







# Radiofrequency Ablation for Recurrent Papillary Thyroid Carcinoma at the Central Compartment Node: A Case Report

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## Abstract

### Keywords

- ▶ papillary thyroid cancer
- ▶ radiofrequency ablation
- ▶ recurrent thyroid cancer
- ▶ lymph node
- ▶ thyroid cancer metastases

Papillary thyroid carcinoma is the most common thyroid cancer with a good prognosis. However, local recurrence or cervical lymph node metastasis is frequent. Reoperation is a standard treatment but may be challenging due to the formation of fibrosis, cervical anatomy distortion, and the small size of recurrent lesions. Radiofrequency ablation (RFA) is a minimally invasive modality for recurrent thyroid cancer in high-risk patients or those who refuse surgery. Here, we describe the case of a 41-year-old woman who underwent total thyroidectomy with central neck dissection because of papillary thyroid carcinoma. Follow-up ultrasonography 14 months after the second surgery revealed two abnormal lymph nodes in the right neck at level VI. She underwent RFA of the lymph nodes. Eighteen months after RFA, the metastasis lymph nodes disappeared completely.

## Introduction

Papillary thyroid carcinoma is the most common thyroid cancer with a relatively good prognosis.<sup>1</sup> A common site of recurrence is the cervical lymph nodes.<sup>2</sup> Minimal invasive treatments such as ethanol ablation and radiofrequency ablation (RFA) may be effective alternatives to surgery for patients with cervical nodal recurrences.<sup>1</sup> In this article, we intended to illustrate a case of successful treatment of a papillary metastatic lymph node with radiofrequency in a patient with a history of two surgeries, total thyroidectomy and neck node dissection for papillary thyroid carcinoma.

## Case Report

A 41-year-old female patient presented with a history of two surgeries for papillary thyroid cancer. Postsurgery, the

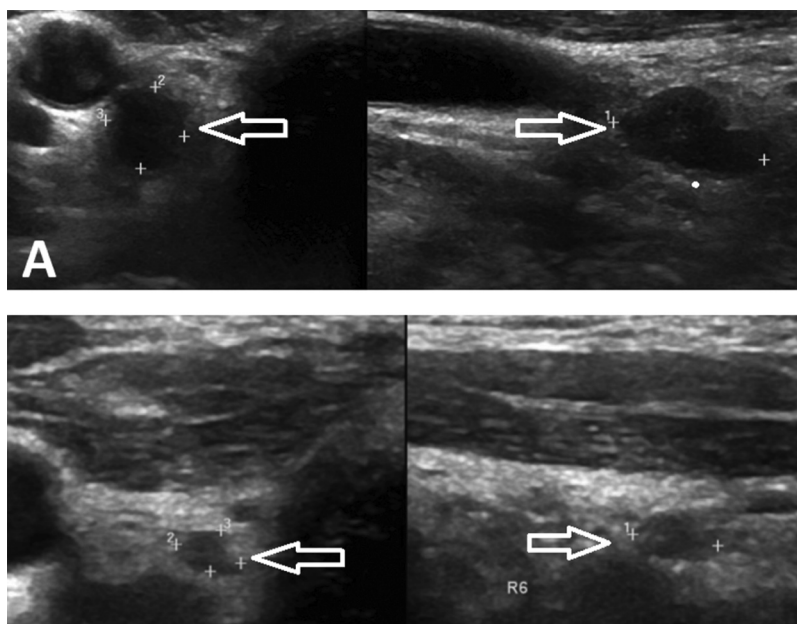
thyroglobulin (Tg) level was 0.02 ng/mL and the anti-Tg level was 20 IU/mL. Follow-up ultrasound performed 14 months after the second surgery revealed two hypoechoic lymph nodes with loss of fatty hilum in the right level VI: 6 × 11 mm (first lymph node) and 2.7 × 4.5 mm (second lymph node; ▶ **Fig. 1**). Her Tg level was 0.04 ng/mL and anti-Tg level was 30.1 IU/mL. Both lymph nodes were confirmed as recurrent by cytological examination. After a careful discussion about the advantages and disadvantages of surgery, radioiodine ablation, and RFA therapy, the patient chose to undergo RFA.

