Letter to the Editor

eISSN 2005-8330
https://doi.org/10.3348/kjr.2023.0974
Korean J Radiol 2024;25(1):118-119

Korean Journal of Radiology
KJR

Response: Inquiries Regarding "Delayed Cancer Diagnosis in Thyroid Nodules Initially Treated as Benign With Radiofrequency Ablation: Ultrasound Characteristics and Predictors for Cancer"

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Keywords: Radiofrequency ablation; Thyroid neoplasm; Follicular thyroid carcinoma; Ultrasonography

We are grateful to Dr. Sim for his interest in our research [1]. In response to his question [2] and considering our research results, the ability to effectively exclude follicular neoplasm (FN) from nodules for radiofrequency ablation (RFA) is a key concern.

As shown in our results, malignancy after RFA mainly comprised follicular thyroid carcinomas and one follicular variant of papillary thyroid carcinoma (FVPTC). In the latter case, the preoperative diagnosis is commonly FN rather than papillary thyroid carcinoma. Core needle biopsy (CNB) is known to be a more useful method for diagnosing FN than fine-needle aspiration (FNA) because it enables the collection of more tissue, including the capsule [3]. Therefore, according to the pre- RFA guideline, two FNAs alone may not be sufficient to diagnose FN [4]. As in a previous study, FN is commonly diagnosed as Bethesda III on FNA, so RFA of a Bethesda III nodule may also have malignant potential [5].

Our study found that malignancy can still develop after RFA, with 3 of 7 cases discovered within 2 years, and 4 of 7 cases discovered after 5 years. It can be assumed that some initial diagnoses may have been false negatives (early detection), while others reflect continuous tumor progression. This highlights the need for vigilant follow-up after RFA.

The criteria for RFA indications should exclude nodules with Bethesda III or IV on FNA or CNB results. RFA can effectively treat nodules with benign diagnosis of any size, even though repeated treatment is necessary for larger nodules. However, physicians must consider the possibility that larger sizes may carry a higher risk of malignancy. In our study, pre-RFA median volume was significantly larger for malignant nodules than for benign nodules (22.4 vs 13.4 mL). It is advisable to issue a warning regarding the potential for malignancy in nodules exceeding 20 mL in volume [5]. In terms of ultrasound findings, RFA targets for benign nodules mostly correspond to the Korean Thyroid Imaging Reporting and Data System (K-TIRADS) 3 nodules [6]. In our unpublished data (Kim MK, unpublished data), K-TIRADS 3 solid nodules with a well-defined halo and marked intranodular hypervascularity were often diagnosed as FN in CNB. In addition, when suboptimal reduction or even enlargement is shown despite sufficient ablation (in terms of RFA energy, power, and time) by an experienced operator, it is necessary to perform a recheck with CNB for early detection of malignancy.

Based on our study, we hold the view that the post-RFA malignancy rate in benign nodules is an inherent outcome attributable to the nature of the disease. We support supplementing the guidelines with improved methods for more accurate pre-RFA diagnosis of FN and early cancer detection through post-RFA follow-up, without discouraging patients from considering RFA as a treatment option.

Conflicts of Interest

Jung Hee Shin, the editor board member of the *Korean Journal of Radiology*, was not involved in the editorial

Received: October 6, 2023 **Accepted:** October 6, 2023
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evaluation or decision to publish this article. The author has no potential conflicts of interest to disclose.

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Funding Statement
None

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