

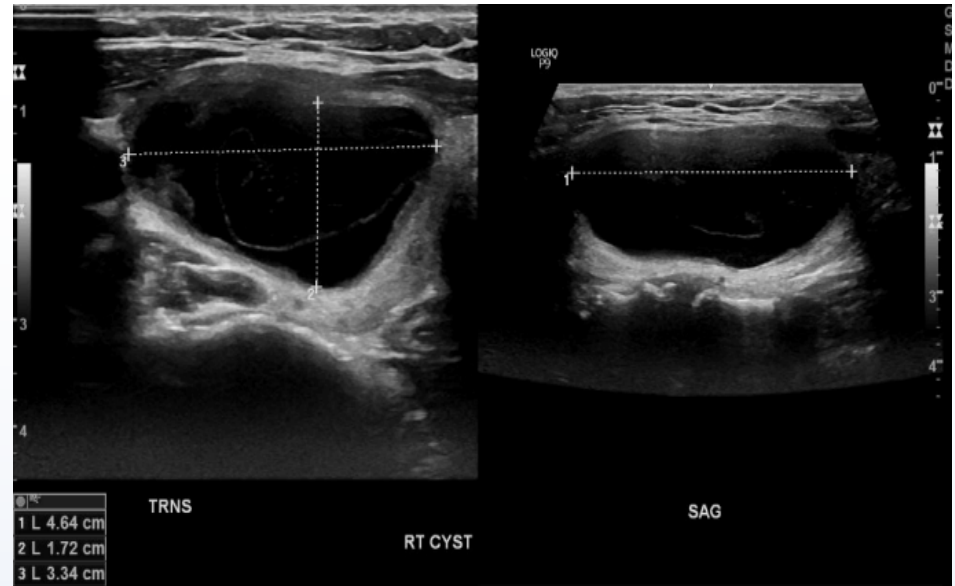
General Principles for the Safe Performance, Training, and Adoption of Ablation Techniques for Benign Thyroid nodules: An ATA[®] Statement

Case Examples

Ethanol Ablation

Case 1: 54 yo with a symptomatic cyst

- 54 yo woman presents with new right neck swelling causing some difficulty swallowing
- 24cc fluid aspirated from a pure thyroid cyst with resolution of symptoms.
- Presented again one month later with re-enlargement
- 4.6x1.7x3.3 cm
- 12.9 mL
- 1.5cc of 1% lidocaine was injected subdermal with 30G needle
- 15cc tan liquid was aspirated and 3cc of ethanol was injected



Case 1: One year follow up after ethanol

- One year later no recurrence of symptoms
- 0.6x0.3x0.6 cm
- 0.05 mL
- 99% volume reduction



Radiofrequency Ablation

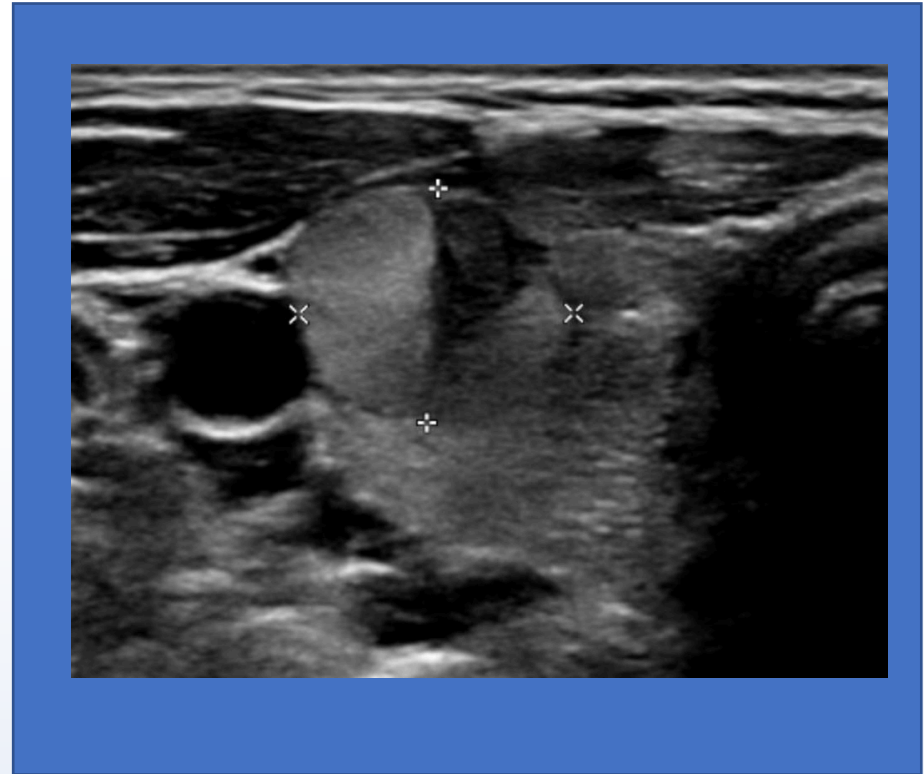
Case 2: 39 yo with a symptomatic solid nodule

