

Experience of RFA for Multifocal Papillary Thyroid MicroCarcinoma: Real-World Issues and Challenges

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Abstract:

Objective: Initial evaluation of the effectiveness and safety of ultrasound-guided radiofrequency ablation (RFA) for the treatment of multifocal papillary thyroid microcarcinoma (mPTMC), based on real-world clinical experience at a tertiary interventional center in Vietnam.

Methods: Using a retrospective case selection approach, 41 patients with 84 papillary thyroid microcarcinoma nodules who underwent ultrasound-guided RFA at Vinmec Times City International Hospital from May 2022 to October 2025 were identified. Multifocal PTMC was defined as 2 or more nodules in any thyroid lobe. Patients with regular imaging follow-up for at least 6 months after the procedure were included. Pre-RFA ultrasound and/or CT were performed to assess tumors and exclude cervical lymph node (LN) metastasis. Thyroid function tests (FT4, TSH) were obtained pre- and post-procedure. Post-RFA follow-up ultrasound was performed at 1, 3, 6, 9 and 12 months, then every 6 months thereafter. Complications, changes in tumor size, tumor disappearance rate, and disease progression were assessed.

Results:

Before RFA, the mean nodule largest diameter was 5.7 ± 1.89 mm (range 2.7-10 mm), the mean nodule volume was $0,067 \pm 0,075$ ml (range 0.005 – 0.26 ml), the mean wattage ablation was 21.25 ± 3.04 W (range 20-25 W). After RFA the mean ablation area volume (Immediately after RFA) was $0,863 \pm 0,430$ ml (range 0,180 -2,270 ml), the volume reduction at 1 month, 3 months, 6 months, 9 months, 12 months and 18 months follow up was $60,92 \pm 12,60\%$, $85,84 \pm 7,73\%$, $93,16 \pm 17,22\%$, $98,80 \pm 1,90\%$, $99,72 \pm 0,63\%$, $99,93 \pm 0,36\%$. There were no cases of hypothyroidism after treatment: The levels of free thyroxine (FT4) and thyroid stimulating hormone were not significantly different at the 6 months and 12 months follow-up from those prior to treatment (all $p > 0.05$). The mean follow-up period was $30.25 \pm 6,65$ months (20-40 months). During the follow-up, no patient developed lymph node metastasis and no patient had recurrent PTMC. No life-threatening or delayed complications occurred. No patients were referred to surgery.

Conclusions: Our study shows that radiofrequency ablation is a safe and effective treatment option for patients with multifocal PTMC without lymph node or distant metastasis, particularly for high surgical-risk patients or those who refuse surgery. The real-world challenges of multifocal disease — including detection of occult foci, multiple ablation zone management, and long-term surveillance — require specialized protocols and institutional expertise..

Key: radiofrequency ablation, Microcarcinoma, thyroid, ultrasound, clinical outcomes, multifocal papillary thyroid carcinoma, Vietnam Experience, Thyroid Function Preservation.

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