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Thyroid nodule size to predict malignancy

Mudit Gupta[1], Neeti Bhat[2], Rupesh Karna[3], Alisha Karna[4]

[1]*Senior Resident, Department of Otorhinolaryngology, Shri Guru Ram Rai Institute of Medical & Health Sciences, Dehradun, Uttarakhand, India.*

[2]*Lecturer, Department of Clinical Physiology, Madan Bhandari Academy of Health Science, Nepal.*

[3]*Medical Officer, Chainpur Primary Health Care Center Hospital, Sankhuwasabha, Nepal.*

[4]*Medical Officer, Chainpur Primary Health Care Center Hospital, Sankhuwasabha, Nepal.*

Corresponding author: *Dr. Neeti Bhat*

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ABSTRACT

Background: Thyroid nodule is commonly presenting finding in Otorhinolaryngology OPD. The nodule needs thorough evaluation to rule out malignancy. Thyroid nodule size has a conflicting relationship with malignancy.

Objective: To find if thyroid nodule size is associated with malignancy.

Methods and Methodology: We retrospectively reviewed archive data and recruited 92 patients who underwent thyroidectomy for presenting with thyroid nodules and had

histopathological evaluation available. The sizes of nodules were recorded by ultrasonography. The histopathological finding was recorded as benign and malignant.

Result: There were 92 HPE reports where 51 (55.4 %) were malignant nodules and 41 (44.6 %) were benign nodules. The mean size was 26.79 ± 13.48 mm. The mean size of benign lesions was 26.94 ± 15.12 cm, and malignant was 26.68± 12.16 cm. The difference was not statistically significant (p=0.927).

Conclusion: Findings from the current study are suggestive that thyroid nodule size is not an independent predictor of malignancy.

Keywords: Malignancy, Thyroid Nodule, Size, Ultrasonography

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INTRODUCTION

A thyroid nodule is a lump within the thyroid gland that consists of unusual tissue growth. It is a common clinical presentation found in 5-7 % of the general population by palpation alone [1]. Patients with thyroid nodules are then evaluated clinically, biochemically, radiologically, and pathologically as 7-15% of thyroid nodules are malignant [2]. Hence, thyroid nodule evaluation intends to effectively categorize the nodule by cost-effective and highly accurate diagnostic methods [3].

Ultrasonography is a non-invasive and reliable method to evaluate thyroid nodules. Various methods have been proposed to characterize thyroid nodules by USG but most commonly preferred are thyroid imaging reporting and data system (TI-RADS), which Horvath first proposed in 2009. TIRAD includes evaluating thyroid nodules as per echogenicity, shape, composition, margin, halo sign, and calcification [4]. The diagnostic ability of TIRADS to accurately distinguish between benign and malignant lesions has been found variable in different studies [4–6].

Likewise, nodule size is also an essential sonographic finding that may prove beneficial for risk stratification of a thyroid nodule, but the acceptance has been widely conflicting [7].

Few research studies have been conducted to address if nodule size is an independent predictor of malignancy in the Nepalese population.

Hence, this retrospective study investigates if nodule size is an independent predictor of malignancy on histopathological findings in a tertiary hospital in Nepal.

MATERIALS AND METHOD

This observational analytical study was conducted at TUTH, IOM, by retrospectively reviewing the archive data from June 2017 to January 2019. Proforma was created to collect and organize data such as name, age, sex, size of the nodule on USG, and histopathological finding.

We recruited 92 subjects who underwent USG followed by thyroidectomy or hemithyroidectomy with the final histopathological finding recorded in the database. USG was performed at the Department of Radiodiagnosis, and the widest diameter of the nodule was noted. For multiple nodules, the size of the largest nodule was documented. The nodules were classified as <1 cm, 1-1.9 cm, 2-2.9 cm, 3-3.9 cm and >4 cm. The histopathological observations were recorded as benign and malignant lesions.

We used SPSS 23.0 software package (IBM Corp., Armonk, NY, USA) for statistical analysis. We calculated the malignancy rate in each subgroup of nodule according to size. T-test was applied to see if any difference in size exists between malignant and benign lesions.

RESULT

We recruited 92 patients in our study that underwent ultrasonography, out of which 84.8% were females (78) and 15.2 % were males [14]. The age varied from 15–74 years, with the mean average age being 40.78 ± 13.48 years. The females ranged 15-74 years with mean age 41.02± 13.75 years, and males were of age range 18-56 years with mean age 38.21 ±12.01 years.

