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Radiofrequency Ablation Therapy for Large Benign Thyroid Nodules

To the Editor: We read with great interest a report by Hamidi et al,[1] titled "Outcomes of Radiofrequency Ablation Therapy for Large Benign Thyroid Nodules: A Mayo Clinic Case Series." Hamidi et al[1] presented a retrospective review of 14 patients with predominantly solid thyroid nodules (TNs) treated with radiofrequency ablation (RFA) at the Mayo Clinic. The authors achieved 44.6% of median volume reduction with 8.6 months of the median follow-up period. The clinical efficacy was proved by resolution of compressive symptoms and improvement of cosmetic concerns. There were minor complications (21%) and no reported major complications. They concluded that RFA has an acceptable safety profile and should be considered as a low-risk alternative to conventional treatment of symptomatic benign TNs.

We congratulate the authors for their meaningful results. Perhaps most importantly, this is the first research reporting the experience of thyroid RFA from the United States. We are certain that this research will be meaningful for both physicians and patients within the United States.

However, several factors should be considered in technical and clinical aspects to achieve sustainable results in the future. The research enrolled large-sized TNs (mean volume, 24 mL). These results were may be induced by using the standard RFA techniques, the transisthmic approach and the moving-shot technique, which are recommended by current RFA guidelines.[2] In addition, the authors used general anesthesia. However, most of the previous RFA studies used local anesthesia in the perithyroidal area because sensory nerves are present in the perithyroidal area (not inside the thyroid gland).[3] Therefore, pain during RFA is tolerable in most patients only using perithyroidal lidocaine injection. Moreover, apart from the usual problems of general anesthesia, monitoring of voice changes by nerve damage during the RFA procedure is impossible under general anesthesia. If voice change is detected during ablation, immediate cessation of RFA and injection of cold dextrose 5% in water (D5W) may recover voice problems induced by thermal damage. Therefore, local anesthesia is a safer pain control method than general anesthesia. Although a large population multicenter study reported only 1% of voice-related complications during RFA of benign nodules,[4] a recent large population single-center study reported a higher incidence of nerve injury (including recurrent laryngeal nerve, spinal accessory nerve, and sympathetic ganglion) during treatment of recurrent thyroid cancers.[5] Therefore, current RFA guidelines recommend local anesthesia.

The authors stressed single-session RFA for benign TNs because they achieved acceptable results at 8-month follow-up. In addition, single-session RFA is cost-effective compared with the surgical procedure. However, we should consider the long-term results of thermal ablations (ie, radiofrequency or laser) for benign TNs. In long-term studies with single-session laser ablation (LA), there has been a tendency of marginal regrowth at 2- to 3-year follow-up. Døssing et al[6] reported that 35% patients (27 of 78 patients) had thyroid surgery because of an unsatisfactory result 67 months later following LA, mainly due to regrowth of the nodule. Valcavi et al[7] reported 9% (11 of 122 patients) recurrence rate at 3-year follow-up. Their volume reduction was maximum at 2 years but slightly decreased at 3 years. It is induced by regrowth of treated nodules. This phenomenon is commonly observed after single-session treatment by LA because tumor regrowth occurs gradually during a follow-up period after an initial improvement of the clinical symptoms. In the single-session study in Mayo Clinic, the authors reported a similar result. In Figure 2, volume reduction at 12 to 24 months was 54.3% but decreased to 52.8% at 24-month follow-up. This result suggests that marginal regrowth started during 12- to 24-month follow-up. In response to this phenomenon, Korean

groups have proposed and performed a complete tumor ablation. Two Korean reports of long-term results showed continuous volume reduction over years.[8,9] In a single-center study, Lim et al[8] reported 90% volume reduction at 1 year and 93.5% at 4 years. In a multicenter prospective study, Jung et al[9] also reported gradual volume reduction over years (80.3% at 1 year, 89.2% at 3 years, and 91.9% at 4 years).

In conclusion, the Mayo Clinic study confirmed that ultrasound-guided RFA is a clinically effective and safe outpatient treatment in patients with symptomatic or steadily growing benign, large, predominantly solid TNs, reproducing the experience generated in European and Asian studies. However, we should consider the pain control method for safety and the treatment strategy to achieve reasonable long-term efficacy.

Auh Whan Park, MD
Department of Radiology, University of Virginia Health System,
Charlottesville, VA

Jung Hwan Baek, MD, PhD
Department of Radiology and Research Institute of Radiology
University of Ulsan College of Medicine
Asan Medical Center
Seoul, Korea

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In Reply—Radiofrequency Ablation Therapy for Large Benign Thyroid Nodules

To The Editor: We thank Park and Jung[1] for their pertinent comments regarding our article.[2] They emphasize the use of a transisthmic approach along with a moving-shot technique, both of which we have used, to achieve a safe and effective radiofrequency ablation (RFA) session. In addition, they describe the commonly used approach to anesthesia for RFA—perithyroidal lidocaine injection—and suggest that general anesthesia, as used by us, would not allow monitoring of voice changes during the procedure. To that point they argue that local anesthesia is a safe pain control method that allows voice monitoring and quote[3] "only 1% of voice-related complications during RFA of benign nodules" when local anesthesia was used. First, we want to point out that we had no voice-related complications with our approach beyond the periprocedure recovery changes. For safety reasons, we have purposefully left untreated the outer 5 mm of the nodule. This has not been the case with previous RFA protocols. We chose this safety margin because we wanted the complication rate as close to 0 as possible and this has allowed us to treat the nodules safely without continuous monitoring of voice in a patient under anesthesia. Of course, the volume reduction is less, but we think it is worth the added safety benefit. Second, it is pertinent that we dealt with rather large nodules that require an extensive procedure time. For some nodules the patient positioning required for adequately reaching the target nodule is not a very natural one. In this scenario, eliminating patients' anxiety and movement was beneficial for achieving optimal control of the treated area and minimizing risk to adjacent structures. Third, as the submitted commentary points out, "pain during RFA is tolerable in most patients only using perithyroidal lidocaine injection," which actually underlines the possibility that for some subjects pain will be an issue with local anesthesia and that could lead to discomfort and more so to undesirable movement during the procedure. In response to this issue, we think that there is a role for both approaches to anesthesia, the ultimate selection depending on the size and location of the target lesion as well as the comfort level of the procedural team with the different approaches. The third issue that Park and Jung bring up relates to the comparison between single-session and multisession RFA. We actually did not perform repeat RFA in our study because it was intended to be a small feasibility pilot study. We do agree with their commentary that repeat RFA is likely to achieve further decrease in nodule volume and, in some cases, avoid the need for surgery. However, in most cases, our goal was symptom relief as opposed to maximum volume