

Retrospective Study of Fine Needle Aspiration Cytology of Patients with Thyroid Nodule in Benghazi in the Period of (2021-2023)



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ABSTRACT

Background: Thyroid nodules constitute a common endocrine disorder, these nodules could be solitary, multiple, cystic, or solid. Increasing age, female gender, iodine deficiency, and history of thyroid radiation all are high risk for thyroid nodules. FNAC representing the most cost-effective diagnostic tool used in the assessment of nodules of the thyroid.

Objective of the study: The aim of this study is to evaluate the result of fine needle aspiration cytology (FNAC) and assess thyroid status using of thyroid hormone obtained from patients with thyroid nodules.

Materials and methods: this is a retrospective study, includes collection of data from available cases of thyroid nodules underwent fine needle aspiration between 2021 to 2023, data regarding age, sex, TFT, USS, FNAC was collected from the archive of endocrine out patients clinic of Benghazi Medical Center and from endocrine clinic of Benghazi diabetic center. The analysis was done using the SPSS program.

Result: A total of 60 cases were studied, Data was collected from 60 patient's files for years between 2021 and 2023. The mean age of the patients with FNAC selected for this study was 49.65, and ranged from 21-80 years. The gender distribution shows female predominance in which female cases were 53 (98.33%) while only one case (1.67%) was reported among men. The size of nodules in our cases range from 1cm to 4.5 cm. The mean size of nodules is 1.89cm. In this study the largest group of nodules located in right lobe (21) cases then left lobe (20) cases then both (17) cases and in isthmus only 2 cases. Most of the cases thyroid function test result shows an euthyroid status (38) cases. FNAC of thyroid nodule showed that most of patient's result diagnosed as benign nodules (47) cases.

Conclusion: FNAC is a key tool in diagnosis of thyroid nodule as it has safe, minimally invasive and cost effective diagnostic role.

INTRODUCTION

According to the American Thyroid Association (ATA) the thyroid nodule is a discrete lesion within the thyroid gland. (1) Thyroid nodules can vary in nature, appearing as solitary, multiple, cystic, or solid formations. They are quite common, being detected in approximately 5% to 7% of the adult population. These nodules can be classified as either neoplastic or non-neoplastic. Neoplastic nodules are further classified to either benign or malignant. While the majority of detected nodules are clinically insignificant benign ones, accounting for more than 90% of cases, thyroid cancer can be found in approximately 4.0% to 6.5% of cases. This emphasizes the clinical significance of investigating thyroid nodules. (2) On the other hand, non-neoplastic nodules encompass hyperplastic and inflammatory nodules. Colloid nodules are the most common type of thyroid nodules and they represent benign adenomatous neoplasms. Non-medullary thyroid cancers are a type of thyroid carcinoma that arises from epithelial cells, constituting approximately 95% of cases. It's worth noting that twenty percent of medullary thyroid carcinomas are hereditary and may occur as part of multiple endocrine neoplasia syndromes. (2)(3)

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The prevalence of thyroid nodules varies depending on the method of screening and the specific population being evaluated. Factors such as increasing age, being female, having iron deficiency, and a history of thyroid radiation all contribute to a higher risk of developing thyroid nodules. (4) Additionally, individuals who are long-term survivors of hematopoietic stem cell transplantation are at a greater risk for secondary thyroid carcinoma, with a relative risk of 3.26. (2) (5)

Thyroid nodules are found to be nearly four times more prevalent in women compared to men and are more frequently observed in populations residing in regions with iodine deficiency. A surveillance study conducted over a span of 20 years estimated the prevalence rates to be 0.8% for men and 5.3% for women.(6) Furthermore, the incidence of cancer associated with these nodules is significantly higher in men, with rates of 8% in men versus 4% in women.(7)

Fine Needle Aspiration (FNA) serves as the fundamental method for evaluating thyroid nodules, being the most economical diagnostic approach for assessing these nodules. This procedure is conducted with the assistance of ultrasound guidance. The decision to carry out an FNA should take into account the individual risk factors, the patient's medical history, and both clinical and ultrasound findings. From a technical perspective, nodules measuring less than one 1cm are subjected to biopsy if there are multiple suspicious ultrasound characteristics, the presence of cervical lymphadenopathy, or a history that indicates high risk. (2)(8)(9)

Aim: The aim of this study is to evaluate the result of fine needle aspiration cytology (FNAC) and assess thyroid status using of thyroid hormone obtained from patients with thyroid nodules.