- 39 yo man with symptomatic changes - discomfort when weight lifting and performing overhead maneuvers.
- Isolated right mid-pole nodule.
- 3.7x2.2x3.5 cm
- 9.75 ml volume
- FNA benign.



Case 2: One year follow up after RFA

- Complete symptomatic resolution
- 2.4x1.3x1.5 cm
- 2.24 mL volume
- 77% reduction



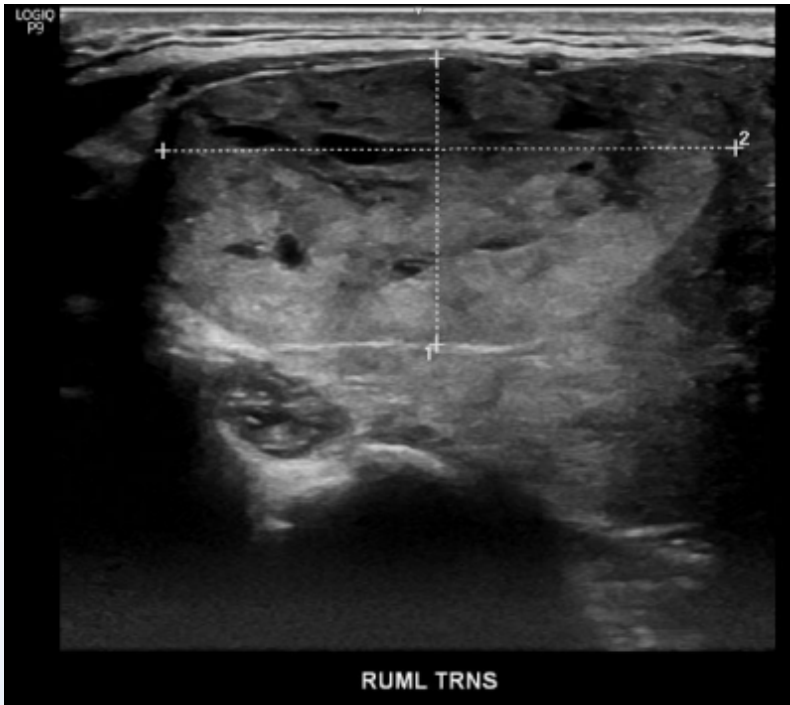
Case 3: 44 yo with enlarging MNG



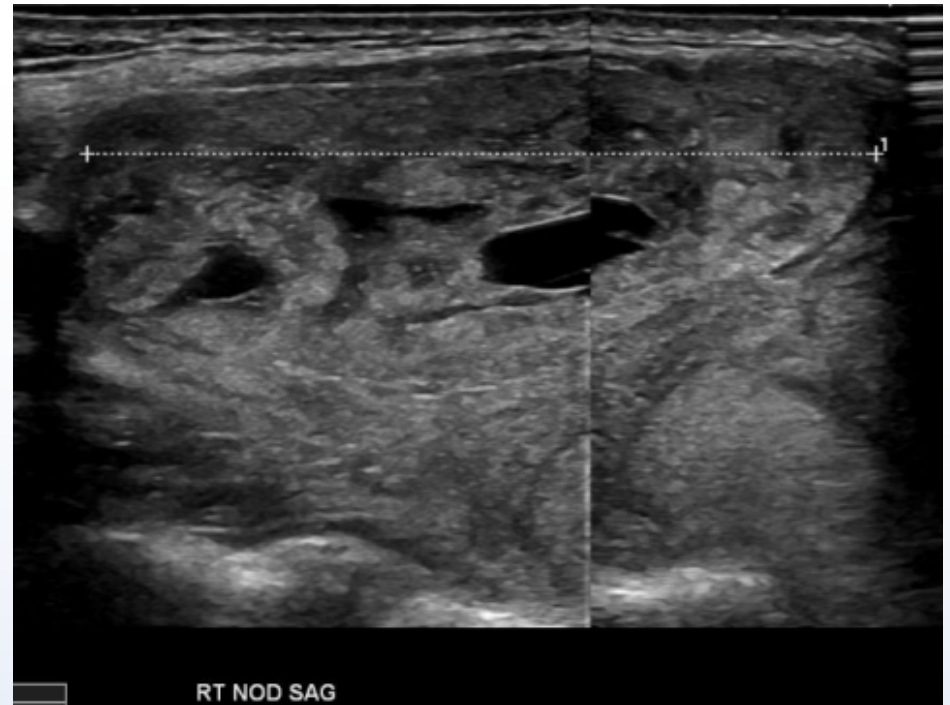
- 44 yo woman with a multinodular goiter and enlarging dominant right nodule.
- Right upper pole nodule 5.1x2x4 cm nodule
- 20 mL volume
- TSH 1.6 mU/L
- FNA benign three times in 6 years.

Case 3: pre-procedure ultrasound

Transverse



Sagittal



Case 3: Radio Frequency Ablation

