Trattamento percutaneo della patologia benigna: risultati clinici

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Overview

- Ablation vs control
- Long term results
- Complications
- LA vs RF
- Ablation vs surgery

Ablation vs control

Thyroid. 2015 Aug;25(8):890-6. doi: 10.1089/thy.2015.0133. Epub 2015 Jul 13.

Efficacy and Safety of Radiofrequency Ablation Versus Observation for Nonfunctioning Benign Thyroid Nodules: A Randomized Controlled International Collaborative Trial.

Deandrea M[1], Sung JY[2], Limone P[1], Mormile A[1], Garino F[1], Ragazzoni F[1], Kim KS[2], Lee D[3], Baek JH[4].

- Prospective RCT
- 2 centers with different experience
- 80 enrolled patients
- 20 patients treated in each hospital, 20 control

TABLE 3. COMPARISON OF CLINICAL CHARACTERISTICS BETWEEN RFA AND CONTROL GROUPS AT SIX MONTHS

Outcome	*RFA* (n=*40*)	*Controls* (n=*40*)	p-*Value*
% Volume reduction [IQR]	71 [21]	−3 [23]	0.0001
Symptom score	0.4±0.7	3.3±1.7	0.0001
Cosmetic score	1.7±0.8	3.5±0.7	0.0001
TSH (μIU/mL)	0.9±0.8	1.0±0.9	0.190
fT4 (pg/mL)	10.8±2.9	11.9±2.0	0.05
Thyroglobulin (ng/mL)	31.5±38	13.6±22	0.02

Ablation vs control

J Clin Endocrinol Metab. 2015 Feb;100(2):460-6. doi: 10.1210/jc.2014-2186. Epub 2014 Nov 11.

Prospective study of effectiveness of ultrasound-guided radiofrequency ablation versus control group in patients affected by benign thyroid nodules.

Cesareo R[1], Pasqualini V, Simeoni C, Sacchi M, Saralli E, Campagna G, Cianni R.

- Prospective RCT
- single center
- 84 patients randomised to RFA or FU
- 3 subgroups : <12 mL; 12 -30mL; >30mL.

- Nodules volume decrease in group A (17.5 ± 34.7 at 1 month, 8.6 ± 9.5 at 6 months),
- Nodules volume remained unchanged in group B (27.6 ± 22.1 at 1 month, 27.8 ± . 22.1 at 6 months).

Ablation vs control

TABLE 2. Thyroid nodule volume (ml) in Radiofrequency ablation Group. Values are reported as mean ±SD

	Baseline	1 month	6 months
Whole group (n=42)			
TN vol.	24.5 ± 19.6	12.7 ± 11.8 ***	8.6 ± 9.5 ***
TN vol. variation (%)		-49.7±14.5	-68.6±13.5
Small (n=10)			
TN vol.	7.4 ± 2.7	3 ± 1.2**	1.6 ± 1**
TN vol. variation (%)		-57.5 ± 8.6	-78.2 ± 10.7
Medium (n=21)			
TN vol.	18.1 ± 4.4	9.3 ± 3***	5.9 ± 2.5***
TN vol. variation (%)		-47 ± 15	-67 ± 12.2
Large (n=11)			
TN vol.	52.3 ± 17.5	27.8 ± 13.7*	20.1 ± 12.1**
TN vol. variation (%)		-47.7 ± 16.3	-62.8 ± 14.8

Differences in mean volumes are considered between value at 1 month and 6 month vs baseline.
p≤0.05,p<0.01,***p<0.001.*

- The mean percentage of volumetric reduction after 6 months in treated patients, differs significantly between the three classes of nodules (P .027)

