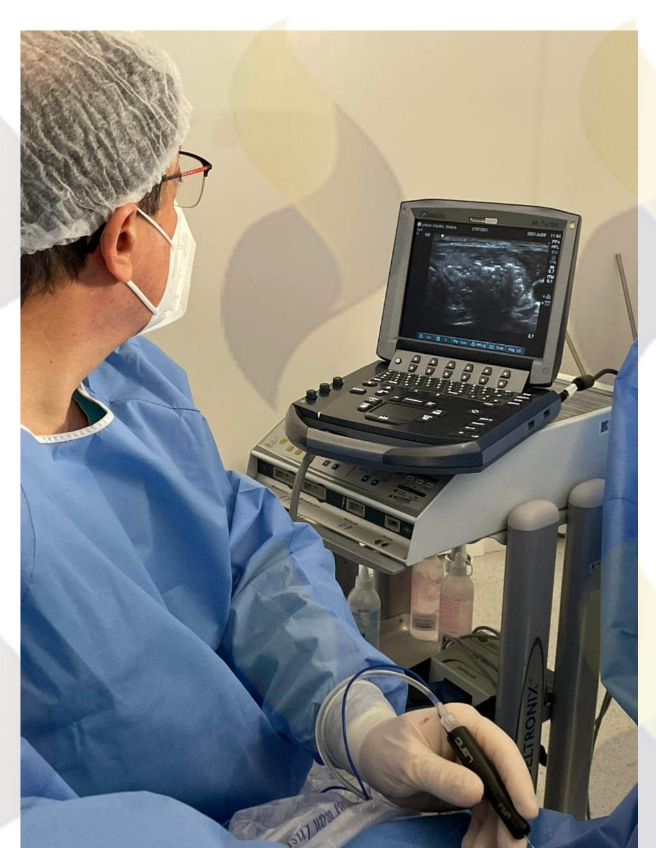
5TH ANNUAL Miami Thyroid Oncology Symposium

March 18-19 2022

Ablative Approaches to Thyroid Nodules



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Erivelto Volpi, MD, PhD

Head and Neck Surgery

ATA Research Committee

LATS Surgical Affair Committee

Associate Editor - *Clinical Thyroidology*

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European Journal of Endocrinology (2008) 159 493–505 ISSN 0804-4643

REVIEW

Thyroid nodules: a review of current guidelines, practices, and prospects

H Gharib, E Papini[1] and R Paschke[2]

Division of Endocrinology, Diabetes, Metabolism and Nutrition, Mayo Clinic, 200 First, Street SW, Rochester, Minnesota 55905, USA, [1]Department of Endocrine and Metabolic Diseases, Regina Apostolorum Hospital, Albano Laziale 00041, Italy and [2]III. Medical Department, University of Leipzig, Ph.-Rosenthal-Street 27, D-04103 Leipzig, Germany

(Correspondence should be addressed to R Paschke; Email: pasr@medizin.uni-leipzig.de)

"Opinions on the optimal management and clinical follow-up of the thyroid nodule varies, controversy and constant changes remain"

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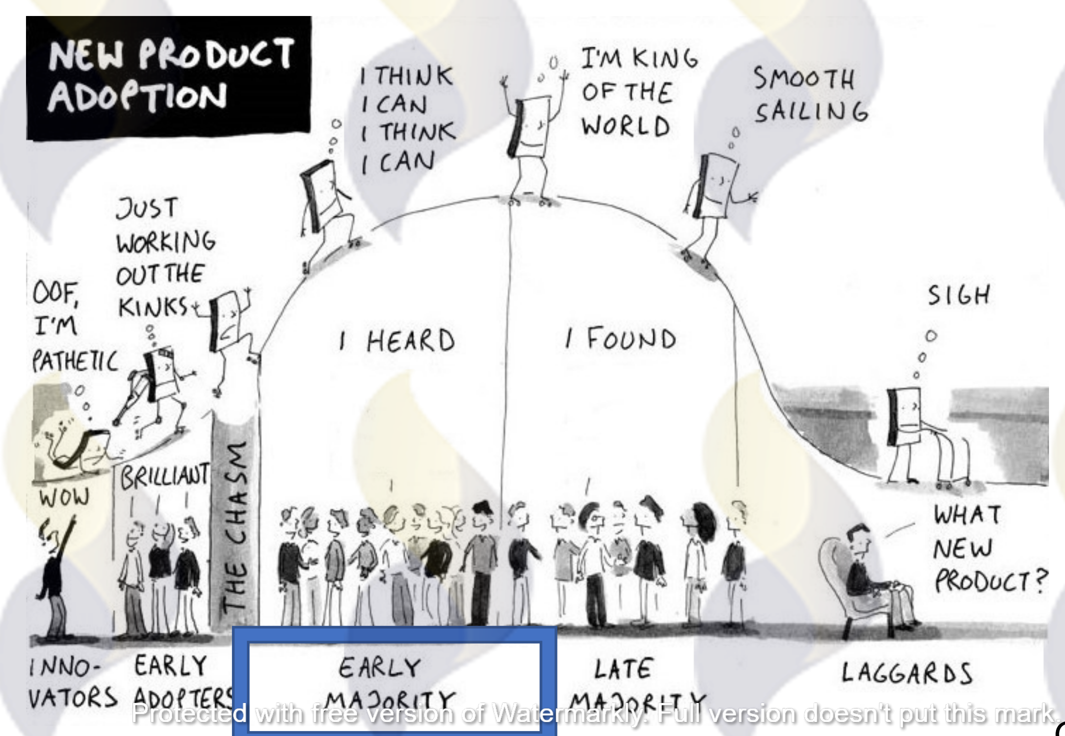
New technologies paradigm



