ORIGINAL ARTICLE

Diagnostic Accuracy of Fine Needle Aspiration Cytology in Thyroid Nodules

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ABSTRACT

Introduction: Goiter is a common problem in southern Punjab and thyroid surgery is frequently performed in surgical units of BVH Bahawalpur. Fine Needle Aspiration Cytology is the investigation of choice in detection of carcinoma thyroid. It is simple and quick to perform and can be readily repeated.
Objectives: The aim of the study was to find out the diagnostic accuracy of FNAC in thyroid nodules.
Methods: Fifty patients of goiter of age ranging from 16 to 60 years, irrespective of gender, presenting with a thyroid nodule and undergoing surgery were included in the study at Department of Surgery, BVH Bahawalpur. Information of each patient was collected on a structural Performa and then analyzed on SPSS to assess the sensitivity and specificity of the FNAC.
Results: the sensitivity and specificity of FNAC was 72.2% and 97.8% respectively.
Conclusion: FNAC should be performed in all cases of thyroid nodules because of its high sensitivity and specificity to diagnose the benign as well as the malignant lesions of thyroid.
Keywords: Fine Needle Aspiration Cytology, Excision biopsy, Goiter.

INTRODUCTION

Discrete thyroid swellings are common and are present in 3-4% population in UK and USA[1,2]. These are four times more common in females[3]. Thyroid swellings can be isolated or dominant. True incidence of thyroid nodularity is less apparent on clinical classification. When such glands are exposed at operation, clinically impalpable nodules are often detected[4]. The usual presentation of thyroid is with swelling, pressure symptoms or signs of toxicity[5]. Importance of discrete thyroid nodule lies in the risk of neoplasia as compared to other thyroid swellings. Fifteen percent of isolated swellings is malignant[6]. Presently available tools to know the nature of a thyroid nodule are thyroid function tests, thyroid antibody titers, isotope scans, ultrasonography and fine needle aspiration cytology[7]. FNAC is an integral part of selected patient management but comprises only part of overall evaluation[8]. FNAC is usually performed in clinically palpable nodules. If nodules are not palpable, then this procedure can be performed under ultrasound guidandance[9]. overall diagnostic efficacy of FNAC is 94.2%. However, only limitation is to differentiate between follicular adenoma and carcinoma. Major load of unnecessary surgery can be avoided by perfection and routine use of FNAC in solitary thyroid nodules[10]. FNAC is a simple and cost effective biopsy technique that can be performed on out-patient basis.

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Identification of the iodine deficiency disorders (IDD) in Pakistan dates back to 1906 when an extensive description of IDD in Gilgit and Chitral was published in Lancet[11]. These two districts have one of the highest prevalence rates in the world which is comparable to those in the highly endemic areas of Bhutan and Nepal. The overall prevalence in these two areas is between 61 to 83%. The total goiter ratio in Multan district was 41.3% and 72.3% in boys and girls respectively[12]. Thyroid diseases are especially common in the region of a belt starting from Sutlej River running alongside the Sindh River involving its delta across Kabeerwala, Multan, DG Khan and into the Sindh province. Bahawal Victoria Hospital falls slightly away from this catchment area, yet it gets its share of thyroid problem quite frequently. The objective of the study was to find out the diagnostic accuracy of FNAC in thyroid nodules.

MATERIALS AND METHODS

This study was conducted at Bahawal Victoria Hospital Bahawalpur. Duration of study was from June 2009 to November 2009. All the patients presenting with thyroid nodule, 16 to 60 years of age irrespective of gender were included in the study. Patients with advanced fixed tumor were excluded from the study. Cases were collected from the surgical wards of BVH. Fifty patients of thyroid nodule were analyzed by a Performa which contained different variables of history, clinical examination and investigations. FNAC and excision biopsy was examined in the Department of Pathology, Quaid -e-

Azam Medical College Bahawalpur. Frequencies of demographic variables were computed. Mean and standard deviation was calculated for continuous variables. Matched analysis was carried out for the excision biopsy report (EBR) and FNAC. Unadjusted matched ratio and their 95% confidence interval was calculated. Association among independent variables was checked by chi-square test. P value <0.05 was considered significant. The sensitivity and specificity of the FNAC was noted by comparing its results with excision biopsy which was taken as a gold standard.

RESULTS

Fifty patients of thyroid nodule from surgical wards were enrolled. The mean age in years of the study subjects was 35 with Std Deviation of 13. Minimum age was 16 and maximum 60. Nine patients were male and 41 females. Female to male ratio was 4:1. Duration of goiter ranged from 1 year to 19 years (mean 6.5 years). FNAC revealed 7 cases of malignant and 39 cases of benign cytology. The results in 3 cases were suspicious and in one case, cytology showed inflammatory disease. Inadequate specimen was obtained in 3 patients and FNAC was repeated in those cases. Excision biopsy confirmed 9 cases of malignancy. Histopathology of 40 cases showed benign disease. One case of thyroiditis was reported.

