

Correlation Between Tirads Classification Ultrasonography and Cytopathological Findings of Thyroid Nodules: The Wahidin Sudirohusodo Hospital Experience

Venna Regita Cahyani¹, Juanita^{2,3}, Amalia Yamin^{2,3}, Upik A. Miskad²

¹Faculty of Medicine, Hasanuddin University, Indonesia

²Department of Anatomical Pathology, Faculty of Medicine, Hasanuddin University, Indonesia

³Lab Anatomical Pathology, Wahidin Sudirohusodo Hospital, Makassar, Indonesia.

ABSTRACT

Background: Thyroid nodule is one of the most common endocrine system diseases in the world with the increasing number of incidences every year. A thyroid nodule is commonly detected by ultrasonography (USG), in which ultrasonography is the main modality of non-invasive thyroid nodule examination that is accessible, and inexpensive.

Aim: The present study aims to improve the clinical practice and management of thyroid lesion by establishing correlations between TIRADS classification ultrasonography (USG) with cytopathological findings in thyroid nodule patients.

Methods: Research method that is used is anobservational analytics with cross-sectional approach. The sample of this research is taken by a consecutive sampling method from medical records of thyroid nodule patients in Wahidin Sudirohusodo Hospital year 2021. Statistic test that is used in this research is spearman test. Data analyzes uses SPSS 27.0. software.

Results: In this research, 51 research samples analyzed by spearman statistic test shows a significant correlation between TIRADS classification ultrasonography (USG) and cytopathological findings ($p = 0,035$).

Conclusion: TIRADS classification ultrasonography (USG) has a significant correlation with cytopathological findings in thyroid nodule patients at Wahidin Sudirohusodo Hospital year 2021.

KEY WORDS: Ultrasonography, TIRADS, Cytopathology, Thyroid Nodule, Wahidin Sudirohusodo Hospital

ARTICLE DETAILS

Published On:
20 February 2023

Available on:
<https://ijmscr.org/>

INTRODUCTION

The thyroid gland is one of the glands that are part of the human body's endocrine system which plays a role in human endocrine functions, such as growth in childhood, absorbing iodine from food to become thyroid hormone, regulating metabolic rate, and other functions. One of the disorders that involve the thyroid gland is thyroid nodule.^{1,8} Thyroid nodule is the most common endocrine system disease in the world with the number of incidents that gradually increase from year to year. In Indonesia itself, which is recorded in Riskesdas 2007 in Indonesia showed that 12.8% of men and 14.7% of women suspected of having hyperthyroidism based on Thyroid Stimulating Hormone (TSH) examination. Meanwhile, in 2013, Riskesdas data only shows 0.4% of

Indonesia's population with hyperthyroidism diagnosis, Although the detected cases decreased in that period, the risk of thyroid nodule malignancy is one of the most common malignancies in Indonesia. In the diagnosis of thyroid nodules, there are several examinations supporting services that can be carried out, such as physical examination, laboratory test, radiology findings, and pathology anatomy examination which is the gold standard for diagnosing thyroid nodules.¹¹⁻¹³ Thyroid nodule detection can generally use ultrasonography (USG), which the main modality of non-invasive, simple, accessible, and low-cost examination. A previous study showed that the prevalence of thyroid nodules detected in the adult population through physical examination is about 5 - 7% and 76% by ultrasound examination. This

Correlation Between Tirads Classification Ultrasonography and Cytopathological Findings of Thyroid Nodules: The Wahidin Sudirohusodo Hospital Experience

shows that USG has high sensitivity and is well used as a screening tool for the diagnosis of thyroid nodules. Besides ultrasonography, pathology anatomy is crucial to do in the diagnosis of thyroid nodules, where this examination aims to assess the malignancy of the thyroid nodule by using ultrasound examination or can be directly performed for cases of palpable thyroid nodules. On the other hand, a study states that the proportion of malignancies in thyroid nodules detected by USG is higher (11.2%) compared to thyroid nodules detected by palpation examination (3.9%).^{1-2, 9} Consequently, the objective of this study is to determine the correlation between the results of thyroid nodule ultrasonography TIRADS classification with cytopathological findings in patients with thyroid nodules so that it can be a reference and guidance for the development of investigations in the diagnosis of thyroid nodules as well as in detecting its transformation into malignancy to get accurate and appropriate treatment.¹⁻³

MATERIAL AND METHODS

The study used a cross-sectional method to determine the relationship of thyroid nodule ultrasonography TIRADS classification with pathology anatomy examination results in patients with thyroid nodules. The population included in this study were patients in Wahidin Sudirohusodo Hospital with thyroid nodule diagnosis. In addition, the inclusion criteria for the subject were patients with comprehensive medical record including USG and cytopathological findings whereas the exclusion criteria was the post-operative thyroid nodule patients in Pathology Anatomy Department in Wahidin Sudirohusodo Hospital.