MATERIAL AND METHODS

Patients and study design: A retrospective study was conducted in relation to 60 patients diagnosed with thyroid nodule. Patient's medical records in the archives of endocrine out patient's clinic of Benghazi Medical Center and of endocrine clinic of Benghazi diabetic center within the period of 2021 to 2023 were reviewed to obtain the following data: age, sex, T3, T4, TSH, size, site of nodule and FNAC result.

Statistical analysis: Data was processed using microsoft Excel 2010 then coded and processed on IBM compatible computer, using the statistical package for social science (SPSS) software (version 26) for statistical analysis.

Result:

Data was collected from 60 patient's files for years between 2021 and 2023. The mean age of the patients with FNAC selected for this study was 49.65, and ranged from 21-80 years. Age distribution for all cases is shown in (figure 1). In this study gender distribution shows female predominance in which female cases were 59 (98.33%) while only one case (1.67%) was reported among men (Figure 2). The size of nodules in our cases range from 1cm to 4.5 cm. The mean size of nodules is 1.89 cm (Figure 3). In this study the largest group of nodules located in right lobe with 21 cases then left lobe with 20 cases then both with 17 cases and last one in isthmus with only 2 cases (figure 4). In the majority of cases thyroid function test result shows an euthyroid status (38) cases; where normal range reference for euthyroid was TSH 0.45 to 4.49 ml U/L (Figure 5). In regards to FNAC of thyroid nodule the result showed that most of patient diagnosed as benign nodules (57) cases and only (3) cases with malignant lesion. Details of benign lesion is shown in (figure 6) and (table 1).

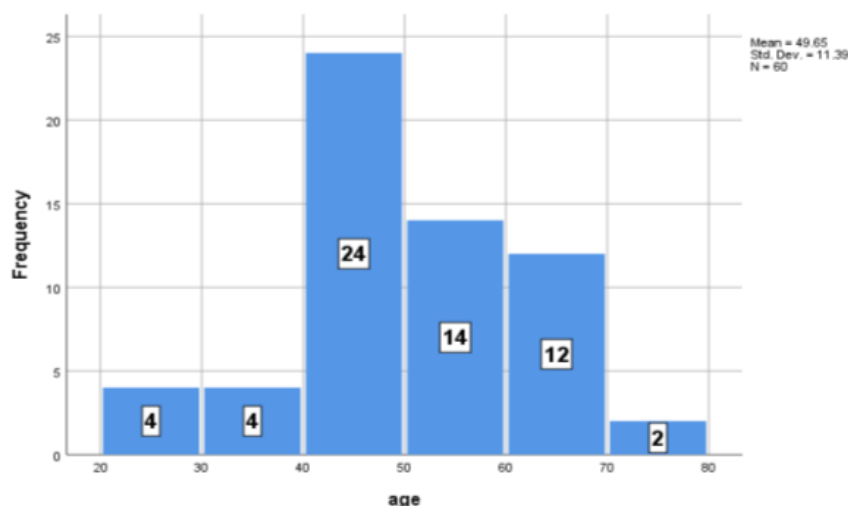


Figure1. Patient's age distribution.