## Radiofrequency Ablation Technique

We injected cold dextrose solution 5% (D5W) between the targeted lymph nodes and the surrounding tissue to make a 10- to 15-mm barrier. During ablation, if the distance was

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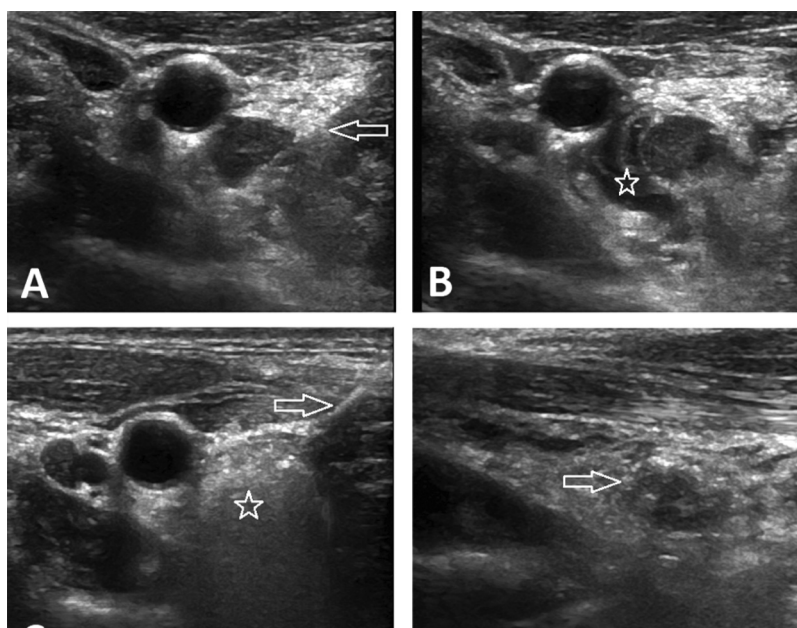
**Fig. 1** Ultrasound images show metastatic lymph nodes. (A) The first lymph node (arrows). (B) The second lymph node (arrows).

less than 10 mm, a repeat injection was performed. We used an 18-gauge needle for RFA (STARmed, Goyang, South Korea) with a 7-mm active tip and the power was between 20 and 30 W. Ablation was performed using the moving shot technique on both the metastatic lymph nodes and the surrounding normal tissue to prevent marginal recurrence. The RFA procedure for the first lymph node is shown in ►**Fig. 2**. There were no minor or major complications after the procedure. The changes in volume of the first lymph node at each follow-up are shown in ►**Fig. 3**. At 18 months of follow-up, the Tg and anti-Tg levels were in the normal range.

