PREVALENCE OF MALIGNANCY IN SOLITARY NODULES OF THYROID

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ABSTRACT

Objective: To ascertain the incidence of cancer in individuals with a single thyroid nodule.

Methods: It is Prospective, Observational, Case Series. Study was conducted at Jinnah Postgraduate Medical Centre, Karachi, Department of ENT, from January 10, 2023, to June 10, 2023. Patients were enrolled if a physical examination revealed a palpable thyroid gland diagnosis. A thorough physical examination and history were documented. Using a pinhole collimator, 99mTc pertechnetate scintigraphy was performed on each patient. The study was open to patients with a single nodule who satisfied the inclusion and exclusion criteria. There was a thyroid ultrasound. Sonographic features were noted, including nodule calcifications, size, hypo echogenicity, and irregular shape.

Results: Ninety-five patients who fulfilled the inclusion criteria were included in the study. The Mean±S.D age of the study population was 48.12±9.457years. The mean duration of the disease was 2.042±0.95years. On analysis of demographics data, it was observed that 57 (60%) were males and 38 (40%) were females. Upon analysis of the frequency of the outcome variables, 11 (11.58%) had malignancy.

Conclusion: Male patients made up the majority and most of them were older than 40. A thyroid gland ultrasound showing an irregular shape and a tumor size larger than 20 cm are linked to a higher risk of cancer.

Keywords: Thalium scan, FNAC, tumor, histopathology.

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INTRODUCTION

Thyroid nodules are common objects that are often found in clinical practice, either by chance during different imaging procedures or physical examinations. Palpation reveals a 4% prevalence of thyroid nodules.[1] When the US is used in place of a clinical examination, the general population's frequency of thyroid nodules increases to 76%.[2] Thyroid nodules are common even at autopsy; in random autopsies, multiple nodules were observed in 37.3% of cases, and solitary nodules were found in 12.2%.[3]

Thyroid nodules are discrete lesions located within the thyroid gland that are radiologically distinct from the surrounding thyroid parenchyma.[1] As per clinical practice, the thyroid nodules are often found accidentally during various imaging procedures or physical examinations.

Palpation reveals a 4% prevalence of thyroid nodules.[2] When the US is used in place of a clinical examination, the general population's frequency of thyroid nodules increases to 76%.[3] Thyroid nodules are common even at autopsy; in random autopsies, multiple nodules were observed in 37.3% of cases, and solitary nodules were found in 12.2%.[4]

The five pathologically classified types of thyroid nodules are hyperplasic, neoplastic, colloid, cystic, and thyroid nodules. Each type has unique histologic characteristics.[5] Solitary nodules found during thyroid scanning can be further categorized as hot, warm, or cold. Malignant thyroid nodules typically show up as hyperfunctioning or nonfunctioning areas on the radioactive iodine scan of the thyroid and as a cold nodule on isotope scanning because thyroid carcinoma typically does not concentrate radioiodine as well as normal tissue does.

As a result, cold nodules are more likely to contain cancer than hot or active nodules.[6] Only 4.6% of solitary nodules turn out to be malignant, but about 80% of them are cold.[7] The primary reason thyroid nodules hold clinical significance is their potential for malignancy. Because of this, a history and physical examination that concentrates on characteristics suggestive of cancer should always be a part of the initial evaluation. In a single nodule, the cancerous rate is 14%.[6]

Surgical removal of malignant nodules that compress adjacent structures is necessary. However, since most thyroid nodules are benign and asymptomatic, the thyroid surgeon must rely on diagnostic tests to decide when surgery is necessary.8 For thyroid nodules, ultrasound is the recommended imaging modality, and fine needle aspiration biopsy (FNAB) guided by ultrasound is the recommended technique for tissue sampling. To more accurately estimate the risk of malignancy, nodules one centimeter in size or those with questionable sonographic appearance should be subjected to cytologic analysis.

The appearance of benign and malignant nodules often overlaps, making it impossible to identify a single imaging characteristic that is pathognomonic. On the other hand, the chance of thyroid cancer rises when two or more suspicious sonographic results occur at the same time.[9]

Numerous research studies have evaluated different sonographic features as thyroid cancer predictors. Sonographic characteristics such as nodule size, calcification presence, hypoechogenicity, solid composition, lack of a halo, and irregular margins have been linked to an elevated risk of cancer. The preferred method for assessing the likelihood that a cold nodule is malignant is the FNAB of a thyroid nodule.[10]

Prior research on this topic indicates that patients with a single thyroid nodule have varying frequencies of malignancy (22-46%).[6,10] Determining the outcomes in the local population was the goal of this study. This would imply actions for an early diagnosis and advocated intervention. Better treatment of patients who present with a single thyroid nodule may arise from this.

METHODS

The study was carried out from 10 October 2022 to 10 April 2023 at the Jinnah Postgraduate Medical Centre in Karachi, in the Department of ENT. The technique of non-probability consecutive sampling was employed. Within the operational definition of a solitary nodule, both solid and cystic, and palpable thyroid glands on physical examination for more than six months were the inclusion criteria. either gender, between the ages of 18 and 60.

Previous thyroid surgery, a history of thyroid irradiation therapy, refusing FNAB, and a multinodular goiter on a clinical examination were the exclusion criteria.

Patients were recruited from Jinnah Postgraduate Medical Center's Karachi ENT department's OPD and ward. The patient gave their informed consent. Every patient whose thyroid gland was palpable during physical examination had a thyroid ultrasound to confirm the existence of a single nodule. Ninety-five patients were included in the study after meeting the inclusion and exclusion criteria.

