

ASSESSING THE ULTRASOUND GUIDED FINE NEEDLE ASPIRATION IN DIAGNOSIS OF THYROID NODULES

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ABSTRACT

Objective: To decide the number of punctures in a biopsy procedure, Fine Needle Aspiration (FNA), needed for secured cytological evaluation of thyroid nodules.

Materials and Methods: This cross-sectional analysis was carried out at Pakistan Institute of Medical Science, Islamabad (PMIS) during the period from January to December, 2016. A total of 94 patients participated in the population study according to the inclusion criteria. The diagnosis was the focal point of the research.

Results: The participants in the study group aged around 51 years, while 86.2% among the patients were females. Since punctures were considered as an independent event, the first puncture produced decisive results in 77.5% of cases. The second and third puncture produced results in 82.1% and 73.2% of all cases relatively. With a view to increase the conclusive analysis at each puncture, two punctures have demonstrated indisputable results in 87.2% of cases, and three punctures, in 91.2% of cases with no less than one decisive result.

Conclusion: Two punctures in fine-needle biopsy of thyroid nodules have prompt determination in 86.2% of cases in the evaluation recommending that there is no requirement for further punctures to securely acquire the analysis of thyroid nodules.

Key Words: Thyroid nodules; Fine needle aspiration biopsy; Ultrasonography guided fine needle aspiration

INTRODUCTION

A thyroid nodule is a term that refers to small lesions found in the thyroid gland. They are radiologically distinguishable from the thyroid parenchyma. In 4% to 7% of population, palpable nodules presence indicated by the epidemiological studies. It could sore up to 30-50% with the use of ultrasonography. The promulgation of the usage of diagnostic imaging has escalated occurrence of fortuitously diagnose thyroid nodule. Those nodules distinguished at carotid ultrasonography, computed tomography and further methods that are not associated with thyroid. Thus, it leads to the diagnosis of nodules that required assessment.¹ The process of discovering the Carcinomas, which is considerably smaller than 1cm in diameter, has sped up in the past decades, and diagnoses of virulent thyroid nodules have surpassed. In the 1980's,² there was a progression in the evaluation of thyroid nodules following the success of fine needle aspiration biopsies (FNAB). Fine needle aspiration biopsy is regarded as a precise method to recognize malicious and benign disease with the finest cost-effectiveness for the evaluation of thyroid nodules.³ FNAB has reduced a notable figure of patients

submitted to an operation and has also lowered the risk of complications.

The occurrence of malicious thyroid nodules in a case with the presence of more than one nodules and with the absence of other risk elements ranges from 6-13%. FNAB has been discovered to be 95 % faultless in 85% of the cases. Results from the method of FNAB are assorted in four categories. They are as under: malignant, benign, suspicious for undetermined / malignancy (follicular neoplasia or Hurthle cell neoplasm) and non diagnostic. A benign colloid nodule is a common thyroid lesion, followed by nodular goiter, hyperplastic nodule, plain cysts, sub acute thyroiditis and lymphocytic thyroiditis. Follicular lesion or undetermined category consists of couple more medically distinct group of lesions, named as Beni Follicular Lesions (Hurthle cell adenomas, hyperplasia of non-neoplastic follicular cells, follicular lesions, follicular adenomas) and malignant follicular lesions (a variation of papilliferous carcinoma, Hurthle cells carcinoma and follicular carcinoma).² The follicular category is also very challenging. Ultrasound-guided needle biopsy is an effortless method which can be done