Ablation vs control

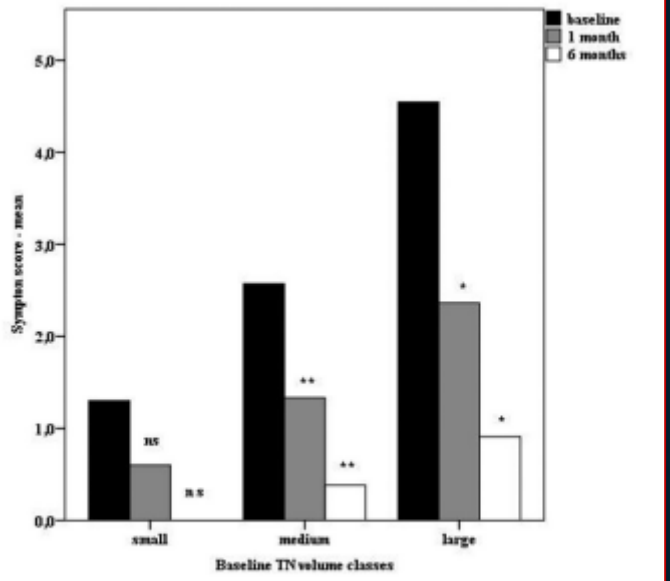


Figure 1. Pressure symptoms score in all subgroups at 1 month and at 6 months vs baseline. . ns = not significant; * $P \leq .05$; ** $P < .01$

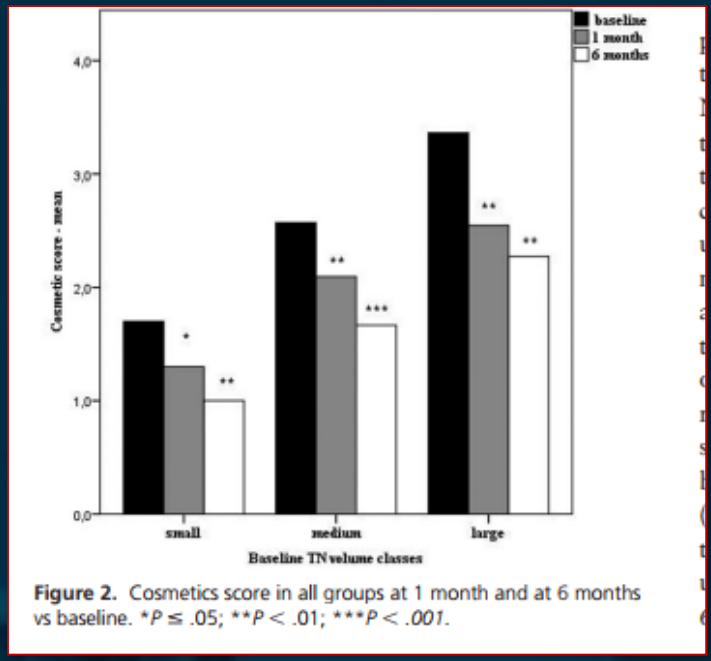


Figure 2. Cosmetics score in all groups at 1 month and at 6 months vs baseline. * $P \leq .05$; ** $P < .01$; *** $P < .001$.

- Pressure symptom score significantly improved in medium and large nodules ($p<0.001$),
- cosmetic score improved in all treated patients ($p <0.001$).

Ablation vs control

Thyroid. 2007 Mar;17(3):229-35.

Treatment of benign cold thyroid nodules: a randomized clinical trial of percutaneous laser ablation versus levothyroxine therapy or follow-up.

Papini E[1], Guglielmi R, Bizzarri G, Graziano F, Bianchini A, Brufani C, Pacella S, Valle D, Pacella CM.

- Prospective RCT
- 62 patents, assigned to PLA, LT4, or FU.

TABLE 2. COMPARISON OF THE THREE GROUPS AT THE END OF THE 12-MONTH STUDY[a]