DISCUSSION

Fifty patients of thyroid nodule were studied in this cross-sectional study. FNAC was done in all the patients and cytology was malignant in 7, benign in 39, suspicious in 3, and inflammatory in one case. The gold standard excision biopsy confirmed 9 cases of malignant and 40 cases of benign disease. The sensitivity of FNAC was 72.2% and specificity was 97.8%. Sensitivity was less for the follicular carcinoma (55%) and high for papillary and medullary carcinoma (88%). The reason of low diagnostic accuracy of FNAC in case of follicular carcinoma is that, its diagnosis is dependent not only on cellular morphology, but also on the capsular and vascular invasion which can only be diagnosed on histopathology, not on cytology. Sensitivity of FNAC is high (97.7%) for diagnosis of benign lesions such as colloid goiter and inflammatory conditions of thyroid with specificity of 95.6%. So it can give an important guide for the further planning of the management of patients.

Sensitivity is low for the cystic lesion than the solitary nodule because initially on aspiration only cystic fluid, blood or dead necrotic material is obtained. Later on, it is practically difficult to take biopsy from its wall. Out of four inadequate specimens obtained during this study, 3 were cystic and FNAC was repeated twice.

FNAC of thyroid nodule is reported to have sensitivity ranges from 65-98% and specificity of 72-100%. [13] The results of this study also fall in this range. In a study conducted by Ngadda[14] and his colleagues, the sensitivity and specificity of FNAC were 70.2% and 97% respectively. Likewise sensitivity and specificity of FNAC in the study of Mundasad[15] was 74.6 % and 98.6%. in another study conducted by Haruana[16], the results were 88.1 and 96.1%. the difference of increased sensitivity may be due to a large sample size. Similarly Martinek's study[17] showed FNAC to be 79.8% sensitive and 98.7% specific. In this study, FNAC was done under ultrasound guidance which improved the results.

CONCLUSION

The recommendations in the light of this study as follows:

1. FNAC should be done in all cases of thyroid nodule because it has high sensitivity and specificity to diagnose the malignant as well as benign lesion of thyroid.
2. Facility of cytopathological diagnosis of thyroid disease should be available at the secondary and tertiary health centers.

REFERENCES

1. Schmauss AK. History ofsurgical treatment of goiter. Artl Fordbild Qualitasshich(Germany), August 1997; 91(5): 469-75.
2. Orlandi A, Puscar A, Capriata E, et al. Repeated fine-needle aspiration of the thyroid in benign nodular thyroid disease: critical evaluation of long-term follow-up. *Thyroid* 2005; 15:274-78.
3. Zygnunt Hk. The thyroid gland and thyroglossal tract: Short practice of surgery. 24th Ed. London. Arnold, 2004; 784-86.
4. Afroze N , Kiani N, Hasan SH. Role of fine needle aspiration cytology in the diagnosis of palpable thyroid lesions. Indian J Pathol Microbiol 2002; 45: 241-6.
5. Nasuti J, Gupta PK, Baloch ZW. Diagnostic value and cost effectiveness of on site evaluation of fine needle aspiration specimens: Review of 5,688 cases. Diagn Cytopathol 2002; 27:1
6. Lawrence W, Kaplan BJ. Diagnosis and management of patients with thyroid nodules. J Surg Onc. Jul 2002; 80(3): 157-70.
7. Zanthour B, Guilhaume B, Tissier F, Louvel A, Jeunematre X, Gimenex-Roqueplo Ap et al. A thyroid nodule revealing paraganglionoma in a patient with new germ line mutation in the succinate dehydrogenase B gene. Eur J Endocrinol 2004; 151: 433-8.

8. Raab SS, Grzybicki DM, Janosky JE. Clinical impact and frequency of anatomic pathology errors in cancer diagnosis. Cancer. 2005; 104: 2205-13.
9. Clary KM, Condell JL, Liu Y. Interobserver variability in the fine needle aspiration biopsy diagnosis of follicular lesions of the thyroid gland. Acta Cytol. 2005; 49: 378-82.
10. Barroeta JE, Wang H, Shiina N. Is fine-needle aspiration of multiple thyroid nodules justified? Endocr pathol 2006; 17(1): 61-5.
11. McCarrison R: observation on endemic cretinism in the Chitral and Gilgit valleys. Lancet 1980; II: 1275-80.
12. Mahmud, Siraj-ul Haq. Current status of endemic goiter and control measures in Pakistan. In: towards the eradication of Endemic Goiter, cretinism and Iodine Deficiency, Scientific publication 502. WHO, Pan American Health Organisation, Washington, D.C. 1986.
13. Hamburger JI. Diagnosis of thyroid nodules by fine needle biopsy: use and abuse. J Clin Endocrinol Metab. 1994; 79: 335-339.
14. Nggada HA , Khalil MIA. Fine Needle Aspiration Cytology (FNAC) Technique as a diagnostic tool of tumours in the UMTH, Nigeria. Highland Medical Research J. 2003; 1(3): 28-30.
15. Mundasad I, Mcallister J, Carson PC. Accuracy of Fine Needle Aspiration Cytology in Diagnosis of Thyroid Swellings. The internet Journal Endocrinol . 2006. Volume 2, No 2.
16. Haruna A, Nggada, Alhaji B Musa, Bata M Gali, Mustapha IA, Khalil. Fine Needle Aspiration Cytology of Thyroid Nodule: A Nigerian Tertiary Hospital Experience. The internet Journal of Cardiovascular Research. 2006. Volume 5. No 1.
17. Martinek A, Dvorackova J, Honka M, Horacek J. Klavana P. Importance of guided fine needle aspiration (FNAC) for the diagnostics of thyroid nodules-own experience. Biomed Pap Med Fac Univ Palacky Plomouc Czech Repub 2004; 148(1): 45-50.