on an outpatient basis and it involves quite a few apparatuses.^{4,5} The case is placed flat on its back with the hyper extended neck. Usually, the Local anesthesia isn't required and the area of cervical is rubbed with alcohol. The aspirate is gathered with gauge needle (30*7) connected to a ten ml needle. The syringe is then punctured in the nodule until some fluid or blood is collected in the syringe. Two or three punctures on different regions of the nodules are highly suggested. The collected fluid is then transformed on 2-6 slides to be examined. Slides are then covered for 4-12 specimen preparation. A non-diagnostic report of thyroid nodule performed by FNAB might be generated by an inadequate cytological material or hemorrhagic specimen. Few studies have assessed the effect of such researches, in spite of the wide usage of ultrasound-guided FNAB.^{6,7} Some acute complications might be observed, alongside low risk of complications which involves pain, discomfort, and growth of small hematomas. A narrative review, reported hemorrhage, edema, hematomas, laryngeal, nerve palsy, infection, tracheal perforation, vasovagal reaction, dysphasia, tumor dissemination (seedlings of the malignant cells can be injected through a needle), and a difference in volume of the nodules. The complications as the outcome of the method are rare, since they may occur nonetheless. It is suggested that by decreasing the number of punctures may result in reducing the risk of complications. In the study, number of pricks for the thyroid nodules diagnosis is not determined. The technique could be safe and secure by the identification of numbers of punctures and to reduce the pain and discomfort and possible complications. Therefore, in present times, the aim is to ascertain the required figure of punctures for a safe cytological thyroid nodules diagnosis.

MATERIALS AND METHODS

This cross-sectional analysis was carried out at Pakistan Institute of Medical Science, Islamabad (PMIS) during the period from January to December 2016. A total of 94 patients were participated according to inclusion criteria. Patients with already experienced FNAB for thyroid nodules diagnoses were excluded from the study. A group of patients underwent ultra sound guided Fine needle aspiration biopsy, for thyroid nodules diagnosis. The drawn taster of ninety four cases subjected to the analysis in the duration between May 2008, and December 209 conducted in a private image diagnostic clinic.^{8,9} The team that performed FNAB consisted of nursing technician and a radiologist. The method used in the technique was aspiration puncture conducted with a 30*7 gauge syringe, which is

connected to a needle (of 10 ml capacity) and proceeded into different regions of nodules and is drawn in and out rapidly without any suction. The patients in the study group were all given local anesthesia with 1% of lidocaine (Xylocaine) without vasoconstrictor prior to the process. Around 1-5 punctures were performed on the same nodule. The drawn out aspiration was then sent to the laboratories in different vials for cytological assessment. The vials were marked as specimen 1, 2 and 3. The collected sample was sent to two pathological laboratories and the results of the specimen were handed over on separate reports. Specimen was characterized by their characteristics which were satisfactory, non satisfactory or limited. The results of the biopsy were submitted into a database of the SPSS 20.

RESULTS

The present examination assessed consequences of oncotoc cytology of thyroid nodules in 88 cases. Of which 86.2% were women, average age of patients of population study was 51 years (standard-deviation = 11.2). No less than one thyroid puncture was performed on the patients, furthermore two puncture were performed on 57 patients and three punctures were subjected on 43 cases. Two patients have punctured four times and five punctures on to single patient. It is crucial to report that no further results were obtained by the added punctures. The number of punctures ranged from 1-4, the mean value of the number of punctures was 2 (standard deviation 0.2). The evaluation of conclusive outcomes as per the punctures numbers illustrates that first puncture as an individual event presented results in 71.59% of the patients. The second puncture as an individual event gave conclusive results in 83.54%. The third individual event showed results in 72.42% of the cases. Among the 85.96% of the patients (on whom two punctures were performed), one presented an absolute result. Of the patients who were subjected to three punctures, 86.04% gave absolute results, as shown in Table 1.

Table 1: Number of Diagnostic Puncture with percentage

Puncture numbers	No. of patients	No. of diagnostic punctures	%	CI (95 %)
1	88	63	71.59	69.21-73.38
2	57	49	85.96	83.11-86.35
3	43	37	86.04	84.39-88.38

Among the thyroid nodules, benign were 69.2%, malignant were 4.2%, undetermined were 14.3% were undetermined and non-diagnostic were 5.3% was non diagnostic because of the inadequacy of the representative cells, and epithelial cells or for the hemorrhagic cytology sample. The most persistent diagnosis to be observed during the first puncture non diagnostic sample (23.5%) accompanied by adenomatous goiter (21.6%) and (12.2%) of follicular pattern nodule. In 4.7%, papilliferous carcinoma was observed at the first individual event. Adenomatous goiter (17.9%) was prevalent at the second puncture, non-diagnostic around 16.4% and goiter around 13.5%. After the examination of the third puncture slide, non diagnostic sample (21.8%), adenomatous goiter (19.4%), follicular pattern nodules (13.5%) and goiter (12.2%) were identified as shown in the Table 2.