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GEOFFREY MOORE CURVE

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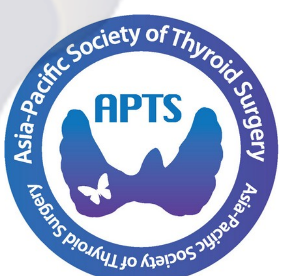
Radiofrequency Ablation and Related Ultrasound-Guided Ablation Technologies for Treatment of Benign and Malignant Thyroid Disease: An International Multidisciplinary Consensus Statement of the American Head and Neck Society Endocrine Surgery Section with the Asia Pacific Society of Thyroid Surgery, Associazione Medici Endocrinologi, British Association of Endocrine and Thyroid Surgeons, European Thyroid Association, Italian Society of Endocrine Surgery Units, Korean Society of Thyroid Radiology, Latin American Thyroid Society, and Thyroid Nodules Therapies Association



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Author Panel

Lisa A Orloff, Julia E Noel, Brendan C Stack, Jr., Marika D Russell, Peter Angelos, Jung Hwan Baek, Kevin Brumund, Feng-Yu Chiang, Mary Beth Cunnane, Louise Davies, Andrea Frasoldati, Laszlo Hegedüs, Ayaka J Iwata, Emad Kandil, Jennifer Kuo, Celestino Lombardi, Mark Lupo, Ana Luiza Maia, Bryan McIver, Dong Gyu Na, Roberto Novizio, Enrico Papini, Kepal N Patel, Leonardo Rangel, Jonathon O Russell, Jennifer Shin, Maisie Shindo, David Shonka, Amanda S Karcioglu, Catherine Sinclair, Michael Singer, Stefano Spiezia, Jose Higino Steck, David Steward, Kyung Tae, Neil Tolley, Roberto Valcavi, Ralph P Tufano, R Michael Tuttle, Erivelto Volpi, Che Wei Wu, Gregory W Randolph

Radiofrequency Ablation and Related Ultrasound-Guided Ablation Technologies for Treatment of Benign and Malignant Thyroid Disease: An International Multidisciplinary Consensus Statement of the American Head and Neck Society Endocrine Surgery Section with the Asia Pacific Society of Thyroid Surgery, Associazione Medici Endocrinologi, British Association of Endocrine and Thyroid Surgeons, European Thyroid Association, Italian Society of Endocrine Surgery Units, Korean Society of Thyroid Radiology, Latin American Thyroid Society, and Thyroid Nodules Therapies Association. Head Neck 2022 Mar;44(3):633-660. doi: 10.1002/hed.26960. Epub 2021 Dec 23

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Background

- **Surgery - long-established therapeutic option for benign thyroid nodules**
- **Relevant concerns remain**

✓ **The cost of surgery**

✓ **The risk of temporary or permanent complications**

✓ ***Effect on quality of life***

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Why minimally invasive treatments?

100,000 to 150,000 thyroidectomies are performed in the US/year

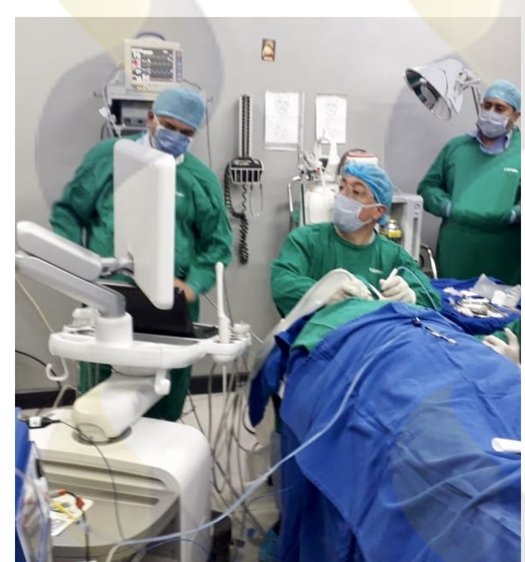
53,000 patients developed thyroid cancer in 2020

Most thyroidectomies are for benign disease

20 years after the first publications –

US Ablation techniques are a safe and effective treatment for thyroid nodules.