	PLA group	*LT4 group*	*Follow-up group*	p *value*
Nodule volume (mL)	6.2 ± 2.7	12.9± 7.4	12.8 ± 5.5	0.001[b]
Delta volume (mL)	−5.2 ± 3.1	−0.6 ± 2.2	+0.7 ± 2.2	<0.001[b] <0.03[c]
Nodule volume decrease >50% (%)	33.3 (7/21)	0.0 (0/21)	0.0 (0/20)	<0.01[b]
Worsening of symptoms (%)	0.0 (0/21)	4.8 (1/21)	45.0 (9/20)	<0.001[d]
Improvement of symptoms (%)	81.2 (13/16)	13.3 (2/15)	0.0 (0/14)	<0.001[c]
Still symptomatic patients (%)	47.6 (10/21)	76.2 (16/21)	90.0 (18/20)	0.001[e]
TSH (mIU/mL)	1.6 ± 0.7	0.17 ± 0.1	1.6 ± 0.5	<0.01[e]
FT3 (pg/mL)	3.2 ± 0.7	3.0 ± 0.4	3.2 ± 0.4	NS
FT4 (pg/mL)	13.4 ± 4.2	16.7 ± 1.3	12.8 ± 2.1	0.06[e]
Tg (ng/mL)	87.8 ± 31.5	75.5 ± 39.5	80.3 ± 31	NS
TPOAb >70 IU/mL (%)	0	0	0	NS
TgAb >70 IU/mL (%)	9.5 (2/21)	0	0	NS
Calcitonin >10 ng/mL (%)	0	0	0	NS

- Significant difference in nodule volume reduction in PLA group vs LT4 and FU

Long term results

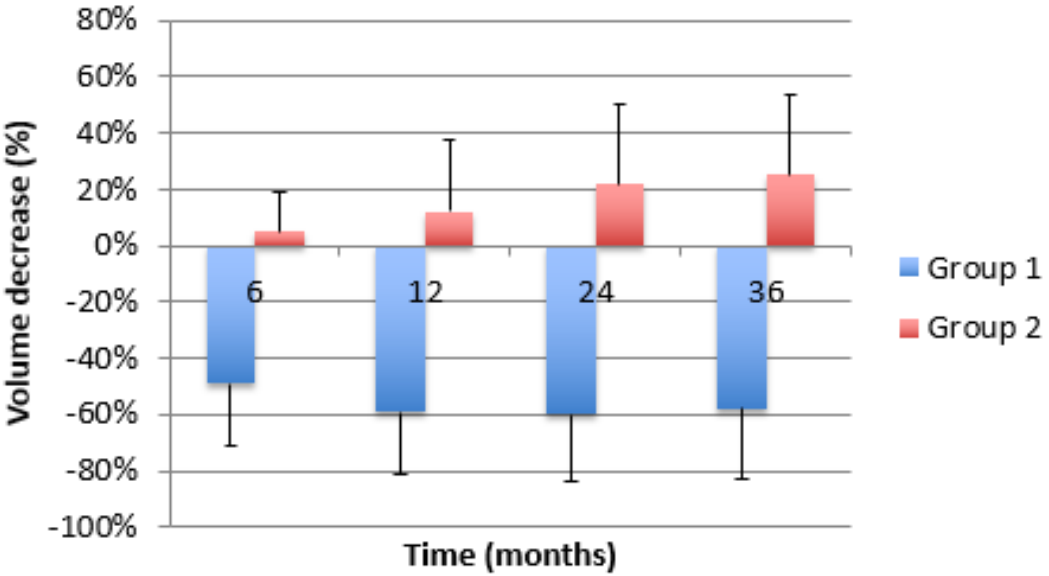
J Clin Endocrinol Metab. 2014 Oct;99(10):3653-9. doi: 10.1210/jc.2014-1826. Epub 2014 Jul 22.

Long-term efficacy of ultrasound-guided laser ablation for benign solid thyroid nodules. Results of a three-year multicenter prospective randomized trial.

Papini E[1], Rago T, Gambelunghe G, Valcavi R, Bizzarri G, Vitti P, De Feo P, Riganti F, Misischi I, Di Stasio E, Pacella CM.

- Prospective, multicenter RCT
- 200 nodules randomized to PLA or FU
- Nodule volume and symptoms at 1,6, 12, 24, and 36 months

Long term results



Mean (SD) nodule volume percent changes (%) at 6, 12, 24, and 36 months vs baseline values in group 1 (LAT-treated patients) and group 2 (control subjects).

- Progressive volume reduction until 12 months that remains stable until 3 years;
- Slow enlargement of untreated nodules

Long term results

Korean J Radiol. 2018 Jan-Feb;19(1):167-174. doi: 10.3348/kjr.2018.19.1.167. Epub 2018 Jan 2.

Efficacy and Safety of Radiofrequency Ablation for Benign Thyroid Nodules: A Prospective Multicenter Study.