In our study of 92 patients, the size of the nodule varied from 4-90 mm, and the mean size was 26.79 ± 13.48 mm.

Table 1: Nodules categorized in different sizes (92)		
Size Category (cm)	Number	Percentage (%)
<1	7	7.6
1-1.9	16	17.4
2-2.9	35	38
3-3.9	22	23.9
>4	12	13

Table no 1. Nodules categorized in different sizes

Male patients have sizes ranging from 19- 90 mm with the mean size of 36.85 ± 18.67 mm, and similarly, female patients had measures ranged from 4- 60 mm with the mean size of 24.99 ± 11.59 mm.

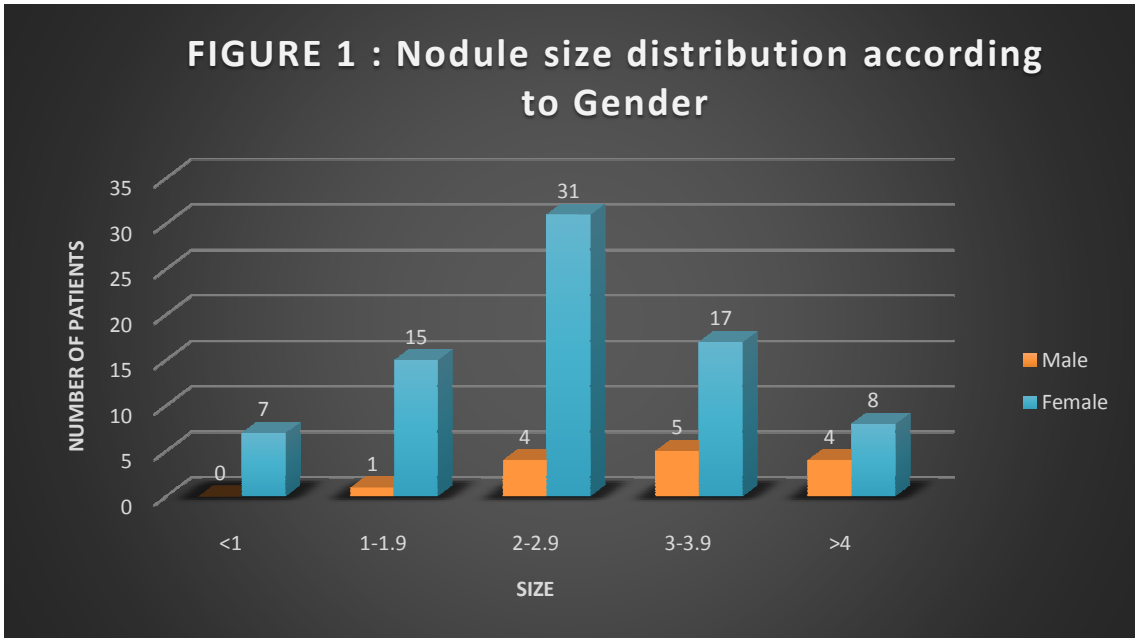

Figure no 1. Nodule size distribution according to gender

As all the subjects underwent a histopathological examination in our study, there were 92 HPE reports where 51 (55.4 %) were malignant nodules, and 41 (44.6 %) were benign nodules.