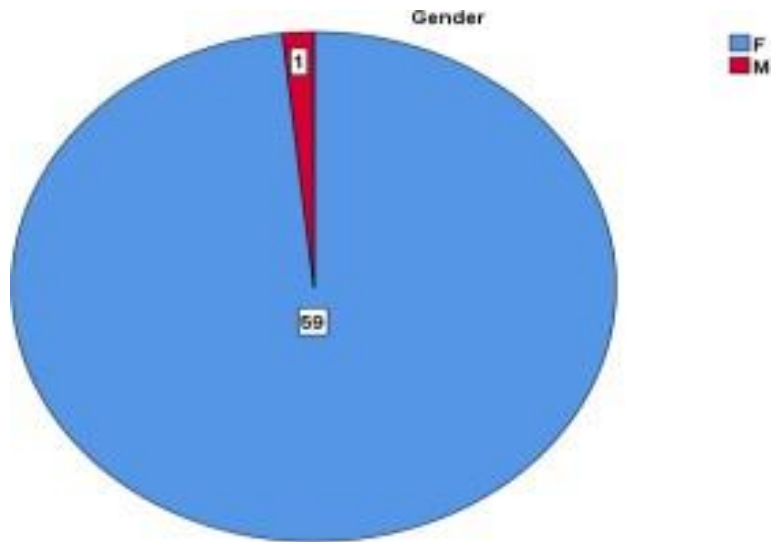


Figure 2. gender of patients

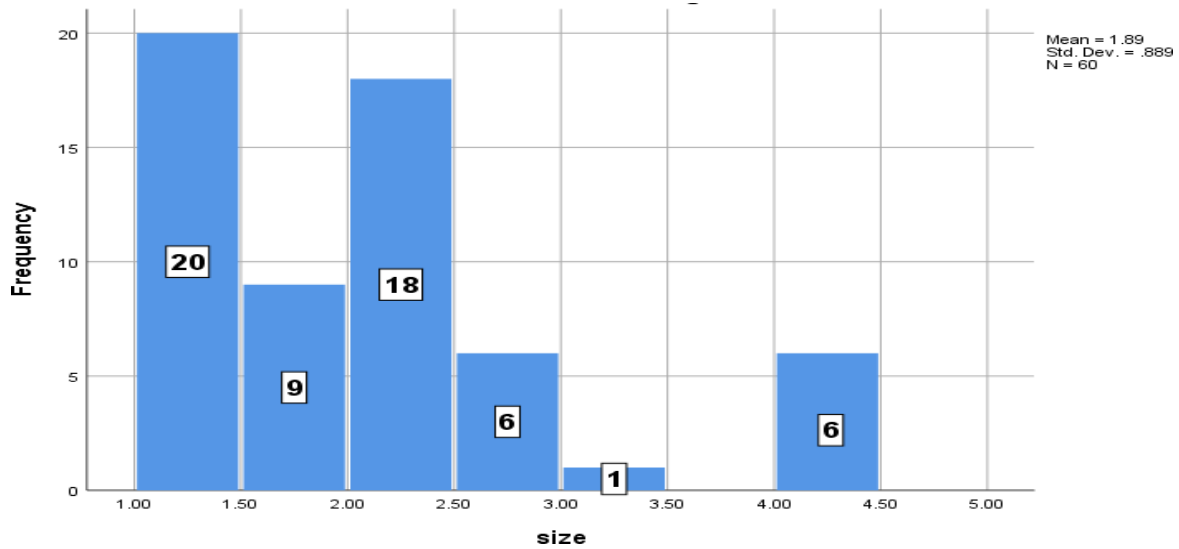


Figure 3. Size (per cm) of the nodules