Jung SL[1], Baek JH[2], Lee JH[2], Shong YK[3], Sung JY[4], Kim KS[4], Lee D[5], Kim JH[6], Baek SM[7], Sim JS[8], Na DG[9].

- Prospective, multicenter study
- Trained radiologists, unified protocol
- 276 nodules (14.2 ± 13.2 mL (1.1-80.8 mL))

Table 2. Treatment Characteristics of 276 Thyroid Nodules Analyzed

	Initial RF Ablation	Additional RF Ablation	Total
RF power (W)	59.7 ± 17.2 (20–120)	63.5 ± 20.6 (15–120)	78.8 ± 41.6 (15–120)
Ablation time (second)	556.0 ± 330.9 (60–1808.0)	561.4 ± 321.2 (63.0–1807.0)	571.4 ± 330.2 (60–1808)
Total energy (J)			37742.0 ± 26417.7 (2852.5–151200.0)
Energy/mL (J)	4024.0 ± 3002.4 (656.3–22030.6)	1235.1 ± 730.5 (208.4–3700.8)	4161.5 ± 2992.8 (656.3–22030.6)
Number of RF sessions	276	70	1.3 ± 0.4 (1–2)†
Solid component*			
Solid	248	65	
Predominantly cystic	28	5	

Values represent mean ± SD; numbers in parenthesis represent range. *Solid component was defined as solid if solid component was > 50%, or as predominantly cystic if solid component was between 10% and 50%, †Mean RF ablation session

Long term results

Table 3. Outcomes for 276 Benign Thyroid Nodules after RF ablation

Variables	Before	1 Month	12 Months	*P**
Largest diameter	3.8 ± 1.1	3.0 ± 1.0	2.0 ± 1.0	< 0.001
Volume	14.2 ± 13.2	8.1 ± 8.8	3.2 ± 4.7	< 0.001
Volume reduction rate (%)		44.4 ± 17.0	80.3 ± 13.7	
Symptom score	2.5 ± 1.8	1.3 ± 1.2	0.4 ± 0.6	< 0.001
Cosmetic score	3.7 ± 0.6	2.9 ± 0.9	1.9 ± 0.9	< 0.001
Vascularity	2.0 ± 0.8	0.6 ± 0.8	0.6 ± 0.9	< 0.001
Therapeutic success (%)†	-	-	270/276 (97.8)	

Values represent means ± SD except for therapeutic success. *Comparison of values before treatment and at 12 months, †Therapeutic success (volume reduction > 50%)

Months	Volume reduction
1	44.4 ± 17.0% (n = 276, range 3.1–86.0%)
6	69.1 ± 17.0% (n = 276, range 8.1–98.3%)
12	80.3 ± 13.7% (n = 276, range 38.7–100%)
24	84.3 ± 13.2% (n = 198, range 36.1–100%)
36	89.2 ± 10.8% (n = 128, range 45.5–100%)
48	91.9 ± 8.4% (n = 57, range 69.9–100%)
60	95.3 ± 4.3% (n = 6, range 88.5–100%)

Jung et al KJR 2018

Complications

Radiology. 2012 Jan;262(1):335-42. doi: 10.1148/radiol.11110416. Epub 2011 Oct 13.

Complications encountered in the treatment of benign thyroid nodules with US-guided radiofrequency ablation: a multicenter study.

Baek JH[1], Lee JH, Sung JY, Bae JI, Kim KT, Sim J, Baek SM, Kim YS, Shin JH, Park JS, Kim DW, Kim JH, Kim EK, Jung SL, Na D
Korean Society of Thyroid Radiology.