RFA is one of the most widely used procedures in specialized centers



Hussain I, Zulfiqar F, Li X, Ahmad S, Aljammal J. Safety and Efficacy of Radiofrequency Ablation of Thyroid Nodules-Expanding Treatment Options in the United States. J Endocr Soc. 2021

Pace-Asciak P, Russell JO, Suárez C, Randolph GW, López F, Shaha AR, Mäkitie A, Rodrigo JP, Kowalski LP, Zafereo M, Angelos P, Ferlito A. Update of Radiofrequency Ablation for Treating Benign and Malignant Thyroid Nodules. The Future Is Now. Front Endocrinol (Lausanne). 2021

Why minimally invasive treatments?

- More and more patients are concerned about their quality of life
- Easy access to information encourages the patient to seek less aggressive treatment
- New technologies are available to safely ablate thyroid nodules without removal of the gland itself.

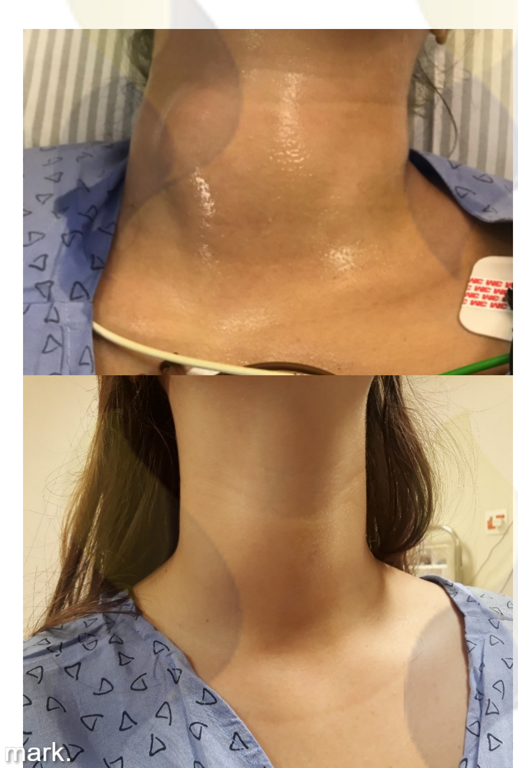


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Table 2. Indications for RFA

Indication	Korea	Italy	Austria	United Kingdom
Symptoms or cosmetic problems	Y	Y	Y	Y
AFTN (toxic or pre-toxic)	Y	Y[a)]	Y[b)]	NA
Cytopathologic confirmation[c)]				
Two benign results	Y	Y	Y	Y
One benign result	K-TIRADS 2[d)] or AFTN	EU-TIRADS 2, 3[e)] or AFTN	NA	NA
Additional RFA	Y	Y	NA	NA

Clinical practice guidelines for radiofrequency ablation of benign thyroid nodules: a systematic review

ULTRASONOGRAPHY

ORIGINAL ARTICLE

Min Kyoung Lee[1,2], Jung Hwan Baek[1], Chong Hyun Suh[1], Sae Rom Chung[1], Young Jun Choi[1], Jeong Hyun Lee[1], Eun Ju Ha[3], Dong Gyu Na[4,5]

[1]Department of Radiology and Research Institute of Radiology, Asan Medical Center, University of Ulsan College of Medicine, Seoul; [2]Department of Radiology, Yeouido St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Seoul; [3]Department of Radiology, Ajou University School of Medicine, Suwon; [4]Department of Radiology, GangNeung Asan Hospital, Gangneung; [5]Department of Radiology, Human Medical Imaging and Intervention Center, Seoul, Korea

https://doi.org/10.14366/usg.20015
pISSN: 2288-5919 • eISSN: 2288-5943
Ultrasonography 2021;40:256-264

Dr. Leonardo Rangel

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Why should I master RFA?