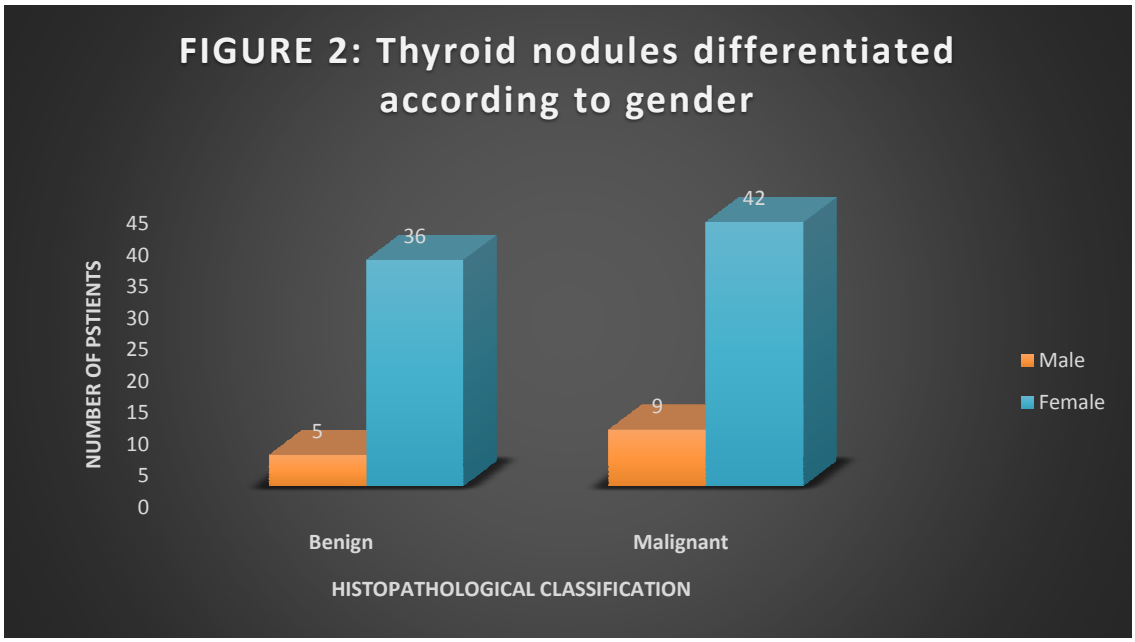

Figure no 2. Thyroid nodules differentiated according to gender

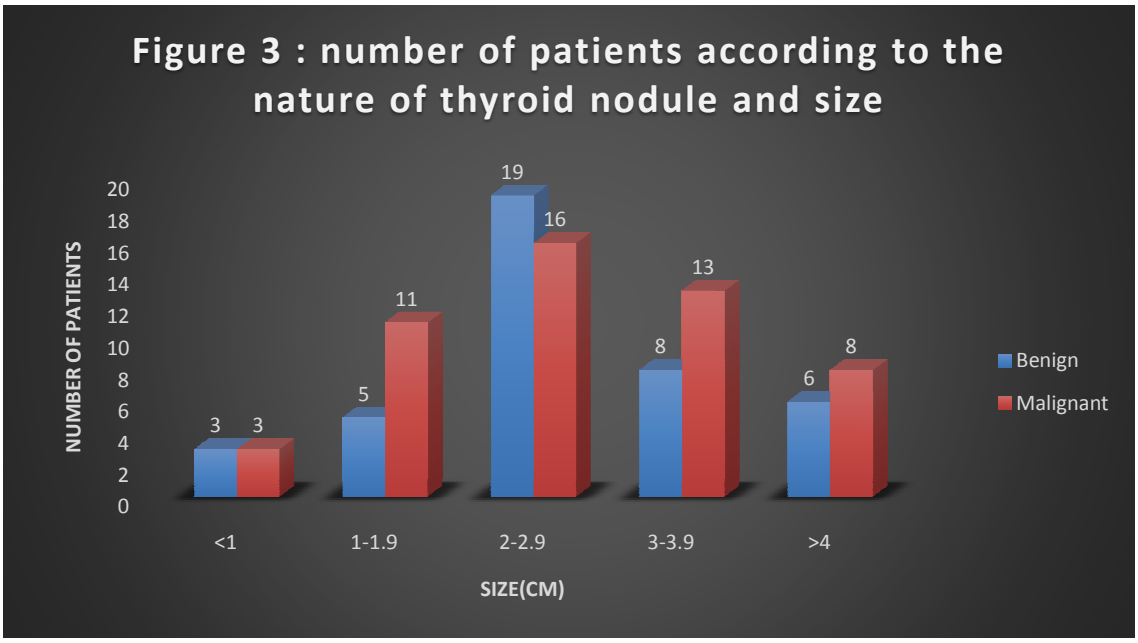

Figure no 1. Number of patients according to the nature of thyroid nodule and size

The mean size of benign lesions was 26.94 ± 15.12 cm, and malignant was 26.68± 12.16 cm. The difference was not statistically significant (p=0.927).