From the calculation of sample size, the minimum sample size was 47 subjects. 235 medical records were initially

reviewed and 184 medical records were excluded due to incomprehensive medical records and post-operative treatment. Therefore, this study used 51 patient medical records to be analyzed and reviewed.

The data obtained from patient medical records will include general information such as age and sex, also the specific information of the examination results such as USG TIRADS classification result and cytopathology with Bethesda system examination result. Furthermore, the data will be analyzed with Spearman statistic test to know the significance of the variables. Cases will be categorized with ACR TIRADS classification and Bethesda system. According to the ACR TIRADS classification, thyroid nodule will be classified into five categories, from benign to highly suspicious nodules.¹¹⁻¹³ Bethesda system divide thyroid nodules into six categories, from non-diagnostic to malignant thyroid nodules.¹⁰ A descriptive frequencies analysis was used to explore the distribution of the general factors (age, sex) and Spearman statistic test was performed to analyze the correlation coefficient of the variables. The activity of this research approved by ethics committee, Faculty of Medicine, Hasanuddin University (624/UN4.6.4.5.31/PP36/2022).

RESULT

Table 1 shows the distribution of thyroid nodule patients who underwent examinations based on age, where there was 1 case under the age of 20 (2%), there were 7 cases in the age group 20-29 years (14%), in the group aged 30-39 years there were 11 cases (21%), age group 40-49 years there were 11 cases (21%), age group 50-59 years there were 13 cases (26%), and age group >60 years there were 8 cases (16%).

Table 1. Age Distribution of Samples

No	Age	N	(%)
1.	<20	1	2%
2.	20 – 29	7	14%
3.	30 – 39	11	21%
4.	40 – 49	11	21%
5.	50 – 59	13	26%
6.	>60	8	16%
Total		51	100%

Table 2 shows the distribution of thyroid nodule patients who underwent examinations based on sex, where female patients

had a higher frequency of 46 cases (90%) than men who had 5 cases (10%).

Table 2. Sex Distribution of Samples

No	Sex	N	%
1.	Female	46	90%
2.	Male	5	10%
Total		51	100%

Correlation Between Tirads Classification Ultrasonography and Cytopathological Findings of Thyroid Nodules: The Wahidin Sudirohusodo Hospital Experience

Table 3 shows the relationship between TIRADS classification ultrasonography (USG) and cytopathological findings in thyroid nodule patients. In the statistical analysis using the Spearman test, it can be seen that there is a

significant relationship between the ultrasonographic (USG) appearance of TIRADS classification and the cytopathological findings in thyroid nodule patients with a p value of 0.035.

Table 3. Correlation between TIRADS and Cytopathological findings

TIRADS	Bethesda (N)						P value
	I	II	III	IV	V	VI	
I	0	1	0	3	0	0	
II	0	8	0	6	0	0	
III	1	3	1	2	1	1	0.035
IV	1	1	0	12	1	1	
V	0	2	0	4	1	1	
Total	2	15	1	27	3	3	

DISCUSSION

The statistical analysis showed that there was a relationship between TIRADS classification ultrasonography (USG) and cytopathological findings with positive and significant correlation ($p < 0.05$). This shows that the increase in the TIRADS level is linear with the increase in the cytopathology category. The correlation strength of the TIRADS classification ultrasonography (USG) with the cytopathology examination results obtained has a p value of 0.035, which means there is a relationship between the TIRADS classification ultrasonography (USG) appearance and the cytopathological findings. This study result has a concordance with some previous studies.