- Time-out performed and consent signed
- 56,000J administered (2,666 J/mL)
- 19 minutes and 45 seconds ablation time
- 22cc of 1% lidocaine used
- Patient observed for 30 minutes and post-procedure instructions provided. She was comfortable with no complaints.



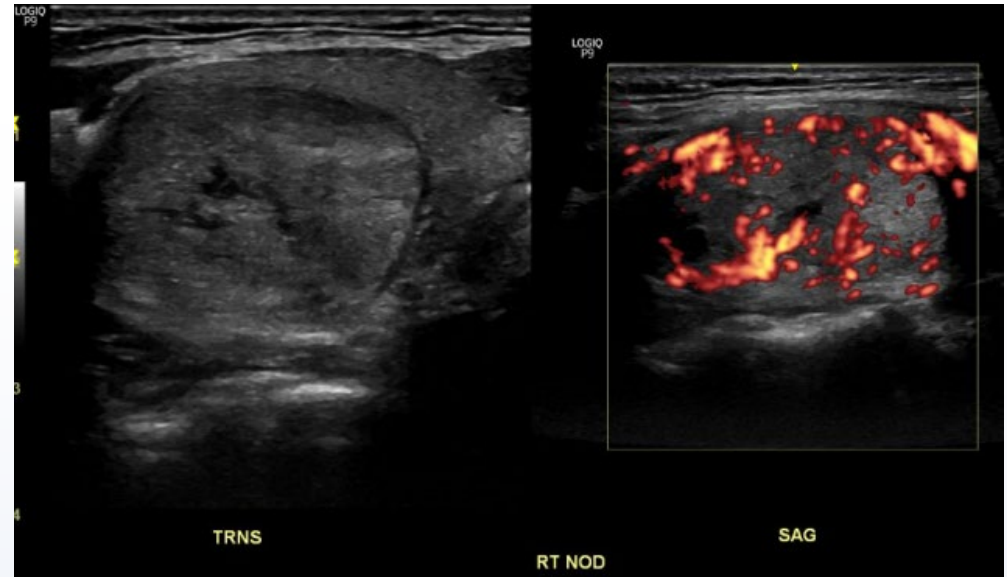
Case 3: 3-month follow up after RFA



$2.9 \times 1.5 \times 2.5 = 5.4 \text{ mL volume (73\% reduction)}$

Case 4: 33 yo with a Toxic Nodule

- 33 yo with four years of progressive symptoms:
 - Globus sensation with head rotated to the right
 - Palpitations
 - Heat intolerance
- No plans for pregnancy
- TSH 0.01, FT4 1.53, FT3 4.5
- 2.8x1.8x2.6 cm
- 6.5 mL
- 5 mg methimazole and 12.5 mg atenolol started



