

Fine Needle Aspiration Cytology of the Thyroid Gland in Sokoto, Nigeria: A 5 years' Experience

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Abstract

Background: Fine-needle aspiration cytology (FNAC) of the thyroid gland is a cost-effective and widely used procedure to triage patients with enlargement of the gland. **Aims:** The aim is to determine the sensitivity, specificity, and accuracy of FNAC, thereby highlighting its usefulness. **Materials and Methods:** This study was conducted in the Usmanu Danfodiyo University Teaching Hospital, Sokoto, North West Nigeria. Using universal sampling, all cases registered as thyroid FNAB over a 5 years' period were consecutively selected. Their corresponding slides were retrieved and reviewed. **Result:** A total of 187 FNA of the thyroid glands were retrieved. One hundred and fifty-six (83.4%) were female, and 31 (16.6%) were male (ratio of 5:1). The age range was 4–88 years, with the mean age of 40.6 years. Benign and malignant lesions accounted for 81.8% and 4.8%, respectively. Sensitivity, specificity, and accuracy were calculated as 70%, 100%, and 98.2%, respectively. **Conclusion:** FNAC of the thyroid gland remains a very useful tool in the management of goiter.

Keywords: Aspiration, Cytology, Thyroid

INTRODUCTION

There is a keen interest in cancer epidemiology globally, with efforts at developing preventive measures, including early screening.^[1] An effective screening tool should among other properties be cost-effective, minimally invasive, cause the least discomfort to the patient and at the same time provide information that can significantly influence the clinical decision-making process.^[1,2] While thyroid enlargement remains relatively common, cancers of the thyroid gland are not.^[3] Thus, a tool to among other things detect thyroid neoplasms and influence the management of such patients becomes necessary. Fine-needle aspiration cytology (FNAC) of the thyroid gland is a cost-effective and widely used procedure to triage patients with enlargement of the thyroid gland. It is simple, affordable, fast, and economic. Results are obtainable within 24 h of the procedure.^[1,2,4,5]

The procedure was first developed in Sweden in the 1950s.^[2] Over half a century, later, it is currently accepted as a first-line procedure in the diagnostic workup of patients with thyroid enlargement.^[1,6]

The prevalence of thyroid enlargement is varied, depending on the population in question. A range of 4%–7% in

general adult population has been observed, with a female preponderance.^[1,2,7]

Of these, only 10%–20% are malignant. Thus, it has been recommended that FNAC is performed on all palpably enlarged thyroid swellings/nodules.^[2]

Other indications for the procedure include therapeutic drainage of cystic lesions and follow-up of individuals exposed to irradiation of the head and neck.^[2,3]

In addition, it has been observed that 2%–15% of smears from the aspirates are unsatisfactory, often due to poor technique.^[1,2]

The diagnostic sensitivity of the procedure is in a wide range of 43%–100%, with a specificity of 47%–100%. A false-negative rate of 1%–26% has been reported.^[2,3,8–10]

This study will portray our experience in Usmanu Danfodiyo University Teaching Hospital, with respect to frequency of

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use of the procedure, its diagnostic relevance, in terms of sensitivity, specificity, and accuracy. There is a dearth of information in this region, and thus this will serve as a baseline, for the future studies.

MATERIALS AND METHODS

This study was conducted in the Department of Histopathology of Usmanu Danfodiyo University Teaching Hospital, Sokoto, North West Nigeria.

The Teaching Hospital is a tertiary health institution situated in Northwestern region of Nigeria. It provides tertiary health-care services to (but not exclusively) Sokoto, Kebbi, Zamfara, and Niger States. It also receives referrals from Niger Republic, a neighboring country.

The patients had earlier presented at the various clinics and wards of the hospital where they were examined with the attending clinician filling out the histopathology requisition form and referring them to the Histopathology Department for FNA of the thyroid gland. All the thyroid FNAC were performed under palpation guide.

Universal sampling was employed, in which from the records of the department, (Reception Registers, Bench Books, Request forms, etc.) all cases registered as thyroid FNAC with their corresponding tissue biopsies (where available) over January 1, 2011–December 31, 2015 (5 years) were consecutively selected and information concerning patients’ age, sex, and site of biopsy. Their corresponding slides (stained with Papanicolaou stain, Giemsa, and Hematoxylin and Eosin) were retrieved from the departmental archive and reviewed through light microscopy, using guidelines laid down by The Bethesda System of Reporting Thyroid Cytology (TBS-RTC, 2010).^[1] The data generated were entered into Statistical Program for the Social Sciences version 20 (SPSS 20 IBM) software for analysis and presentation of the findings as frequencies, percentages, and charts.

Cases with missing or irreparably broken slides were excluded from the study.

RESULTS

A total of 187 FNA of the thyroid glands met the inclusion criteria. One hundred and fifty-six (83.4%) were female and 31 (16.6%) were male (ratio of 5:1).

The age range was 4–88 years, with the mean age of 40.6 years [Figure 1].

The procedure was commonly performed in patients within the ages of 41–50 years and least performed in children <10 years [Figure 1].

Benign lesions accounted for 153 (81.8%) and malignancies were encountered in 9 (4.8%) of cases [Table 1 and Figure 2].