Table 2: Diagnosis identification of patients

Diagnosis	Puncture		
	1 (n = 88)	2 (n = 57)	3 (n = 43)
Follicular pattern nodule	12.2%	12.1%	13.5%
Goiter	6.8%	13.5%	12.2%
Colloid goiter	6.3%	4.6%	2.2%
Adenomatous goiter	21.6%	17.9%	19.4%
Lymphocytic thyroiditis	5.2%	6.4%	6.8%
Cyst	1.4%	-	-
Negative for malignancy	6.5%	5.3%	6.8%
Papilliferous carcinoma	4.7%	2.6%	3.6%
Non-diagnostic	23.5%	16.4%	21.8%
Cystic lesion	2.4%	2.9%	1.3%
Hemorrhagic smears	1.3%	1.6%	-
Cystic degeneration	1.3%	1.6%	-
Follicular lesion	1.3%	3.6%	3.4%

DISCUSSION

Fine needle aspiration Biopsy is considered to be the most preferable diagnosis method and also produces results in an accurate manner. Because of its thorough and reliable examination FNAB has been able to avoid a number of operations carried out on patients. But to enable a reduction in the surgical processes, the required amount of cytological specimen must be obtained in the hub of a syringe. Insufficient amount of

cells, technical puncture failure, minor nodules, and mixed solid and cystic contents lead to non diagnostic sample. A common factor that yields non diagnostic result is aspirating insufficient amount of cells which occurs in 1 to 15% of the events. In current case the percentage of non diagnostic specimen is observed to be 6.3. This result is similar to that of the author's who'd examined the rate of specimen varying from 3 to 11% of their samples. 2 punctures were performed per case (it varied from 1 to 4 punctures)¹⁰ which makes it a considerably lower than that of the report which suggested 3.8 punctures, (1- 11 puncture per case). It has been analyzed that there had been a definite increase in the conclusive result by 9.7% on the performance of second puncture. However, the third individual event led to only 1.1% of the conclusive result. Therefore, we arrived to a conclusion that two punctures were adequate to acquire desirable results. The third puncture event was concluded to be unnecessary in order to increase the chance of obtaining specimen. However this discovery is yet to be established in literature. There is no mention or recommendation in the researches about the number of punctures conducted during a test. Physician writers are able to find a single article that suggests the influence of the diagnosis. A lesser number of punctured are recommended as it enables to lessen the pain and discomfort in the patient. It also reduce the complication chances resulted by punctures. It is very important to remind that among uncertain results, the hazards of malignancy runs between 4 to 20 %, and in such cases, the reputation of FNAB is highly suggested. It is also crucial to remind that Pathologists stay amid the procedure held at the diagnostic center, in order to overview the sample before sending it to the laboratory for evaluation. Most of the diagnostic centers do not have a pathologist present at the place, so the obtained specimen has to be sent without an overview. If the sample comes out as none diagnostic, the patient has to undergo the procedure all over again.

In the current analysis, the prevalence of benign nodules was 68.5% and prevalence of malignant nodules was 4.8%. A result like that found by various authors who exhibited malignancy between 3 to 18 %, and benign nodules between sixty nine percent to eighty one percent.^{11,12} Some constraints in the current analysis should taken into notice to avoid in future examinations. Initially the amount of specimen was little and helpful, which limits the speculations of the outcome. Second, the specimen was sent down to different medical centers, which may incur various answers. However it is crucial to determine that focus of present investigation is not accuracy of FNAB in laboratories, but solely to

outline the importance of range of punctures for accurate evaluation of thyroid gland.

CONCLUSION

Two punctures through fine needle aspiration determined satisfactory diagnoses thyroid gland in 86.2% of patients, suggesting that there is no requirement whatsoever for further punctures to obtain secure analysis of thyroid nodules.

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