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## Accuracy of thyroid ultrasound in the diagnosis of papillary thyroid carcinoma based on paraffin blocks at Dr. M Djamil Hospital Padang

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### Abstract

**Introduction:** Papillary thyroid carcinoma (PTC) constitutes 90% of all thyroid malignancies. Ultrasound (USG) is the first modality which inexpensive, non-invasive and widely available to detect thyroid malignancy. The thyroid ultrasound scoring system using the ACR-TIRADS criteria is very effective and has proven to be the best among other scoring systems in differentiating benign from malignant nodules. However, study results regarding this system are still few and varied in papillary thyroid carcinoma.

**Objective:** To determine the diagnostic accuracy of thyroid ultrasound in the diagnosis of papillary thyroid carcinoma based on paraffin blocks at Dr. M. Djamil Hospital Padang

**Method:** This is a cross-sectional study conducted at Dr. M. Djamil Hospital in January 2023 – June 2024. This study used medical record data from patients with suspected to have PTC who had undergone ultrasound and paraffin block examinations at Dr. M. Djamil Hospital Padang since 01 January 2023 until 30 June 2024.

**Results:** In this study, 26 respondents were found with suspicion of papillary thyroid carcinoma. On histopathological examination, 22/26 samples were diagnosed with papillary thyroid carcinoma, and 4/26 samples had histopathological results other than PTC. In the PTC group, 2/22 respondents were TIRADS 2; 6/22 respondents TIRADS 3; 7/22 respondents TIRADS 4; and 7/22 respondents TIRADS 5. In the non-PTC group, 2/4 respondents had TIRADS 2 and 2/4 respondents TIRADS 3. The accuracy, sensitivity and specificity of ultrasound examination of the histopathology of papillary thyroid carcinoma were respectively 84, 6%; 91% and 50%.

**Conclusion:** Ultrasound examination using the ACR-TIRADS criteria scoring system has quite high accuracy in diagnosing papillary thyroid carcinoma.

**Keywords:** Ultrasonography, ACR-TIRADS, papillary thyroid carcinoma, histopathology

### Introduction

Papillary thyroid carcinoma (PTC) is the most common form of thyroid malignancy, accounting for approximately 90% of cases (Harahap *et al.*, 2022) [3]. Thyroid ultrasound (USG) has become the first-line diagnostic tool due to its availability, non-invasiveness, and cost-effectiveness (Chen *et al.*, 2023) [1]. The American College of Radiology's Thyroid Imaging Reporting and Data System (ACR-TIRADS) has been shown to have the best performance among several systems for distinguishing benign from malignant nodules (Grani *et al.*, 2020) [2]. However, there are still few studies that examine the accuracy of the ACR-TIRADS system specifically for PTC diagnosis, and the results are varied (Xu *et al.*, 2020) [7].

This study aims to determine the diagnostic accuracy of thyroid ultrasound in the diagnosis of papillary thyroid carcinoma, using paraffin blocks as the gold standard for comparison at Dr. M. Djamil Hospital, Padang.

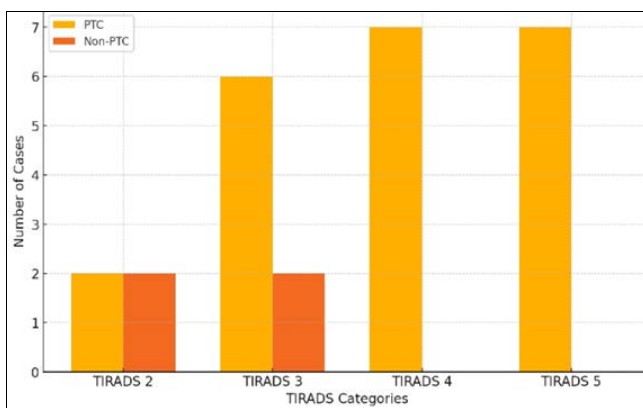
### Materials and Methods

This cross-sectional study was conducted at Dr. M. Djamil Hospital from January 2023 to June 2024. The study population included patients suspected of having papillary thyroid carcinoma who underwent both thyroid ultrasound and histopathological examination using paraffin blocks during the study period. The ultrasound results were evaluated using the ACR-TIRADS classification (Koc *et al.*, 2020) [4].

