SUITABILITY OF FINE NEEDLE ASPIRATION CYTOLOGY FOR MALIGNANCY DETECTION IN SOLITARY THYROID NODULE

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ABSTRACT

Objectives: *To assess the diagnostic efficacy of fine needle aspiration cytology (FNAC) in identifying cancer in isolated thyroid nodules using nodule histology as the gold standard.*

Materials and Methods: *Between January 2021 and September 2022, 145 individuals who were hospitalized to ENT department, Khyber Teaching Hospital in Peshawar, Pakistan, with a single thyroid nodule and underwent surgery for histopathology and whose needle aspiration cytology of thyroid nodules was done were included in the research. We looked at the FNAC reports as well as the histopathology results.*

Results: *For diagnosing cancer in a single thyroid nodule FNAC had sensitivity of 81%, specificity of 73.56%, PPV of 67.14% and NPV of 85.33%.*

Conclusion: *The FNAC test is a good test to screen for cancer in solitary thyroid nodules.*

Key words: *Thyroid nodule, FNAC, accuracy*

INTRODUCTION

A solitary thyroid nodule is single enlarged lump in thyroid gland detected on clinical exam and verified by ultrasonography. A small percentage of these nodules are cancerous. These nodules are usually harmless. This disease is a frequent illness in our part of the globe.[1,2]

ENT surgeons regularly do operative procedures on thyroid gland both for removal of diseased tissues and for taking specimens for histopathological examinations to identify cancer in this gland. Operations on thyroid gland is an extremely complicated process, and even experienced surgeons occasionally encounter complications, leading to an increased risk of serious morbidities and even mortality. Secondly most of the thyroid diseases are benign and don't need any surgical removal. So it is imperative to have some sort of tissues or cytological diagnosis before performing any surgical procedure on thyroid gland. In this way a great number of intraoperative and postoperative complication can be prevented by performing surgical procedures only on the needy patients.[3] If no malignancy is identified, these nodules must be managed with prudence conservatively.[1,4]

Fine Needle Aspiration Cytology (FNAC) was first used to diagnose thyroid neoplasms in 1950, and it immediately acquired widespread acceptance. It now plays an important role to evaluate and diagnose malignancies in thyroid lumps. Typically, the operation is not associated with any major risk without needing any incision. It can be performed as a day case without admitting a patient in the hospital. It is a minimally invasive procedure as compared to taking of tissue biopsy.[5,6]

Because of the high number of false negative results of FNAC it's us in diagnosis for malignancy is somewhat controversial.[7] Thus, we designed tis investigative research to assess FNAC's accuracy in identifying malignancy in thyroid nodule and correlating it to tissue biopsy findings.

MATERIALS AND METHODS

The current retrospective research was conducted in department of ENT at Khyber Teaching

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Hospital in Peshawar, Pakistan between January 2020 and September 2022 including 145 patients of both male and female genders, age ranging between 18 to 80 years, who had biopsy for a single thyroid nodule and cytological examination though fine needle aspiration during this period. Sample size was determined taking the following values; sensitivity, specificity of FNAC being 69% and 76% respectively8, prevalence of malignant solitary thyroid nodules being 34%9, desired precision of 13% and confidence interval of 95%. Patients with multinodular goitre, thyrotoxicosis and severe neck edema, were excluded. Data was calculated through SPSS version 22. Categorical data was expressed as frequencies and percentages. Continuous variables were expressed as mean and standard deviation. Diagnostic accuracy was determined in the terms of sensitivity, specificity, NPV, and PPV of FNAC's taking histological diagnosis of biopsy specimen as the gold standard.

RESULT

100 (68.96%) of patients were the age range of 20 and 50, with a mean ±SD of 47.20±14.21 years. 36 patients (21.38%) were male, while 114 (78.62%) were female (Figure 1). Pain was experienced by 14 (9.66%) of patients in the thyroid gland. Out of all the patients 37 (25.52%) were having the lump in left lobe of thyroid gland, whereas it was found in 108 people (74.48%) in right lobe of thyroid gland. 60 (41.38%) of the 145 nodules were malignant. Papillary carcinoma was found in 50 (34.48) nodules while follicular carcinoma was found in 10(6.9%) nodules (Table 1). FNAC showed sensitivity was 81%, specificity was 73.56%, positive predictive value was 67.14%, and negative predictive value was 85.33% in identifying malignant thyroid nodules (Figure 2).