Since 2015, minimally invasive thyroid nodule therapies are discussed more and more often

RFA is easy to master, reproducible, and doesn't require sophisticated US equipment

RFA can be done by Surgeons, Radiologists, and Clinicians

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Efficacy and Safety

- RFA is an effective, safe, and reproducible technique.
  It can be used as an alternative to surgery in the management of benign TN, - <u>solid, mixed (solid/cystic), functional or non-functional</u>
- RFA is widely used (more than laser, microwaves and HIFU) because of its simplicity and reproducibility (cost)
- Treatment by RFA must be carried out within an specialized center and <u>requires</u> <u>ultrasound and anatomical expertise</u>

Dr. Higino Steck

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Monpeyssen H, et al. Long-Term Results of Ultrasound-Guided Radiofrequency Ablation of Benign Thyroid Nodules: State of the Art and Future Perspectives-A Systematic Review. Front Endocrinol 2021

Complications and Safety

<u>Personal experience</u> (over 300 nod)

Pain – most important

Ecchymosis – very common

Skin allergy

Cough

Dysphagia

Temporary hoarseness

Vocal fold palsy – 1 case

Claude Bernard Horner SYN – 2 cases

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Long-Term Efficacy of a Single Session of RFA for Benign Thyroid Nodules: A Longitudinal 5-Year Observational Study

Maurilio Deandrea,[1] Pierpaolo Trimboli,[2] Francesca Garino,[1] Alberto Mormile,[1] Gabriella Magliona,[1] Maria Josefina Ramunni,[1] Luca Giovanella,[2] and Piero Paolo Limone[1]

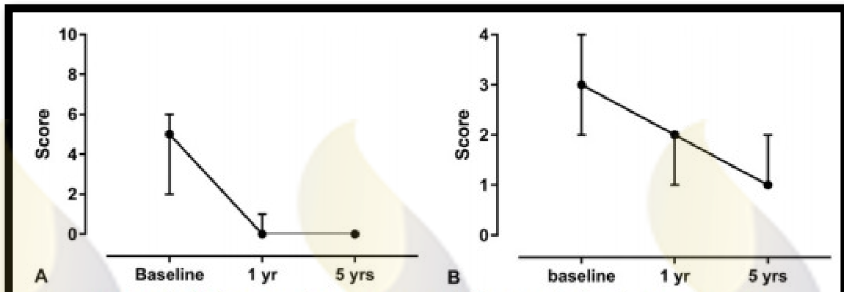
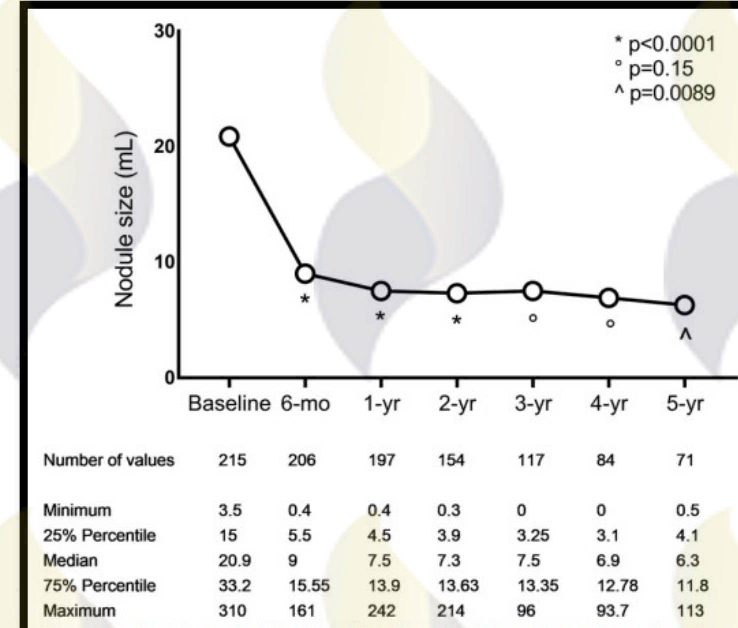


Figure 2. Trend of (A) compressive symptoms and (B) cosmetic disturbances after RFA. Circles represent the median value of the group. Bars represent the interquartile ranges.



	Baseline	6-mo	1-yr	2-yr	3-yr	4-yr	5-yr
Number of values	215	206	197	154	117	84	71
Minimum	3.5	0.4	0.4	0.3	0	0	0.5
25% Percentile	15	5.5	4.5	3.9	3.25	3.1	4.1
Median	20.9	9	7.5	7.3	7.5	6.9	6.3
75% Percentile	33.2	15.55	13.9	13.63	13.35	12.78	11.8
Maximum	310	161	242	214	96	93.7	113

Figure 1. Volumetric trend of thyroid nodules after RFA. Circles represent the median value of the group. Symbols representing *P* values are indicated under each circle. Number of values indicates the number of patients observed at each ultrasound evaluation. Median, minimum/maximum, and 25%/75% percentiles are reported for each time from baseline to the last control.

Deandrea, M., et al. The Journal of Clinical Endocrinology & Metabolism, 2019

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ULTRA-SONOGRAFIA DO PESCOCO C/DOPPLER COLORIDO

June/2020

ULTRASSONOGRAFIA DA TIROIDE COM DOPPLER COLORIDO

Tiroide tópica, com forma preservada.