Seven out of the nine cases which had been diagnosed as malignant on cytology subsequently had tissue biopsy

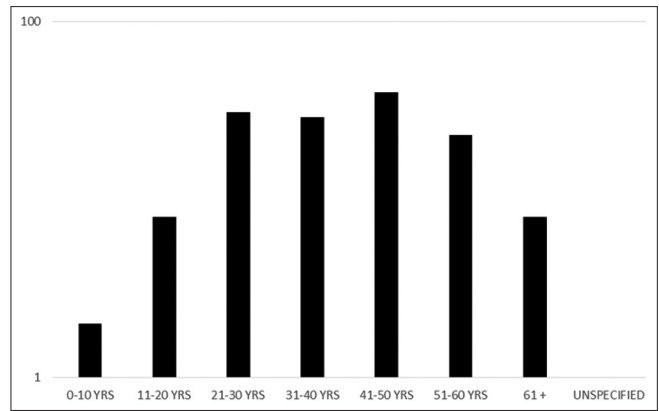


Figure 1: Age distribution of thyroid fine-needle aspiration biopsy

Table 1: Statistical analysis of thyroid gland fine-needle aspiration cytology results

Test (FNAC)	Disease positive (histology)	Type	Disease negative (histology)	Type
Positive (malignant)	7	TP	0	FP
Negative (benign)	3	FN	150	TN

Sensitive=TP/(TP + FN) × 100 (7/[7+3] × 100=70%),
 Sensitive=TN/(TN + FP) × 100 (150/[150 + 0] × 100=100%),
 Accuracy=TP + TN/total number × 100 ([7 + 150]/160=98.2%). TP: True positive, FP: False positive, FN: False negative, TN: True negative, FNAC: Fine-needle aspiration cytology

confirming thyroid carcinoma while the remaining two had no information on subsequent surgery. Out of the 153 cases diagnosed as benign on FNAC, three were found to have cancer on histologic examination of the thyroidectomy specimens. These findings were used to calculate the sensitivity, specificity, and accuracy of the procedure, using a scheme proposed by Kumar *et al.*^[5] to give values of 70%, 100%, and 98.2%, respectively [Table 1].

DISCUSSION

Sample sizes of 6,300, 730, 593, and 428 have been reported by Goeliner *et al.* (United Kingdom), Florentine *et al.* (California, USA), Mamoon *et al.* (Pakistan) and Khairy and Murshid (Saudi Arabia), each of these studies spanned a period of 4 years; these are more than our sample size of 187 over the same relative time frame. The small sample size in our study may be explained because in the third world countries such as Nigeria, the patronization of Western medicine is very low, probably because of ignorance and poverty of the populace. However, our sample size is comparable to Gohino *et al.*’s (London) who had 163. Our sample size dwarfs 89 reported by Kumar *et al.* (Pakistan) which was over a 5 years’ period. A study by Ngadda *et al.* in North East Nigeria, over 10 years had a sample size of 69.^[4,5,7-9,11,12] In addition, Thomas *et al.* and Afolabi *et al.* in separate reports from Ibadan, Southwestern Nigeria, reported a sample size of 143 and 151.^[13,14] These are relatively comparable to ours.

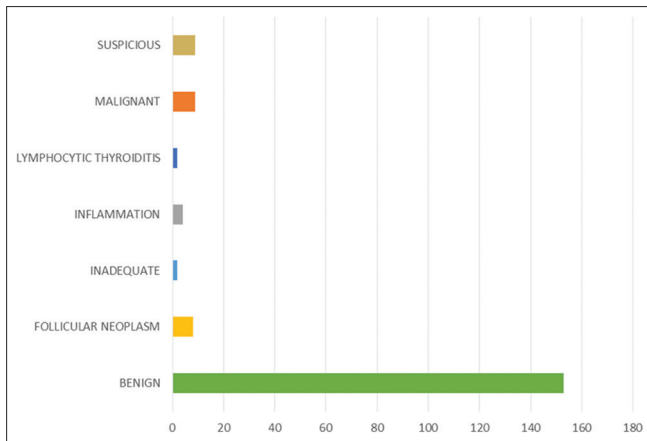


Figure 2: Distribution by diagnosis of thyroid fine-needle aspiration biopsy

Our age range of 4–88 years compares to findings reported from Pakistan which had a range of 18–75 years and mean of 38.5 years, which is lower than ours. Our findings also compare with reports from London.^[8] Afolabi *et al.* reported a similar age range of 7–86 years.^[14]

Our observations on the sex distribution are similar to what Godinho reported in London and Afolabi in Ibadan. This reflects the general trend of thyroid enlargements to be more common in females.^[4,6,11,14]

Majority of the FNA diagnosis were benign (81.8%), although this is slightly lower than Godinho's series of 87%, our finding is much higher than Ngadda *et al.*'s report of 51% as benign in their series from North East Nigeria.^[7,9]

We observed that only 4.8% of the FNA were malignant, a figure lower than 11% from the United Kingdom (Goellner *et al.*) and 18% in North East Nigeria.^[3,9] Probably a larger sample size will reflect a higher percentage of malignant neoplasms diagnosed by FNAC.

Sensitivity, specificity, and accuracy of thyroid FNAC in our center were calculated as 70%, 100%, and 98.2%, respectively. These figures compare well with what Ngadda *et al.* found as 88.9%, 96.1%, and 94.2%. They, however, contrast with Afolabi's 35% and 97% for sensitivity and specificity, respectively.^[9,14]

Furthermore, studies from other parts of the world show a range of these parameters as 77%–93% (sensitivity), 67%–100% (specificity), and 65%–97.7% (accuracy), all indicating how valuable the procedure is in evaluating thyroid swellings.^[5,6]

CONCLUSION

FNAC of the thyroid gland remains a very useful tool in the management of enlargement of the thyroid gland. This study has shown that it has a high specificity and accuracy in Sokoto, and reinforces the need for its continuous practice in the center and other parts of the world.

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Conflicts of interest

There are no conflicts of interest.

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