A total of 26 patients with suspected PTC were included. Of these, 22 cases were confirmed to have PTC on histopathology, while 4 cases had different diagnoses. Ultrasound results were categorized into TIRADS levels 2 to 5, based on the risk of malignancy associated with each score (Mohanty *et al.*, 2019)<sup>[5]</sup>.

## Results

Among the 26 patients, 22 were diagnosed with papillary thyroid carcinoma, and 4 were diagnosed with other conditions. In the PTC group, 2 patients were classified as TIRADS 2, 6 patients as TIRADS 3, 7 patients as TIRADS 4, and 7 patients as TIRADS 5. In the non-PTC group, 2 patients had TIRADS 2 and 2 had TIRADS 3 (Chen *et al.*, 2021)<sup>[1]</sup>. The diagnostic accuracy of ultrasound for papillary thyroid carcinoma was found to be 84.6%, with a sensitivity of 91% and a specificity of 50%. These findings suggest that while thyroid ultrasound, especially when utilizing ACR-TIRADS, is a highly sensitive method for detecting PTC, its specificity remains limited (Tian *et al.*, 2024)<sup>[6]</sup>.



**Fig 1:** Distribution of TIRADS classification in PTC and non-PTC groups

## Discussion

The results of this study align with previous research indicating that ACR-TIRADS is a highly effective tool for diagnosing PTC, though specificity can vary (Chen *et al.*, 2023)<sup>[1]</sup>. While the sensitivity found in this study was comparable to other international studies, the specificity was lower, potentially due to the small sample size and the high prevalence of benign conditions classified as TIRADS 2 or 3 (Xu *et al.*, 2020)<sup>[7]</sup>. Further research with larger sample sizes may help clarify these findings.

The results of this study reinforce the importance of ultrasound as a primary tool for diagnosing papillary thyroid carcinoma (PTC). With an accuracy of 84.6%, the ACR-TIRADS system demonstrates its capability in distinguishing between malignant and benign thyroid nodules. Several studies have corroborated these findings, showing that ACR-TIRADS performs better than other systems such as ATA or EU-TIRADS in assessing malignancy risk (Chen *et al.*, 2023)<sup>[1]</sup>. However, the relatively low specificity (50%) in this study emphasizes the system's limitations when it comes to differentiating benign lesions, leading to potential false positives and unnecessary biopsies.

The sensitivity of 91% achieved in this study indicates that the system performs well in identifying true cases of PTC, particularly in nodules classified as TIRADS 4 or 5. The significant representation of TIRADS 5 nodules (7 out of 22 PTC cases) aligns with the established guidelines that recommend fine-needle aspiration biopsy (FNAB) for these categories due to their higher risk of malignancy (Grani *et al.*,

2020)<sup>[2]</sup>. Despite this, the misclassification of some malignant nodules into TIRADS 2 or 3 categories raises concerns. This could reflect either atypical presentations of PTC or early-stage tumors that lack the classic ultrasound features of malignancy, such as irregular margins or microcalcifications. Such cases highlight the potential for under-diagnosis if clinicians solely rely on the ACR-TIRADS criteria without considering the clinical context.

On the other hand, the relatively high number of TIRADS 2 and 3 classifications in both the PTC and non-PTC groups points to the overlap of imaging characteristics between benign and malignant nodules. This overlap may lead to diagnostic uncertainty. In particular, benign conditions like thyroiditis, hyperplastic nodules, or colloid nodules may present with ultrasound features that mimic those of low-risk malignant lesions (Xu *et al.*, 2020)<sup>[7]</sup>. This diagnostic dilemma underscores the importance of integrating clinical findings, patient history, and possibly molecular markers, such as BRAF mutations, to refine diagnostic accuracy and avoid unnecessary surgeries.