Table 1: Patients characteristics

Nodule location	Left thyroid lobe=37 people	(25.52%)
	Right thyroid lobe=108	(74.48%)
Neoplastic condition	Malignant= 60	(41.38%)
	Benign=85	(58.62%)
Papillary carcinoma	50	(41.38%)
Follicular carcinoma	10	(6.9%)
Pain in thyroid nodule	14	(9.66%)

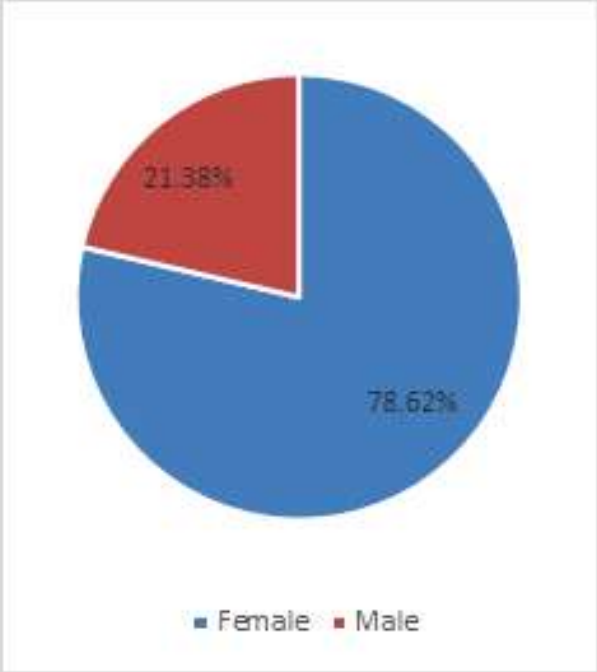

Fig 1: Figure.1: Gender-based distribution

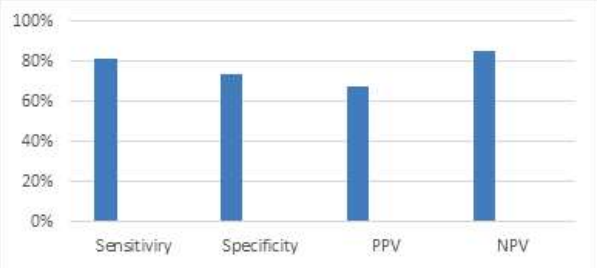

Fig 2: Figure.2: Accuracy Values

DISCUSSION

The current research showed that the females outnumbered male with 78.62% being female and 21.38% being male. Similar observations was shown by Bahai AS et al. in their study 81% were women and 19% were men, demonstrating that the condition is more common in female as compared to male.[6] According to another research also this illness is more frequent among women.[10] The current research showed that 34.48% of the patients had papillary carcinoma, whereas the remaining 6.9% had follicular cancer. These findings were supported by observations of Karimi's, who showed that papillary carcinoma was present in 35.7% of patients while follicular carcinoma was present in 6.4%.[11] The current study determined FNAC accuracy as following; specificity being 73.56%, positive predictive value being 67.14%, negative predictive value being 85.33%, and sensitivity being 81% for

detecting cancer in single thyroid nodules. these results were similar to study conducted by Attia et al., who determined a sensitivity and specificity of 80% and 95.38%, respectively for FNAC to detedt malignancy in solitary thyroid nodule[12] and Sadler et al., who determined a sensitivity and specificity of 76% and 69%, respectively for FNAC, for the diagnosis of malignancy in thyroid nodules.[10] The little variability in FNAC diagnostic accuracy ratings are attributable to the fact that it is operator dependant and it can happen that on some occasions the representative cells of malignancy may not be taken on fine needle aspiration.

CONCLUSION

The findings of current study indicate that FNAC is a minimally invasive test that is extremely successful in detecting malignancy in a single thyroid nodule. It can be successfully used as a screening tool for evaluation of thyroid nodules.

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