlation between fine-needle aspiration cyto-
logic and histologic findings of malignancy in cytologic diag-
nostic categories of cellular follicular lesion and follicular
neoplasm in patients with thyroid follicular lesions

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References

1 Guidelines of the Papanicolaou Society of the Cytopa-
thology for the examination of fine-needle aspiration
specimens from thyroid nodules. The Papanicolaou So-
ciety of Cytopathology Task Force on Standards of Prac-

Received: February 20, 2002
Accepted: July 30, 2002

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