Using a 5- to 15-MHz transducer, a radiologist with more than three years of experience and specialized knowledge in thyroid sonography performed the thyroid ultrasonography. Sonographic features were noted, including nodule size, margins, halo absence, calcifications, and echogenicity.

FNA was carried out using ultrasonography guidance. With a 25-gauge needle, three to four aspirates were made. Histopathological analysis served as the foundation for the final diagnosis of cancer. Malignancy frequency was noted.

Using SPSS v23.0, a database was developed. The thyroid nodule's size and age duration were calculated to yield a mean and SD. Gender, a family history of thyroid cancer, sonographic nodule characteristics such as hypoechogencity, irregular shape, and nodule calcifications were taken into account when calculating frequency and percentages. The outcome variable, or the frequency of malignancy (Yes/No), was also considered. The chi square test was used to see how the effect modifiers—age, gender, family history of thyroid nodule, and length of illness—affected the outcome variable. Significant data was defined as P value < 0.05.

RESULTS

In this study, 95 patients who met the inclusion criteria were included. The age distribution of the study population was 48.12 +/- 9.457 years. The disease lasted 2.042+0.9555 years on average.

Demographic data analysis revealed that 38 (40%) of the participants were female and 57 (60%) were male. Thirty-two (33.68%) had a positive family history of thyroid nodule, while sixty-three (63.68%) had none.

54 (56.8%) of the sonographic features that were analyzed had abnormal shapes.28 people (29.5%) had calculus. 38 people (or 40%) were hypoechogenic. Eleven (11.58%) of the outcome variables with frequency analysis had cancer.

Tables II through VI discuss stratification based on age, gender, length of disease, and family history of thyroid nodule.

Table-I: Frequency of sonographic characters

Variable	Number	Percent
Abnormal shape	54	56.8%
Calcification	28	29.5%
Echogenicity	38	40%

Table-II Analysis of age with malignancy (n=95)

	Malignancy		
Age	Yes	No	P - value
Below 40 years	01	10	0.105
40 years and above	27	57	

Table-III: Analysis of gender with malignancy (n=95)

	Malignancy		
Gender	Yes	No	P – value
Males	07	50	0.533
Females	04	34	

Table-IV: Analysis of size of tumor with malignancy (n=95)

	Malignancy		
Size of tumor	Yes	No	P – value
Less than 20 cm	07	70	0.126
20 cm and above	04	14	

Table-V: Analysis of family history of thyroid malignancy with malignancy (n=95)

Family history of thyroid malignancy	Malignancy		P - value
	Yes	No	
Yes	06	26	0.113
No	05	58	

Table-VI: Analysis of duration of thyroid nodule with malignancy (n=95)

Duration of thyroid nodule	Malignancy		P - value
	Yes	No	
Less than 1 year	07	60	0.414
1 year and above	04	24	

DISCUSSION

Thyroid nodules are common objects that are often found in clinical practice, either by chance during different imaging procedures or during physical examinations. Palpation reveals a 4% prevalence of thyroid nodules.[11]

When US is used in place of a clinical examination, the general population's frequency of thyroid nodules increases to 76%.[12] Thyroid nodules are common even at autopsy; in random autopsies, multiple nodules were observed in 37.3% of cases, and solitary nodules were found in 12.2%.[13]

Thyroid nodules are discrete lesions within the thyroid gland that are radiologically distinct from the thyroid parenchyma surrounding them.[14] Pathologically, they can be divided into five categories: hyperplasic, colloid, neoplastic, cystic, and thyroid nodules. Each category has unique histologic characteristics.[15]

The primary reason thyroid nodules hold clinical significance is their potential for malignancy. Because of this, a history and physical examination that concentrates on characteristics suggestive of cancer should always be a part of the initial evaluation. According to our research, single nodules frequently have malignancy. Another study discovered that 14% of single nodules had malignancy.[16]

Usually, nodules are discovered during physical examinations or by accident during other imaging procedures. Nodules that compress adjacent structures and are malignant or symptomatic should be surgically removed. However, since most thyroid nodules are benign and asymptomatic, the thyroid surgeon must rely on diagnostic tests to decide when surgery is necessary.[17] For thyroid nodules, ultrasound is the recommended imaging modality, and fine needle aspiration biopsy (FNAB) guided by ultrasound is the recommended technique for tissue sampling. To more accurately estimate the risk of malignancy, nodules one centimeter in size or those with questionable sonographic appearance should be subjected to cytologic analysis.

The appearance of benign and malignant nodules often overlaps, making it impossible to identify a single imaging characteristic that is pathognomonic. On the other hand, the chance of thyroid cancer rises when two or more suspicious sonographic results occur at the same time.[18]

The preferred method for assessing the likelihood that a particular thyroid nodule is malignant is FNAB.[19–20] Numerous studies have also evaluated different sonographic features as potential thyroid cancer predictors. Sonographic characteristics such as nodule size, calcification presence, hypoechogenicity, solid composition, lack of a halo, and irregular margins have been linked to an elevated risk of cancer.

CONCLUSION

Male patients made up the majority and most of them were older than 40. A thyroid gland ultrasound showing an irregular shape and a tumour size larger than 20 cm are linked to a higher risk of cancer.

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AUTHOR'S CONTRIBUTIONS

HK: Introduction, data collection, literature research
DK: manuscript editing, results
SRA: literature research, results, data analysis
MI: manuscript editing, discussion, literature research
AN: Introduction, literature research
GD: Discussion