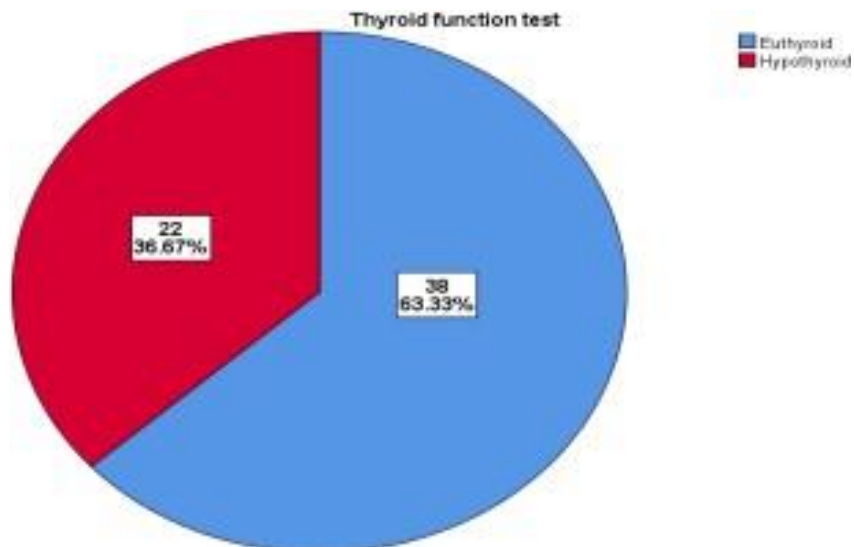


Figure 4. Thyroid function test status of patients

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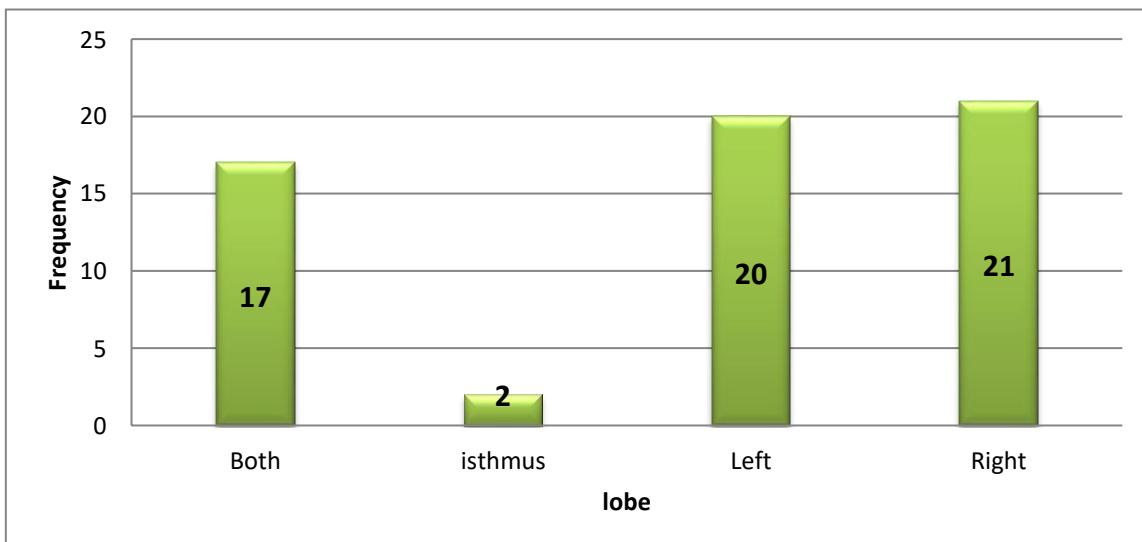


