CONTRIBUTION OF FINE NEEDLE ASPIRATION CYTOLOGY (FNAC) IN THE DIAGNOSIS OF MALIGNANT THYROID NODULES

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ABSTRACT
Objective: To analyze the efficacy of fine needle aspiration cytology (FNAC) in the initial evaluation of malignant solitary thyroid nodules.

Design & Duration: Retrospective descriptive study from March 2001 to November 2007.

Setting: Dept. of General Surgery (Ward-2), Jinnah Postgraduate Medical Centre, Karachi.

Patients: A total of 381 patients with solitary thyroid nodule, who were operated after FNAC.

Methodology: The data of all the patients was collected, and their preoperative FNAC reports were compared with the histopathological reports of their resected specimen.

Results: Thyroid cancer was confirmed postoperatively among 110(29%) patients of the study population. Out of the 255 patients who had benign FNAC findings, 10 were found to be malignant on histopathology reports. There were 5% false +ve and 7% false -ve results.

Conclusion: FNAC of the thyroid gland is sensitive, specific, accurate, rapid, minimally invasive and cost effective. It is the first line procedure in the evaluation of thyroid nodules.

KEY WORDS: Goitre, Thyroid Nodules, FNAC, Carcinoma Thyroid

INTRODUCTION

Fine needle aspiration cytology (FNAC) is a well established technique for pre-operative investigation of thyroid nodules\(^1\). The technique is a cost effective and efficient method of differentiating benign and malignant thyroid nodules\(^2,3\), with an accuracy exceeding 80% according to most studies\(^4,6\). Its limitations include false negative, false positive, indeterminate or suspicious results. Besides a large number of aspirates are labelled as inadequate. Hence the most important factors in the outcome depends upon the experience of the aspirator and the criteria used to define a satisfactory sample\(^7\).

We undertook this study to define the diagnostic accuracy and the clinical utility of thyroid FNAC in differentiating benign from malignant nodules.

PATIENTS & METHODS

The medical record of all the patients who underwent thyroidectomy at Ward 2, Jinnah Postgraduate Medical Centre, Karachi from March 2001 to November 2007, were reviewed and a correlative data base established to compare preoperative FNAC reports with postoperative histopathological reports.

Fine needle aspiration cytology was performed on the patient in the supine position, neck fully extended by a pillow underneath the shoulders. A 22-25 gauge needle attached with 5ml syringe was used to collect the tissue sample. Multiple passes were made through the centre and the periphery of the nodules. A cytopathology technician was present during the aspirations, who prepared direct smear, air-dried and wet-fixed slides. Onsite assessment of the slides for adequacy was performed in many cases.

RESULTS

A total of 480 thyroid lobectomies for solitary thyroid nodule were performed during the study period. Amongst these only 381 underwent preoperative FNAC. The overall cancer prevalence in our patient population was
29% (n-110), as established by histopathology.

An FNAC diagnosis of papillary carcinoma had a predictive accuracy of 97%; amongst the 75 patients who were diagnosed as having papillary carcinoma on FNAC, only 73 were confirmed on histopathology. Eleven patients had either a border line or an insufficient specimen on FNAC, even after several (>3) attempts. All of these patients underwent thyroideectomy; only two (18%) had carcinoma on histopathology.

All patients (n-255) with an FNAC diagnosis of a benign nodule underwent surgery. Of these 10(6%) were found to be malignant; five had an incidental micro-carcinoma with a diameter of <1cm that did not correspond to the clinically significant nodule, while five had a significant carcinoma representing their clinically significant and biopsied nodule.

Indeterminate follicular lesions on FNAC were found in 40 patients. Of these 25(62%) had a histopathologic diagnosis of cancer; 13 had a follicular variant of papillary, eight were papillary and only four were follicular carcinoma on the final histopathology report. No correlation was found between nodule size and malignant potential in the indeterminate follicular lesion group.

**DISCUSSION**

FNAC was first proposed in 1904 to sample the lymph nodes in sleeping sickness disease. In 1930 Martin and Ellis described it as a valuable step in the workup of neck lumps including thyroid nodules. Many investigators have shown that fine needle aspiration cytology is the single most sensitive and specific method in the evaluation of solitary thyroid nodules which has gained popularity among pathologists and clinicians.

FNAC of the malignant thyroid nodule is reported to have sensitivity ranges from 65-98% and specificity of 72-100%. The false negative rate (FNR) is defined as the percentage of patients with benign cytology in whom malignant lesions are later confirmed on thyroidection. False negative results are expected particularly with small tumors and when there is associated degenerative or inflammatory change in adjacent thyroid tissue. In different series it ranges from 1.5-11.5%. In this study we reported 10 cases that translates to 7% FNR. The false positive rate (FPR) indicates that a patient with malignant FNAC result was found on histological examination to have benign lesion. In different series it is reported from 0-8%. In the present study 15 (5%) of our patients had a FPR.

Many thyroid diseases present clinically as the thyroid nodules; most are benign, yet up to 30% of the solitary nodules may harbour malignancy. Hence, the solitary thyroid nodule presents as a problem regarding surgical decision, because of the variable prevalence of malignancy in such nodules; different series have reported a prevalence rate of 20-60% carcinoma in surgically removed solitary thyroid nodules. The results of the present study are comparable with those over the world with a cancer prevalence of 29%.

The most controversial is the management of follicular lesions, as the diagnosis of follicular thyroid carcinoma can be made on histopathological identification of cellular infiltration into blood vessels or follicular capsule, or by detection of distant metastasis, because cytological diagnosis has its limitations. The cytologic findings in aspirates from adenomatoid nodules, follicular adenomas, well-differentiated follicular carcinomas and papillary carcinomas of follicular variant are often similar. Our experience in this study was the same, as only four patients had follicular carcinoma on histopathology, out of forty picked up on FNAC as indeterminate follicular lesions.

**CONCLUSION**

Fine needle aspiration cytology is regarded as the gold standard and a well established outpatient procedure, used as an initial investigation in palpable thyroid swellings, with a very low complication rate and an overall accuracy rate around 70% in the detection of thyroid malignancy. Hence, clinicians should be encouraged to ask for this investigative procedure in the management of patients with thyroid disorders.

**REFERENCES**