Size group	HPE	Frequency	Mean	SD	p-value
< 4 cm	Benign	36	22.62	7.95	0.538
	Malignant	45	23.88	9.87	
> 4 cm	Benign	5	58	8.50	0.227
	Malignant	6	47	1.89	
< 2 cm	Benign	14	15.1879	5.60245	0.614
	Malignant	19	14.2000	5.44089	
> 2 cm	Benign	27	33.0370	14.94730	0.733
	Malignant	32	34.0938	8.31772	
< 3 cm	Benign	30	20.3543	6.55077	0.555
	Malignant	32	19.2750	7.68786	
>3 cm	Benign	11	44.9091	17.48402	0.209
	Malignant	19	39.1579	6.87397	

Table no 2. Sizes of histopathological findings in different size groups

DISCUSSION

Different ultrasonography findings of thyroid lesions are often accredited as an independent predictor of malignancy. In the literature review, we found that the association of nodule size and malignancy potential is highly discordant [3, 8–12]. We thus conducted this retrospective study to evaluate if nodule size is an independent predictor of malignancy. Our study proffered that size doesn't independently predict malignancy in thyroid nodules. We observed no notable difference in the size of benign and malignant lesions.

The mean age of our study participants was 40.783 ±13.48 years, with an age range from 15-74 years. Likewise, there was notable female pre-dominance in our participants. Our finding was per existing literature [7, 12].

The widest nodular diameter was 4-90 mm with a mean diameter of 26.79 ±13.48 mm. Similar observations were made in earlier studies [3, 7].

Most participants had thyroid nodule size belonging to 2-2.9 cm, which is probably because lesion size greater than 2 cm is the likely candidate to undergo thyroidectomy. Literatures have ushered in the likelihood of malignancy in nodule size greater than 2 cm [13].

On histopathological findings, it was observed that more than half of the lesions were malignant. This study is a tertiary hospital-based that explains the discovery. The discovery is of notable distinction from earlier studies that have reported far less malignant findings on histopathological reporting [14–16]. Female predilection was naturally maintained in both benign and malignant findings on histopathology. But the remarkable result was a higher risk of malignancy in histopathological findings observed in male participants. This finding did not correspond to earlier observations of gender disparity in thyroid carcinoma. Such observations could be due to the lower number of male participants [17].

As per size, most benign and malignant lesions belonged to a size group of 2-2.9 cm with a similar mean size. Variable findings were observed in similar other studies. [3, 9, 12]. On statistical analysis, no significant difference was observed between the sizes of benign and malignant lesions. Puca et al. demonstrated a significant difference in the size of a benign and malignant thyroid nodule [18]. No significant difference in size was observed between a benign and malignant group on further stratification according to size. Our impression correlated fairly with earlier studies and further supported the idea that thyroid nodule size is not an independent predictor of malignancy [11, 19]. A study by Kamran et al. proposed a threshold size of 2 cm, below which larger size is a predictor of malignancy. However, the above nodule size of 2 cm size did not accord to malignancy in the underlying lesion [3]. A similar disagreement was also met with a study by El-Gammal et al. [12]. Similarly, Puca et al. illustrated a significant difference in size in benign and malignant thyroid nodule of size less than 1 cm and greater than 4 cm with greater risk of malignancy with an increase in given size groups. Other size groups did not show a significant difference [18]. Our findings also refuted observations made by Cavallo et al. They demonstrated a decrease in risk of malignancy with an increase in size [8].

As we scarred lesion below and above 4 cm, we still did not observe any significant difference in nodule size of a benign and malignant lesion. This finding was consistent with previous similar works [20, 21] but contradicted other existing literature [7, 22].

Similarly, we did not observe any difference in the benign and malignant lesion size when nodules were categorized as or >2 and ≤ or>3. Hence we did not find any threshold value

where thyroid nodule size would be a predictor of malignancy. The findings during literature reviews were highly incongruous [10, 13, 19, 23, 24].

As per histopathological evaluation, papillary carcinoma dominated in all size groups followed by colloid goiter. We did not observe any increase or decrease in the prevalence of papillary carcinoma according to the size, which was reported by Hong et al. [19].

As our study was a hospital-based retrospective study, findings from this study should be interpreted with caution. It is plausible that other limitations, such as small sample size and operator dependant findings, could have influenced the results.

We believe this study would help surgeons tackle deciding the line of management of patients with thyroid nodules. Further studies with a larger sample size and more rigid methodology should be undertaken.

CONCLUSION

Taken together, findings from the current study are suggestive that thyroid nodule size is not an independent predictor of malignancy. Therefore, a larger thyroid nodule is not necessarily a candidate for thyroidectomy for potential underlying malignancy.

DECLARATION OF COMPETING INTEREST

All authors declare no conflicts of interest.

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