Parênquima com áreas hipoecogênicas esparsas.
Nódulos com as seguintes características e localizações:

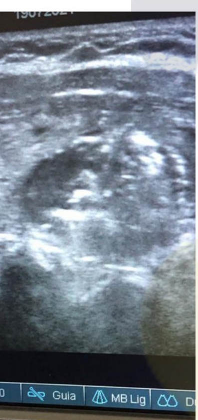
- predominantemente sólido, isoecogênico, de contornos lobulados, sem focos ecogênicos de permeio, no terço médio/inferior do lobo direito, com 5,8 x 4,5 x 2,7 cm (L x T x AP) e fluxo periférico ao estudo Doppler. Classificação TI-RADS - ACR®: 4.

- sólido, hiperecogênico, de contornos bem definidos, sem focos ecogênicos de permeio, no terço médio do lobo esquerdo, com 1,5 x 1,1 x 0,9 cm (L x T x AP) e fluxo periférico e central ao estudo Doppler. Classificação TI-RADS - ACR®: 3.

Ao estudo Doppler, o parênquima tiroidiano apresenta vascularização habitual.

Istmo: 2,6 x 1,7 x 0,3 cm (volume: 0,6 cm³).
Lobo direito: 7,0 x 4,5 x 2,8 cm (volume: 44,1 cm³).
Lobo esquerdo: 5,0 x1,9 x 1,7 cm (volume: 8,1 cm³).
Volume tiroidiano global: 52,8 cm³ (normal de 6 a 15 cm³).

Não há evidência de linfonodomegalia.



OPINIÃO:

Aspecto ultrassonográfico compatível com tiroidite.

Nódulos tiroidianos.
O nódulo do lobo direito tinha volume aproximado de 73,4 cm³ no estudo de 06/2019 de 40,8 cm³ no estudo de 01/2020 e no estudo atual tem volume aproximado de 35,2 cm³.
Demais achados inalterados.

* *ACR Thyroid Imaging, Reporting and Data System (TI-RADS): White Paper of the ACR TI-RADS Committee.* J Am Coll Radiol. 2017 May; 14(5):587-595. doi: 10.1016/j.jacr.2017.01.046. Epub 2017 Apr 2.

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K.F.M.P – 32 YO – FEMALE

PRE RFA USG – 3.55 x 2.47 x 1.79 cm- 8.16 CC- DEC/2020

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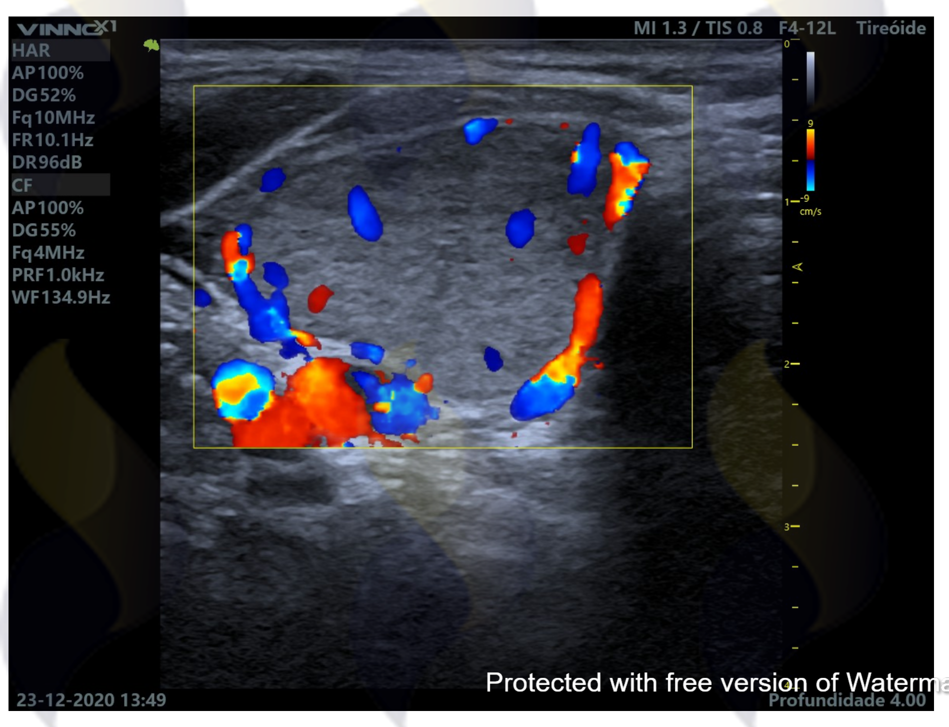
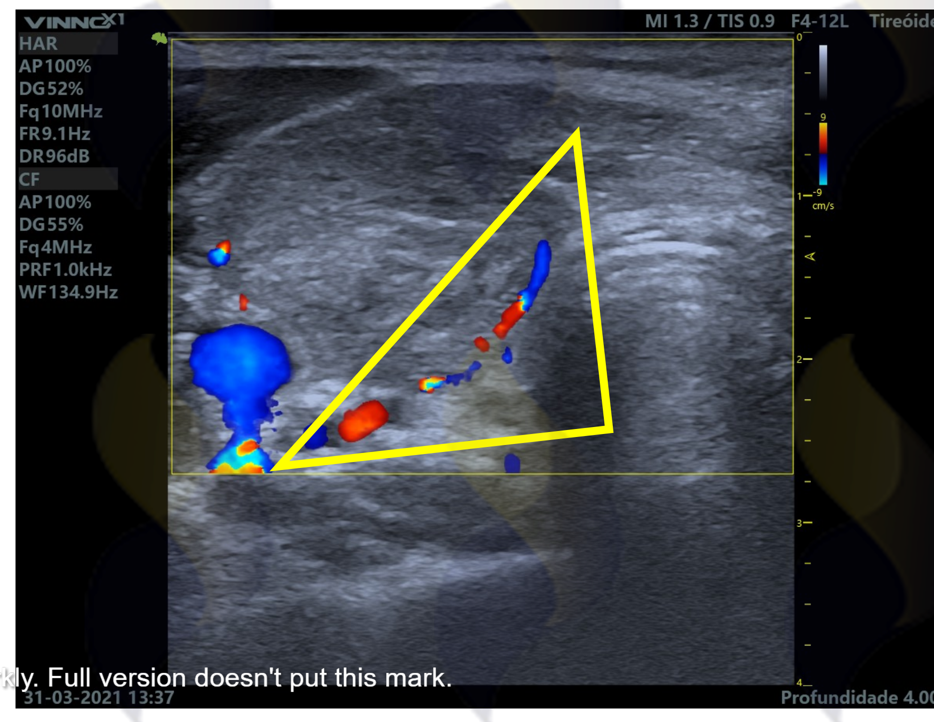
K.F.M.P – 32 YO – FEMALE
DOPPLER US PRE RFA AND 3 MO AFTER