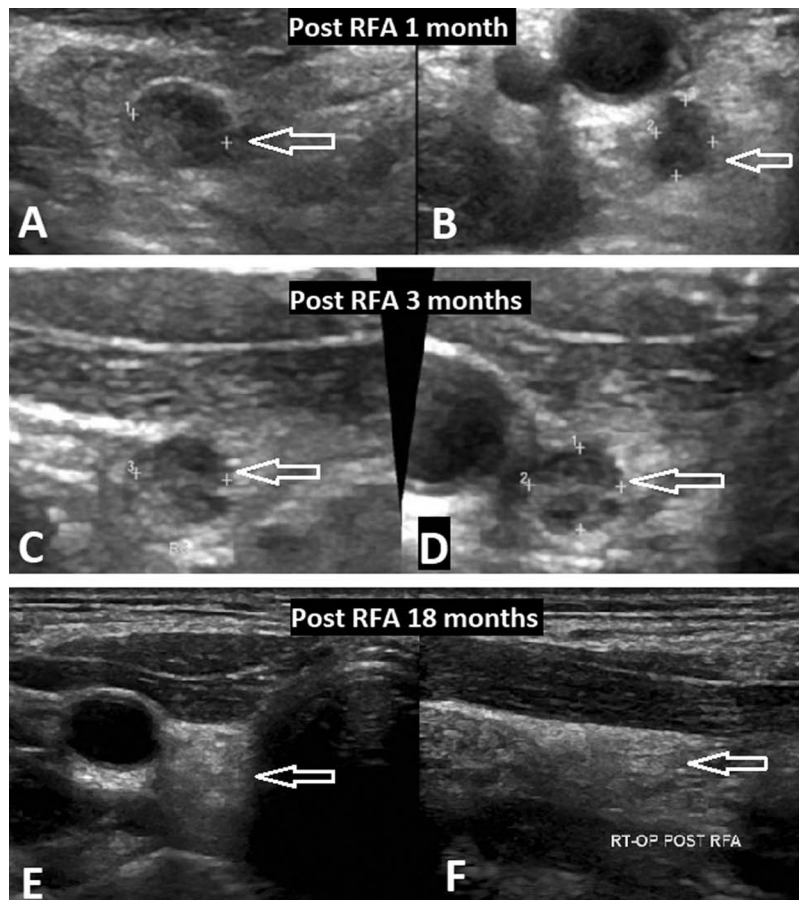
## Discussion

Minimally invasive treatments, such as RFA, for the management of recurrent thyroid cancer are applied in fragile patients, the elderly, or those at risk of surgical complications.<sup>3-6</sup> RFA for recurrent well-differentiated thyroid cancer was first reported by Dupuy et al in 2001.<sup>7</sup> Then, more studies showed that RFA is effective and safe for treating locally recurrent papillary thyroid cancer.<sup>6,8-12</sup>

A study by Choi et al<sup>13</sup> showed that the 6-year recurrence-free survival rates remained similar between the RFA and



**Fig. 2** Radiofrequency ablation (RFA) procedure of the first lymph node. (A) A needle of 5% dextrose (arrow) is inserted posterior to the recurrent tumor. (B) A safe thermal barrier (star) was created greater than 10 mm between the lymph node and adjacent structures. (C) RFA showed complete ablation of the lymph node (needle ablation: arrow; bubble formation: star). (D) The lymph node 2 hours after RFA (arrow).



**Fig. 3** Ultrasound images obtained at 1, 3, 18 months of follow-up. The volume reduction rate (VRR) for each nodule was expressed as a percentage and calculated using the following equation:  $[(\text{initial nodular volume} - \text{final nodular volume}) \times 100] / \text{initial nodular volume}$ . The VRR was 86, 90, 100%, respectively, (arrows) at 1, 3, 18 months of follow up.

surgery groups (89.5 and 94.5%, respectively,  $p=0.1$ ). The pooled proportion of the recurrence rate of RFA was 6% at 2 years of follow-up.<sup>14</sup> A study by Kim et al<sup>15</sup> showed that the hoarseness rate was similar between the RFA and reoperation groups, and higher hypocalcemia occurred in the reoperation group but not in the RFA group.

The RFA complication rates of recurrent thyroid cancers are higher than those of benign nodules.<sup>16</sup> The incidence of voice change in both central and lateral regions after RFA is up to 19%, and in centrally located tumors, it is 24%.<sup>6,10,14</sup> Major complications associated with RFA have been reported, which included nerve injuries (recurrent laryngeal nerve, cervical sympathetic ganglion, brachial plexus, and spinal accessory nerve), nodule rupture, and permanent hypothyroidism.<sup>14,17</sup> Minor complications include hematoma, vomiting, skin burn, lidocaine toxicity, hypertension, and pain.<sup>14,17</sup> Patients with voice change often have tumors in the central compartment.<sup>6</sup>

In our case, the metastatic lymph nodes were in the central neck region; the recurrent laryngeal nerve was not visualized on ultrasound. Both the esophagus and the trachea were also at risk of thermal injury in the surgical bed. We used a continuous, large-volume hydrodissection technique during the procedure to prevent thermal injury. During the RFA procedure, the interventional radiologist checked the recurrent laryngeal nerve by talking with the patient.

## Conclusion

RFA is a minimal invasive treatment for recurrent papillary thyroid carcinoma. We believe that RFA may be preferred as an alternative treatment for patients with high surgical risk or those who refuse repeated surgery.

## Funding

None.

## Conflict of Interest

None declared.

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