Figure 5. Site of the lesion

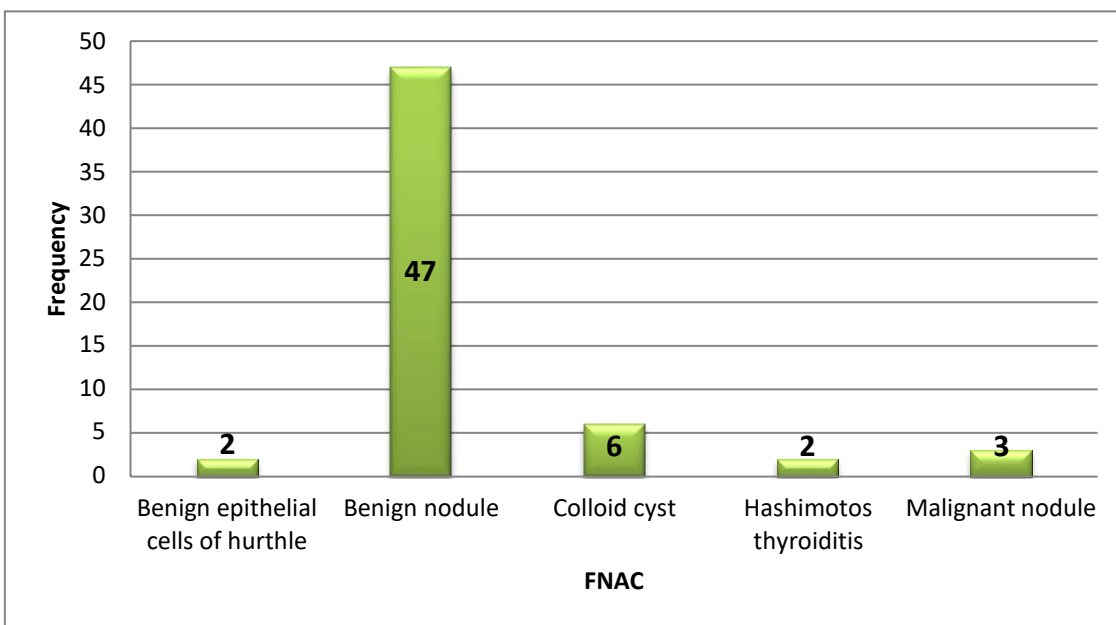


Figure 6. FNAC result

Table 1 shows FNAC result

FNAC	Frequency	Percent%
Benign epithelial cells of hurthle	2	3.3
Benign nodule	47	78.3
Colloid cyst	6	10.0
Hashimotos thyroiditis	2	3.3
Malignant nodule	3	5.0
Total	60	100.0

DISCUSSION

Thyroid nodules are a common clinical issue. Its incidence has been increased in population, specifically in middle-aged women. Early diagnosis plays a vital role in enhancing life expectancy, due to the low malignant potential of thyroid nodules, and slow progressing characteristics of thyroid gland cancers. This study assesses the application of Fine Needle Aspiration Cytology (FNAC) techniques, which are characterized by their simplicity, speed, ease of repetition, and non-invasive nature. This diagnostic method

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is capable of identifying both benign and malignant lesions, utilizing ultrasound guidelines to minimize unnecessary surgical procedures. The study was conducted in relation to 60 cases to evaluate thyroid nodules in Benghazi.

In this study, the age of patients ranged from 21 to 80 years with mean age 49.65 with female predominance. Most of the available research in literature are in accordance in that the percentage of female is higher than male with similar age distribution; approximate range was found by Bahaj et al. study (10) which reported (81%) females and (19%) male with thyroid nodules and mean age 42 years. Further similarity was found in Abeer et al. Study (11) that shows female predominance (90%) while male (10%) and mean age was 51.5. In the same context the mean age in a study of Park et al. (12) is 50 years. In contrast, the mean age in the studies of Bachir et al. Study (13) is 40 years, Naz et al. (14) is 39.7, Gupta et al. (15) is 38.7, and Bhat et al. (16) is 36; which are lower as compared with our study and other reported series. However; all listed studies show female predominance. Similar to our study benign pathology including colloid nodular goiter, follicular lesion, Hurthle cell lesion, and Hashimoto's thyroiditis are reported as the common lesions of thyroid nodules in most of the research Dhamecha et al. (17), Patel et al. (18) Abeer et al. (11) and Handa et al. (19).

For the evaluation of patients presenting with thyroid nodules, the measurement of thyroid-stimulating hormone (TSH) should be the first diagnostic test conducted and utilized to inform subsequent management decisions. An elevated or normal TSH level often heightens the suspicion of malignancy, as the likelihood of cancer correlates positively with serum TSH levels. Conversely, a low TSH level typically suggests a benign nature of the nodule (2). However, in the current study majority of cases are benign nodule and show euthyroid status; and further the 3 malignant cases are euthyroid.

The assessment of nodule dimensions and the likelihood of malignancy continues to be a compelling field of study. Study of Cavallo et al. (20) shows that the size of thyroid nodule is inversely associated with the risk of malignancy, indicating that larger nodules tend to exhibit lower rates of malignancy. Consistent with the study of Al-Hakami et al. (21) where highest malignancy risk was observed in nodules <2 cm and no increase in malignancy risk for nodules >2 cm. However; for the cases diagnosed as malignant nodule in this study; the size is 2.5cm for two cases and 4.5cm for the other case, for benign nodules result shows that in most of cases the size ranges from 1cm to 1.5 cm (20 cases) and from 2cm to 2.5 cm (18cases). Study of Jinih et al. (22) indicates that the size of a thyroid nodule is not a reliable indicator of the risk of thyroid cancer.

6. CONCLUSION

FNAC is a gold standard method for evaluation of thyroid nodules and guide its management. Cases results were mostly euthyroid benign nodule with female predominance. In the future more research is required to enrich the performance of FNAC and document a good data for future management review and research. To determine the sensitivity, specificity, and accuracy of FNAC result it is better to be compared in relation to histopathological findings.

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