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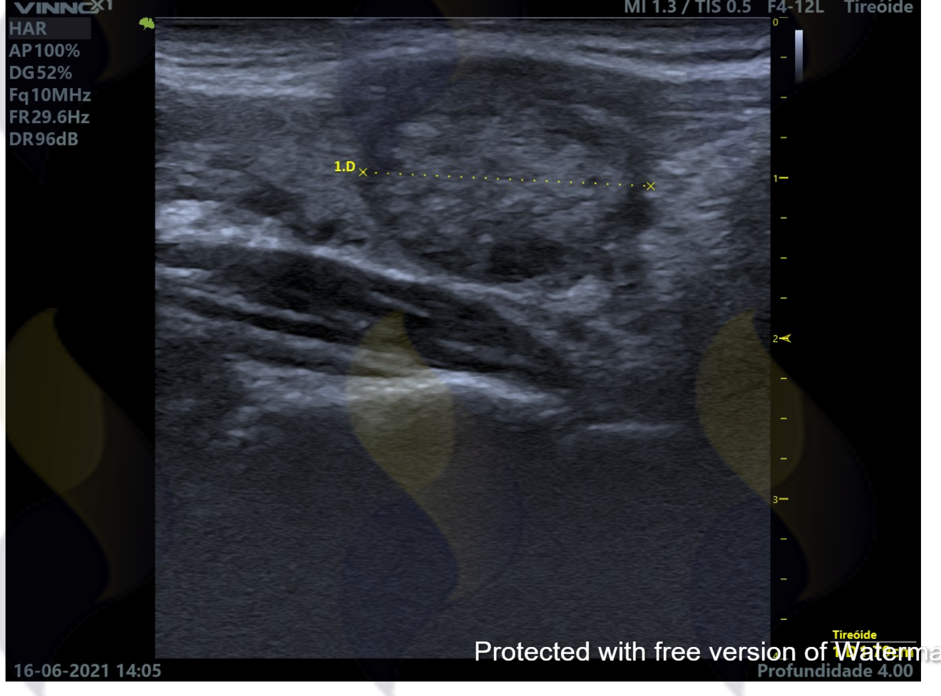
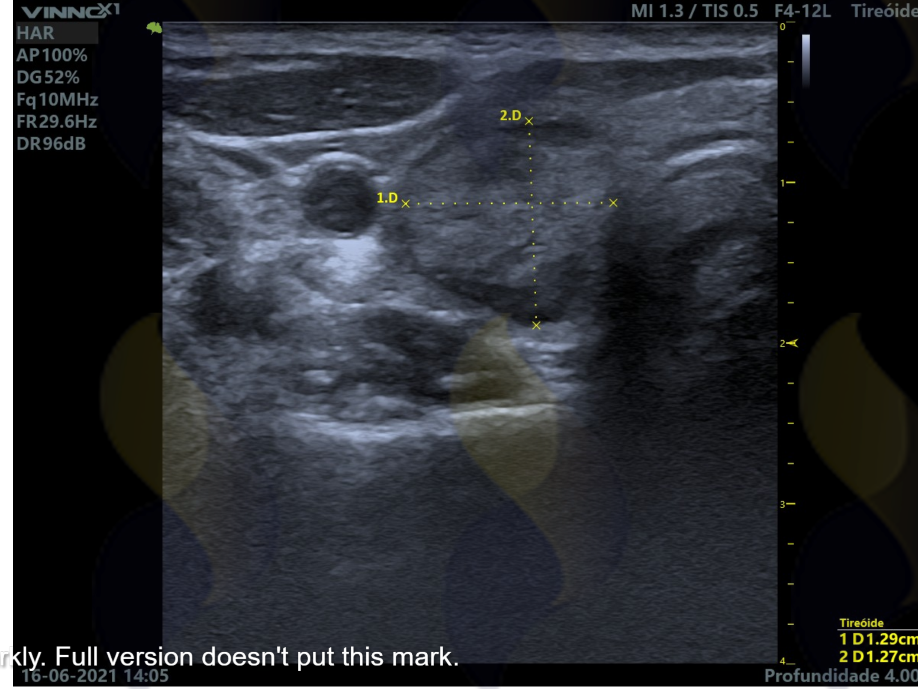
K.F.M.P – 32 YO – FEMALE