- Retrospective multicentric analysis
- 1459 patients,
- 48 complications (3.3%)
- 20 major
- 28 minor

Table 2

Complications and Side Effects in 1459 Patients Who Underwent RF Ablation of Thyroid Nodules

Complication or Side Effect	No. of Complications	Time of Detection (d)	Time to Recovery (d)
Major	20 (1.4)	1–180	1–90
Voice change	15 (1.02)	1–2	1–90
Nodule rupture	2 (0.14)	22–30	<30
Nodule rupture with abscess formation*	1 (0.07)	50	None
Hypothyroidism*	1 (0.07)	180	None
Brachial plexus injury	1 (0.07)	1	60
Minor	28 (1.92)	1–2	1–30
Hematoma	15 (1.02)	1	<30
Vomiting	9 (0.62)	1–2	1–2
Skin burn	4 (0.27)	1	<7
Side effect	46 (3.15)	1	1–2
Pain	38 (2.6)	1	1–2
Vasovagal reaction	5 (0.34)	1	1
Coughing	3 (0.21)	1	1

Complications

J Clin Endocrinol Metab. 2015 Oct;100(10):3903-10. doi: 10.1210/jc.2015-1964. Epub 2015 Aug 14.

Outcomes and Risk Factors for Complications of Laser Ablation for Thyroid Nodules: A Multicenter Study on 1531 Patients.

Pacella CM[1], Mauri G[1], Achille G[1], Barbaro D[1], Bizzarri G[1], De Feo P[1], Di Stasio E[1], Esposito R[1], Gambelunghe G[1], Misischi I[1], Raggiunti B[1], Rago T[1], Patelli GL[1], D'Este S[1], Vitti P[1], Papini E[1].

- Total of 1837 treatments (83% single session)
- Volume decrease from 27± 24 ml to 8 ± 8 ml ($p < .001$)
- Mean volume reduction 72% ±11
- Seventeen complications (0.9%)
  - 8 major (transient voice change)
  - 9 minor (8 subcapsular or perithyroida hematoma and 1 skin burn)
- 463 (30.2%) side effects

PLA vs RFA

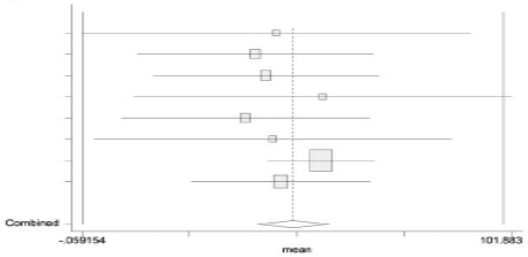
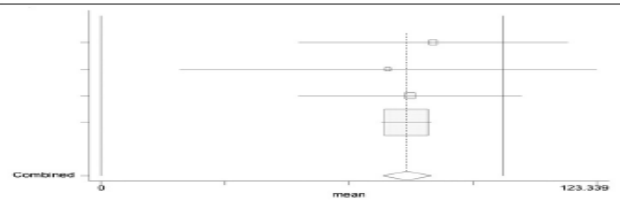
J Clin Endocrinol Metab. 2015 May;100(5):1903-11. doi: 10.1210/jc.2014-4077. Epub 2015 Feb 19.

Comparative efficacy of radiofrequency and laser ablation for the treatment of benign thyroid nodules: systematic review including traditional pooling and bayesian network meta-analysis.

Ha EJ[1], Baek JH, Kim KW, Pyo J, Lee JH, Baek SH, Døssing H, Hegedüs L.

- 10 eligible papers
- a total of 184 patients
- Bayesian network meta-analysis

Table 3. Results of the Pooled Percentage of Mean Changes in the LA and RFA Groups

Study, Year	N	Baseline (SD)	Follow-up (SD)	Forrest Plot (% Mean Change)	% Mean Change (95% CI)
LA					
Dossing et al, 2002	16	10 (7.9)	5.4 (5.1)		46.0 (-0.8, 92.1)
Dossing et al, 2005	15	9 (3.8)	5.3 (3.2)		41.1 (13.2, 69.0)
Dossing et al, 2006*	15	10.1 (4.3)	5.7 (3.2)		43.6 (16.7, 70.4)
Dossing et al, 2006*	15	10.7 (9)	4.6 (3)		57.0 (12.1, 100.0)
Dossing et al, 2006	10	10.6 (4.9)	6.5 (1.2)		38.7 (9.2, 68.2)
Gambelunghe et al, 2006	13	10.4 (6.9)	5.7 (4.3)		45.2 (2.70, 87.7)
Dossing et al, 2007	14	10.6 (2.5)	4.6 (0.6)		56.6 (43.9, 69.3)
Papini et al, 2007	21	11.7 (5.1)	6.2 (2.7)		47.0 (25.9, 68.1)
Pooled estimates	119	NA	NA		***49.9 (41.4, 58.5)***
				Test for heterogeneity: Q= 0.2.453 (p= 0.931)	
RFA					
Baek et al, 2010	15	7.5 (4.9)	1.3 (0.8)		82.7 (49.2, 100.0)
Huh et al, 2012†	15	13.3(12.9)	3.8 (4.4)		71.4 (19.5, 100.0)
Huh et al, 2012†	15	13 (6.8)	3 (2.2)		76.9 (48.0, 100.0)
Faggiano et al, 2012	20	13.3 (1.8)	3.2 (0.6)		75.9 (69.7, 82.2)
Pooled estimates	65	NA	NA		***76.1 (70.1, 82.1)***