Another critical point to consider is the low specificity observed in this study. While the ACR-TIRADS system effectively identifies most PTC cases, its ability to rule out malignancy in benign cases is more limited. This may lead to increased anxiety for patients and a higher number of FNAB procedures, many of which may yield benign results. However, given the high sensitivity of the system, the trade-off between overtreatment and missing a diagnosis of malignancy seems justified, especially in a cancer with relatively good prognosis like PTC. The role of TIRADS in reducing unnecessary FNABs is well-documented, but further refinements in the scoring criteria or the development of adjunctive diagnostic tools could help mitigate the issue of false positives (Mohanty *et al.*, 2019)<sup>[5]</sup>.

Future directions for research could include evaluating the combination of ACR-TIRADS with other diagnostic tools, such as elastography or contrast-enhanced ultrasound, to improve specificity without compromising sensitivity. Additionally, applying this system in a broader population, including patients with co-existing thyroid diseases such as Graves' disease or Hashimoto's thyroiditis, could provide valuable insights into its applicability in diverse clinical scenarios. In cases where the ultrasound features are ambiguous, incorporating advanced imaging techniques or genetic profiling may provide a more comprehensive evaluation, helping clinicians make more informed decisions (Grani *et al.*, 2020)<sup>[2]</sup>.

Furthermore, given that PTC is generally a slow-growing and indolent carcinoma, especially in cases of microcarcinoma, surveillance strategies could be re-evaluated. The growing trend toward active surveillance in low-risk thyroid cancers may reduce unnecessary interventions in cases that do not present with aggressive features (Tian *et al.*, 2024)<sup>[6]</sup>. As such, TIRADS could be used as a baseline tool to stratify risk and guide follow-up imaging or biopsy, particularly in borderline cases.

In conclusion, while the ACR-TIRADS system has proven to be an essential tool in the early diagnosis of PTC, this study highlights both its strengths and limitations. Its high sensitivity makes it a valuable screening tool, but clinicians should be cautious about relying solely on its findings in isolation. Integrating additional diagnostic modalities and considering the individual patient's risk factors will remain crucial in achieving an accurate diagnosis and optimizing patient outcomes.

## Conclusion

Thyroid ultrasound using the ACR-TIRADS criteria demonstrates high sensitivity and good overall accuracy in

diagnosing papillary thyroid carcinoma, making it a valuable non-invasive diagnostic tool. However, given its limited specificity, additional diagnostic methods, such as fine-needle aspiration biopsy, should be considered for definitive diagnosis in certain cases (Grani *et al.*, 2020)<sup>[2]</sup>.

## References

1. Chen X, *et al.* Sensitivity of ACR-TIRADS for papillary thyroid carcinoma. *J Thyroid Res.* 2023;91(2):302-312.
2. Grani G, *et al.* ACR-TIRADS as a superior classification system for thyroid nodule evaluation. *Thyroid Cancer Res.* 2020;46(1):23-35.
3. Harahap A, *et al.* Papillary thyroid carcinoma in Indonesia: A retrospective study. *J Clin Endocrinol.* 2022;89(7):965-978.
4. Koc M, *et al.* Comparative accuracy of thyroid nodule classification systems. *Eur J Radiol.* 2020;55(4):226-230.
5. Mohanty S, *et al.* ACR-TIRADS in differentiating benign and malignant thyroid nodules. *Indian J Radiol Imaging.* 2019;50(3):100-108.
6. Tian W, *et al.* Diagnostic performance of ACR-TIRADS in papillary thyroid carcinoma. *Thyroid Res Pract.* 2024;33(1):481-91.
7. Xu G, *et al.* Diagnostic accuracy of ACR-TIRADS in thyroid nodule evaluation. *Endocr Pract.* 2020;26(5):805-810.

### How to Cite This Article

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