POST RFA USG 1,79 x 1,29 x 1,27 cc – 1.52 CC (8.16 CC)- JUN/2020

Reduction Rate – after 5 mo- 80.5%





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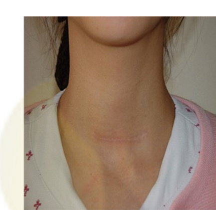
Radio Frequency Ablation for Benign Nodules

- Best choice for benign nodules
- Effective and safe
- No medication
- No scar
- No general anesthesia
- Repeat procedure (if necessary)
- Outpatient basis



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84 patients w/

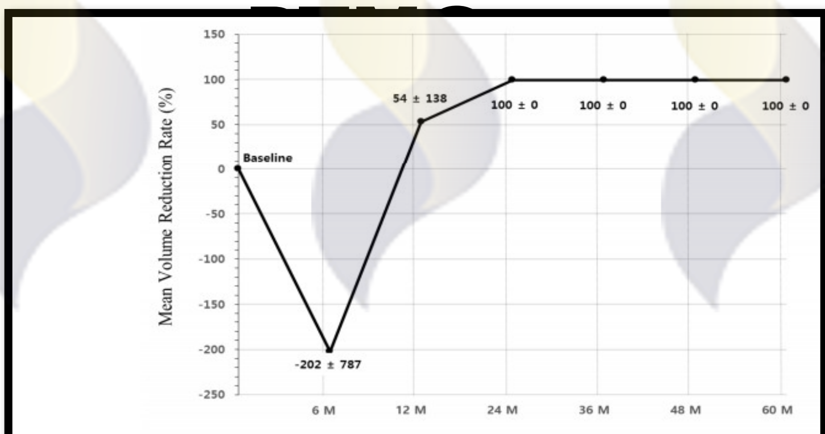

Figure 2. Serial mean volume reduction rates during long-term follow-up. The values of mean volume reduction rates ± standard deviation.

Supplementary Table. Complete disappearance rates during follow-up period

Follow-up duration (months)	Total tumors (n = 84)		Tumors < 0.5 cm (n = 52)		Tumors ≥ 0.5 cm (n = 32)	
	Number	Percentage	Number	Percentage	Number	Percentage
6	29	34.5%	22	42.3%	7	21.9%
12	63	74.1%	41	77.8%	22	68.8%
24	83	98.8%	52	100%	31	96.9%
36	83	98.8%	52	100%	31	96.9%
48	83	98.8%	52	100%	31*	96.9%
60	84	100%	52	100%	32	100%

* One tumor that had not completely disappeared at 48 months was treated by additional RFA, which resulted in complete disappearance at 60 months.

Mean Volume Reduction Rate = **54%** **in 1 year**

Complete Disappearance = **100%** **in < 5 years**

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Cho et al., Thyroid 2020

174 patients w/

For carefully selected PTMC, RFA did not have inferior oncologic outcomes after 5 years of follow-up compared to open surgery

Complications and costs were lower and quality of life was better.

Longer follow-up and additional studies with more patients will be necessary to demonstrate whether these findings are durable or reproducible.

