LETTER TO THE EDITOR

Prediction of nodule regrowth after radiofrequency ablation of benign thyroid nodules

We thank Dr. Sim et al. [1] for their comments on our work and agree with them that regrowth and additional treatment are important topics of interest. As an alternative to surgery, the long-term efficacy of thermal ablation should be addressed.

In our study, the residual vital ratio (RVR) was measured and calculated in the first follow-up period. The results showed that RVR was not only an independent factor but also an early predictor of nodule regrowth after radiofrequency ablation (RFA). If the RVR was larger than 44.5%, the nodule tended to regrow during the follow-up period. There were two reasons for not using the immediate data. First, the immediate range of the ablated area may not represent the final necrotic volume caused by ablation [2]. Studies have indicated that the immediate post-procedural necrotic volume on contrast-enhanced ultrasound (CEUS) is smaller than that measured 24 h or 7 days later [3,4]. This is probably because a certain amount of sub-lethally injured tissues in the periphery undergoes expansion and become necrotic, which becomes evident only 1–7 days after the ablation [3,5,6]. Then the volume decreases slightly in the subsequent weeks as a result of the breakdown of and removal of the necrotic tissue by inflammatory cells [5,7]. Second, the volume measurement immediately after RFA can also be affected by edema and hemorrhage [8]. Therefore, the ablated volume measured immediately after ablation is not the real necrotic volume caused by ablation. Based on these two reasons, the RVR was calculated in the first follow-up period. Our results showed that the area under the curve (ROC) of RVR for regrowth was 0.819 (sensitivity 80.8%, specificity 74.7%), which indicated a good prediction ability. It implied that the time of calculation of RVR at the first follow-up point might have little impact on the prediction of regrowth. However, this needs to be verified by further studies.

There were also some problems associated with the initial ablation ratio (IAR). First, IAR was defined as the ratio of the ablated volume to the total volume of the nodule calculated immediately to predict therapeutic success after ablation [8]. Although IAR should be calculated immediately after ablation, it was actually calculated at the first follow-up point [8]. Therefore, the measurement time issue for RVR was also existed for IAR. Second, the measurement of IAR was based only on conventional US. However, the margin of the ablated area was ill-defined or irregular on conventional US [8]. Accurate detection and measurements of the true volume are essential for successful evaluation [9]. Schiaffino et al. [10] showed that CEUS had higher reproducibility and inter- and intra-observer agreement compared to conventional US in the assessment of Va measurement after RFA for benign thyroid nodules. Our recent study also yielded similar results [11]. Our results showed that Va measured by conventional US was significantly larger than that measured by CEUS. Moreover, intra- and inter-reliability and agreement between conventional US and CEUS in measuring Va were unsatisfactory. Because of the larger Va measured by conventional US, the IAR may be overestimated in some nodules, which could affect the prediction of therapeutic success and follow-up management.

Twelve-month VRR was also used to predict nodule regrowth after laser ablation (LA) [12]. However, compared with RVR calculated at the first month after RFA, it was not an early predictor. Moreover, the incidence of regrowth was 37.5% [12], which was much higher than that in our study (12.62%) [1]. This might be due to the different ablation technique used. Meta-analysis showed that VRR after RFA was 68%, 75% and 87% at 6, 12 and 24 months, respectively. The VRR of LA was 48%, 52%, and 45% at 6, 12 and 24 months, respectively. The performance of RFA seemed to be better than that of LA in terms of the VRR achieved [13]. Therefore, the performance of 12-month VRR to predict nodule regrowth after RFA needs further investigation.

In conclusion, as an alternative to surgery, the efficacy of RFA and other thermal ablation techniques should be sustainable for longer periods. Efforts to investigate the parameters associated with nodule regrowth or therapeutic success, such as IAR, 12-months VRR or RVR, could improve the clinical outcomes of ablation.

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