

# Fine Needle Aspiration Cytology (FNAC) in the Management of Thyroid Pathology - The Aga Khan University Hospital Experience

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## Abstract

**Objective:** To report the efficacy of FNAC in patients with thyroid disease.

**Methods:** Between January 1990 and December 1994 the records of all patients treated surgically for thyroid disease at ENT Head and Neck Surgery of Aga Khan University were reviewed. All the patients had preoperative FNAC as the first line of evaluation and the histopathologist examined post-operative thyroid specimen.

**Results:** Forty-five patients (36 female and 9 male) had thyroid surgery. In 26 patients out of 45, FNAC was conclusive in diagnosing the nature of disease, while in 19 patients the FNAC was inconclusive because of the presence of follicular cell neoplasia.

**Conclusion:** Our results indicate that the FNAC is very accurate and a reliable test in the diagnosis of thyroid pathology, however, to distinguish follicular adenoma from follicular carcinoma final histology is required. FNAC is cost effective method of evaluating thyroid pathology pre-operatively and plays a vital role in planning the surgical management of thyroid nodule (OPMA 49:133, 1999).

## Introduction

Goitre is seen in the general population, with a frequency varying between 4-10%. The prevalence of thyroid cancer is quite rare; between 3-11% of the thyroid pathologies will be malignant<sup>1,2</sup>. Clinicians need to recognize and distinguish between malignant lesions pre-operatively to avoid unnecessary surgery. Pre-operative identification of a malignant tumor in thyroid pathology is difficult and often unreliable. Thyroid scintigraphy, ultrasonography and biochemical tests provide little help in resolving this diagnostic problem<sup>3</sup>. Needle aspiration cytology has been used for pre-operative diagnosis for more than half a century. This method has gained worldwide acceptance during the last two decades and has been recommended as the first choice for the evaluation of thyroid pathology<sup>4-6</sup>. The cytologic criteria for papillary, medullary and anaplastic carcinoma are well defined, but the differentiation between well differentiated follicular carcinoma and follicular adenoma is not reliable by FNAC alone<sup>7,8</sup>.

## Material and Methods

Between January 1990 and December 1994, the records of all patients treated surgically at Department of Otolaryngology of Aga Khan University were reviewed retrospectively. All these patients had pre-operative FNAC, as the first line of evaluation and post-operatively thyroid specimen were examined by the histopathologist. All patients in whom pre-operative FNAC was not done have been excluded from this study.

For the purpose of this study, the following definitions and diagnostic categories are used: Benign

lesions include the colloid nodules, hyperplastic nodules and multinodular goiters, while malignant lesions include papillary carcinoma, medullary carcinoma, anaplastic carcinoma, lymphoma etc. For description of cytologic diagnosis, the term follicular lesion is used for both follicular adenoma and carcinoma, because cytologic separation of these entities is often impossible.

Forty-five patients, who had pre-operative FNAC of thyroid lesion and in whom post-operative histopathology was done, were selected for this study. Of 45 patients, 36 were female and 9 males. The age group varied from the teens to the seventies, the median age range was 30 to 50 years. On initial clinical presentation, 12 had solitary nodules, 13 had diffuse enlargement and 20 patients had multinodular enlargement of the thyroid gland. To assess the endocrine status of the thyroid gland, biochemical assessment was done in all these patients. Thirty-six patients were euthyroid and 9 were thyrotoxic. However, the thyrotoxic patients were converted into euthyroid state before surgery.

## Results

The results of FNAC are shown in Table 1.

**Table. Sensitivity of FNAC in thyroid pathology.**

	Year	%
Hamburger	1985	91%
Hawkin	1985	86.3%
Husu and Boeg	1987	74.5%
Schmid et al	1989	84.6%
Leung et al	1993	94%
Gharib (Mayo)	1994	95%

Twenty four patients had benign lesions, 19 had follicular lesions and 2 had malignant lesions. The results of FNAC were correlated with final histology results and we found that all benign lesions reported on FNAC were benign on final histology too. In 19 patients with follicular lesions on FNAC, 2 were found to be follicular carcinoma on final histology while 17 were reported as benign follicular adenoma. The 2 patients who on FNAC had malignant nodules on FNAC were confirmed by histopathology.

## Discussion

Needle aspiration biopsy and direct cytologic examination from a number of organs was pioneered by Martin and Ellis in 1930<sup>2</sup>. In 1952, Soderstorm used FNAC for the investigation of thyroid nodules<sup>9</sup>. It

is a relatively simple technique requiring no anesthesia and is not associated with any serious complications, although the fear of needle tract implantation is possible but it is largely due to the use of large needle (18 gauge). The most commonly reported complication is a small hematoma<sup>10</sup>. Borges and Rao<sup>11</sup> from Tata Memorial Hospital, Bombay reported no serious complication in a study of 3822 patients who had FNAC. Fine needle aspiration biopsy should be distinguished from the large needle aspiration and tru-cut needle biopsy. The latter technique uses larger needles and specimens are processed as tissue rather than cytologic smears. They are associated with a higher complication rate and consequently not used for diagnosis of thyroid nodules.

Goitre is common, occurring in 3.2-6.5% of Western population<sup>3,12</sup>. In America, 11000 cases of thyroid carcinomas are reported every year<sup>3</sup> and more than 1000 people die of thyroid cancer each year<sup>14</sup>. In India thyroid cancers are 1% of all the head and neck cancers<sup>15</sup>. The percentage of malignancy in patients with thyroid pathology varies 3-11%<sup>3,16</sup>. The clinical challenge has been to identify the malignant nodules pre-operatively and thus minimize the indications for surgery in benign lesions. No pre-operative test can definitely distinguish benign from malignant thyroid nodules. The thyroid scintigraphy and ultrasound imaging has been used to identify cold nodule and cystic lesions, however most cold nodules are usually benign but 15-20% are malignant. Approximately 5-10% of warm (normofunctioning) and 20% of hot (hyperfunctioning) nodules prove to be malignant<sup>9</sup>. The majority of small cysts are benign; the incidence of malignancy in cystic lesions varies between 7-25%<sup>9,14</sup>. The FNAC is commonly used for the diagnosis of thyroid pathology, many authors have reported a very high ratio of accuracy. Table<sup>17-22</sup>, shows the results of different studies, the sensitivity of FNAC varies from 74.5 to 95%.

Our results indicate that the FNAC is very accurate and a reliable test in the diagnosis of thyroid pathology. With application of gold standard equation, the sensitivity and specificity for malignancy is 100% as we do not have any false positive in our study although our data is small. The problem lies in the diagnosis of the follicular lesion. To distinguish follicular adenoma from follicular carcinoma, it is essential to see the invasion of the capsule, lymphatic and blood vessels. This cannot be done through cytology. In 19 patients, follicular lesions were reported. All of them underwent surgery and in only 2 patients the follicular lesion were found to be malignant.

Our review of thyroid cases suggests, that lesions with suspicion of malignancy and follicular lesions on FNAC should undergo surgical treatment (as it is impossible to differentiate between benign and malignant follicular lesions on FNAC). We conclude, that FNAC is safe, reliable in the hands of experienced cytopathologist and cost effective method of evaluating thyroid pathology pre-operatively and plays a vital role in planning the surgical management of thyroid nodules.

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