Efficacy: ≃

Adverse effects: $<$

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Dr. Antonio Rahal

RFA of a PARATHYROID ADENOMA

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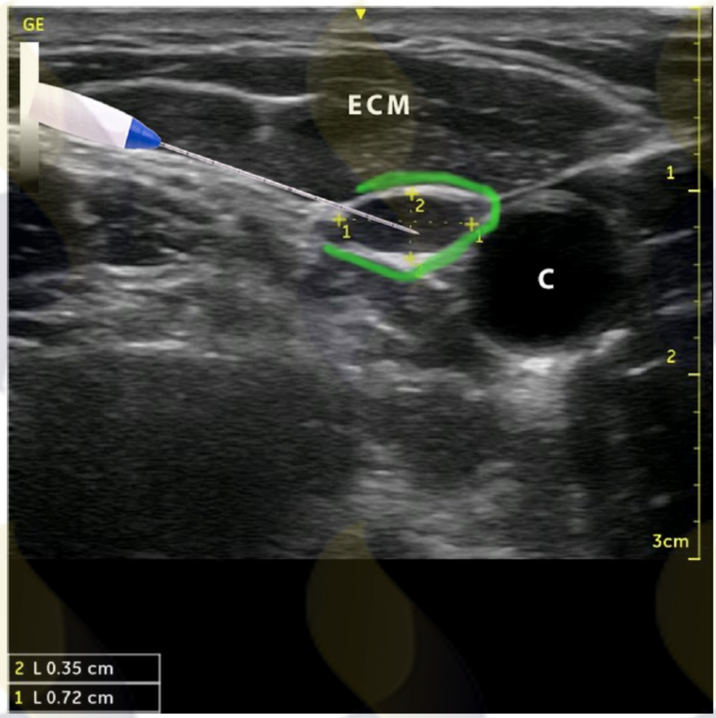
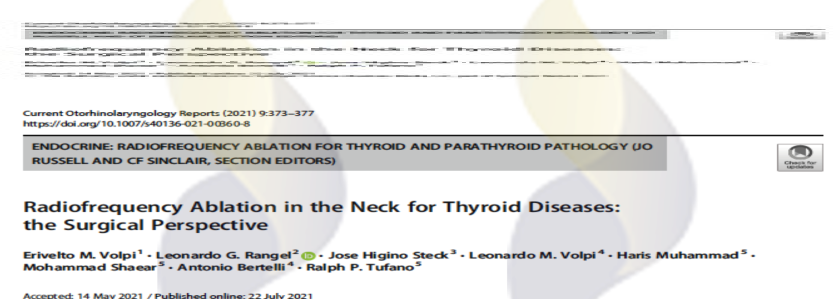


Fig. 1 Schematic neck RFA for recurrent metastatic lymph node. ECM: sternocleidomastoid muscle, C: carotid artery. Green line: area to be injected with D5W for hydrodissection. RFA electrode: white and blue device



Current Otorhinolaryngology Reports (2021) 9:373–377
https://doi.org/10.1007/s40136-021-00360-8

ENDOCRINE: RADIOFREQUENCY ABLATION FOR THYROID AND PARATHYROID PATHOLOGY (JO RUSSELL AND CF SINCLAIR, SECTION EDITORS)

Radiofrequency Ablation in the Neck for Thyroid Diseases: the Surgical Perspective

Erivelto M. Volpi[1] · Leonardo G. Rangel[2] · Jose Higino Steck[3] · Leonardo M. Volpi[4] · Haris Muhammad[5] · Mohammad Shaear[5] · Antonio Bertelli[4] · Ralph P. Tufano[5]

Accepted: 14 May 2021 / Published online: 22 July 2021
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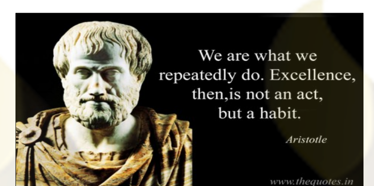
Take home messages



- RFA IS CHANGING THE WAY WE SEE THE THYROID NODULES –

  WE SHOULD TREAT THE PATIENT, NOT ONLY THE NODULE

- RFA REPRESENTS A NEW TREATMENT TOOL – WE SHOULD MASTER THE TECHNIQUE

- RFA NOT DOES NOT COMPETE WITH SURGERY BUT IT'S AN ADDITIONAL OPTION

- RFA SHOULD BE CONSIDERED FIRST LINE THERAPY FOR BENIGN NODULES

  AND A REASONABLE OPTION FOR PTMC

- THE MAJOR PATIENT CONCERN WITH THYROID SURGERY IS NOT THE SURGERY ITSELF, BUT THE NEED FOR MEDICATION FOREVER - *RFA CAN HELP AVOID BOTH*

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QUESTIONS?
COMMENTS?
CONCERNS?

THANK YOU!

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