Study performed by Periakaruppan, et al. (2018), where a relationship was found between TIRADS classification ultrasonography (USG) and the results of cytopathology examination, where the higher the TIRADS level, the higher the risk of malignancy of a thyroid nodule. Research by George, et al. (2021) also showed a relationship between higher TIRADS level and the risk of malignancy in cases of thyroid nodules. The results of the study by Debanu, et al., used 137 samples and found a correlation between TIRADS scores and cytopathology results, but only in certain Bethesda categories, so sustainability data was needed for this study. Research by Khalushi, et al. (2020) also showed that the results of identification were not good enough in cases of malignancy on cytopathology results, especially in the Bethesda classification III or IV. This is attributed to the diversity of ultrasound examination operators. Another study conducted by Biswas, et al. (2020) showed a similarity between TIRADS classification ultrasonography and cytopathological result using Bethesda system, especially in evaluating benign thyroid nodule lesion. This combination of

screening diagnostic tool will complement each other in diagnosing thyroid nodule lesion.⁴⁻⁷

CONCLUSIONS

In this study, the TIRADS classification of ultrasonography (USG) had a significant relationship with the cytopathological findings of thyroid nodule patients. As a conclusion and suggestion, this study can be carried out more massively due to the prevalence of thyroid nodule patients which are quite large and require an effective screening modality with the aim for reducing the cost of examinations and unnecessary examinations.

REFERENCES

- I. Armstrong M, Asuka E, Fingeret A. Physiology, Thyroid Function. StatPearls Publishing Treasure Island (FL). 2022 Jan.
- II. Chen Z, Mosha SS, Zhang T, Xu M, Li Y, Hu Z, et al. Incidence of microcarcinoma and non-microcarcinoma in ultrasound-found thyroid nodules. BMC Endocr Disord. 2021 Dec;21(1):1-5.
- III. Miskad, U. A., Leiwakabessy, W. N., Durry, M. F., Rahawarin, H., Cangara, M. H., Djimahit, T. The Utility Of Galectin-3 And Hector Battifora Mesothelial Epitope (HBME)-1 In Differentiating Thyroid Lesions. European Journal of Molecular & Clinical Medicine. 2020 Volume 07 Issue 07.
- IV. Periakaruppan G, Seshadri KG, Vignesh Krishna GM, Mandava R, Venkata Sai PM, Rajendiran S. Correlation between Ultrasound-based TIRADS and Bethesda System for Reporting Thyroid-cytopathology: 2-year Experience at a Tertiary Care Center in India. Indian J Endocrinol Metab. 2018.
- V. George N, Suresh S, Jiji V, Renu S, Thomas S,

Correlation Between Tirads Classification Ultrasonography and Cytopathological Findings of Thyroid Nodules: The Wahidin Sudirohusodo Hospital Experience

- Janardhan D, et al. Correlation of TIRADS and Bethesda scoring systems with final histopathology of thyroid nodules – an institutional experience: Semantic scholar. 2020.
- VI. Khalushi RE, Jackson BS, Mokoena T. Correlation between thyroid ultrasound and histology in patients with indeterminate cytology results : A local experience [Internet]. UPspace Home. Health and Medical Publishing Group. 2020.
- VII. Biswas A, Basu K, De S, Karmakar S, De D, Sengupta M, et al. Correlation between thyroid imaging reporting and Data System and Bethesda System of reporting of thyroid cytopathology of thyroid nodule: A single center experience. Journal of cytology. U.S. National Library of Medicine. 2020
- VIII. Zamora EA, Khare S, Cassaro S. Thyroid Nodule. *Encycl Endocr Dis*. 2021 Sep;529–38.
- IX. Blum M. *Ultrasonography of the Thyroid*. Most. South Dartmouth (MA). 2020 Apr;(July):1–44.
- X. Ammendola S, Girolami I, Bovo C, Painsi M, Castelli C, Bruno C, et al. Thyroid Fine-Needle Aspiration Cytology: Focusing on Adherence to Guidelines and Hospital Organization. *Am J Case Rep*. 2020;21:e920933-1.
- XI. Fridrihsone I, Strumfa I, Strumfs B, Vanags A, DainisBalodis, Jakovlevs A, et al. Thyroid Nodules in Diagnostic Pathology: From Classic Concepts to Innovations. *Histopathol - An Update*. 2018 Sep.
- XII. Bai Y, Kakudo K, Jung CK. Updates in the Pathologic Classification of Thyroid Neoplasms: A Review of the World Health Organization Classification. *Endocrinol Metab*. 2020;35(4):696.