Case 4: RFA procedure

- Time-out performed and consent signed
- Pre-RFA Nodule measurement: 3.2 x 1.8 x 2.5cm, 7.3mL
- T=7mm
- 14711J (2015 J/mL)
- 9 minutes and 9 seconds ablation time
- 23cc of 1% lidocaine used
- Patient observed for 30 minutes and post-procedure instructions provided. She was comfortable with no complaints.

Post-Procedure, TRANS



Case 4: Follow up

- One month clinic visit reported resolution of symptoms
- One month ultrasound 2.4x1.8x2 cm (4.5 mL)=30% decrease in volume
- Three month laboratory evaluation:
 - TSH = 1.37
 - FT4 = 1.08
 - FT3 = 2.8



Complications

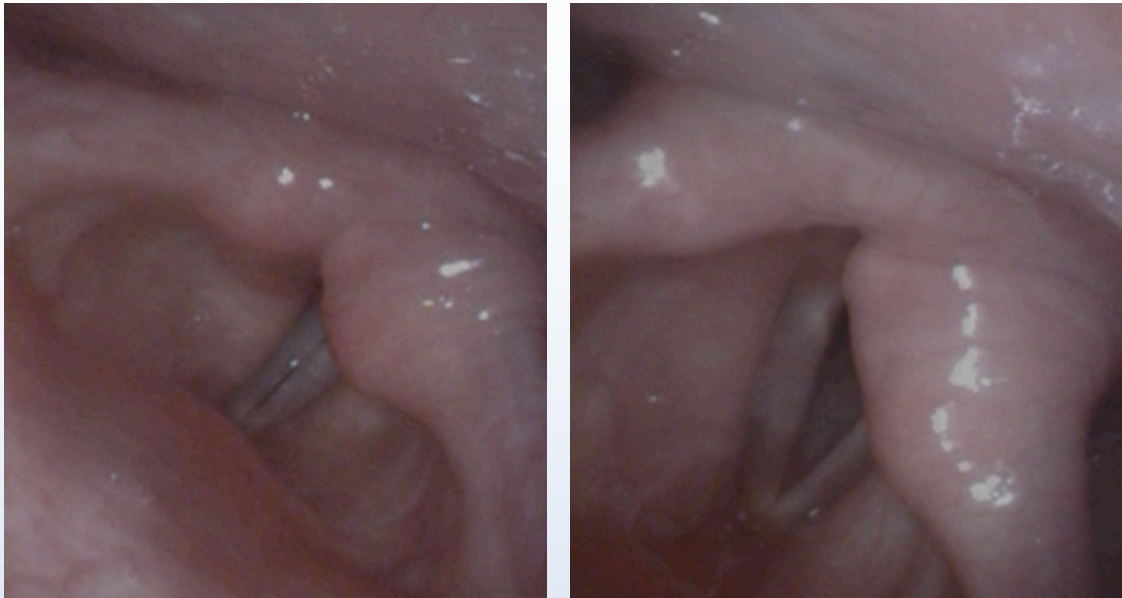
Nodule Rupture after RFA

- Potential Risk Factors:
 - Anterior and superficial nodules
 - Excess energy usage
 - Capsular weakening due to thermal injury
 - Microbleeding
 - Environmental factors



Vocal Fold Paralysis

- May be detected by patient reported voice change
- Routine post-procedure laryngeal examination may identify asymptomatic vocal fold paralysis



Laryngeal examination demonstrating left vocal fold paralysis

Other Complications

- Hematoma
- Skin burn
- Transient hyperthyroidism
- Nodule regrowth