PLA vs RFA

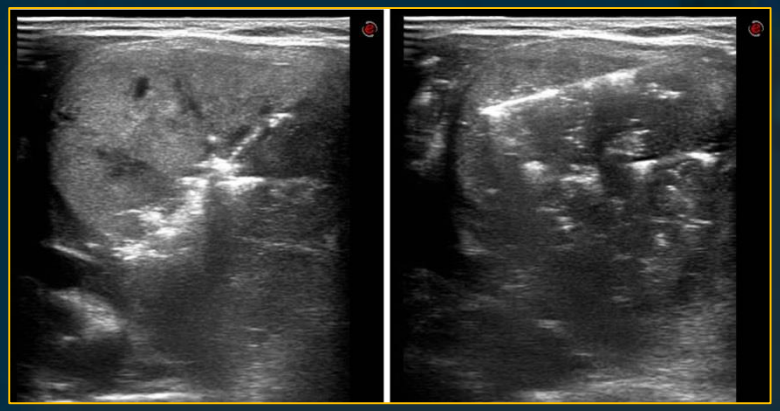
Int J Hyperthermia. 2016 Nov 15:1-5. [Epub ahead of print]

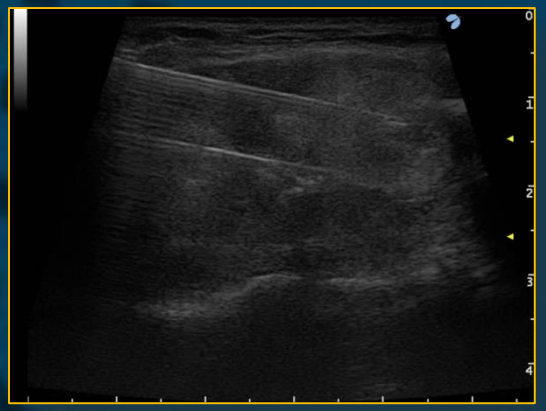
Benign thyroid nodules treatment using percutaneous laser ablation (PLA) and radiofrequency ablation (RFA).

Mauri G[1,2], Cova L[3], Monaco CG[4], Sconfienza LM[2,5], Corbetta S[5,6], Benedini S[6], Ambrogi F[7], Milani V[7], Baroli A[8], Ierace T[9], Solbiati L[9,10].

Table 2. Volume reduction and relative reduction percentages for each technique at follow-up times.

	Overall (90 patients)	PLA group (31 patients)	RFA group (59 patients)
Pre-treatment	28.5 ± 19.4	20.3 ± 16.4	32.7 ± 19.5
1 month	15.7 ± 12.2	13.2 ± 10.7	17.1 ± 12.9
% relative reduction	48% ± 16%	42% ± 17%	51% ± 15%
6 months	11.1 ± 8.9	8.7 ± 7.4	12.9 ± 9.6
% relative reduction	62% ± 14%	60% ± 15%	64% ± 14%
12 months	8.7 ± 8.6	7.1 ± 7.5	9.9 ± 9.2
% relative reduction	72% ± 15%	70% ± 16%	74% ± 14%





PLA vs RFA

Int J Hyperthermia. 2017 Dec;33(8):911-919. doi: 10.1080/02656736.2017.1332395. Epub 2017 Jun 12.

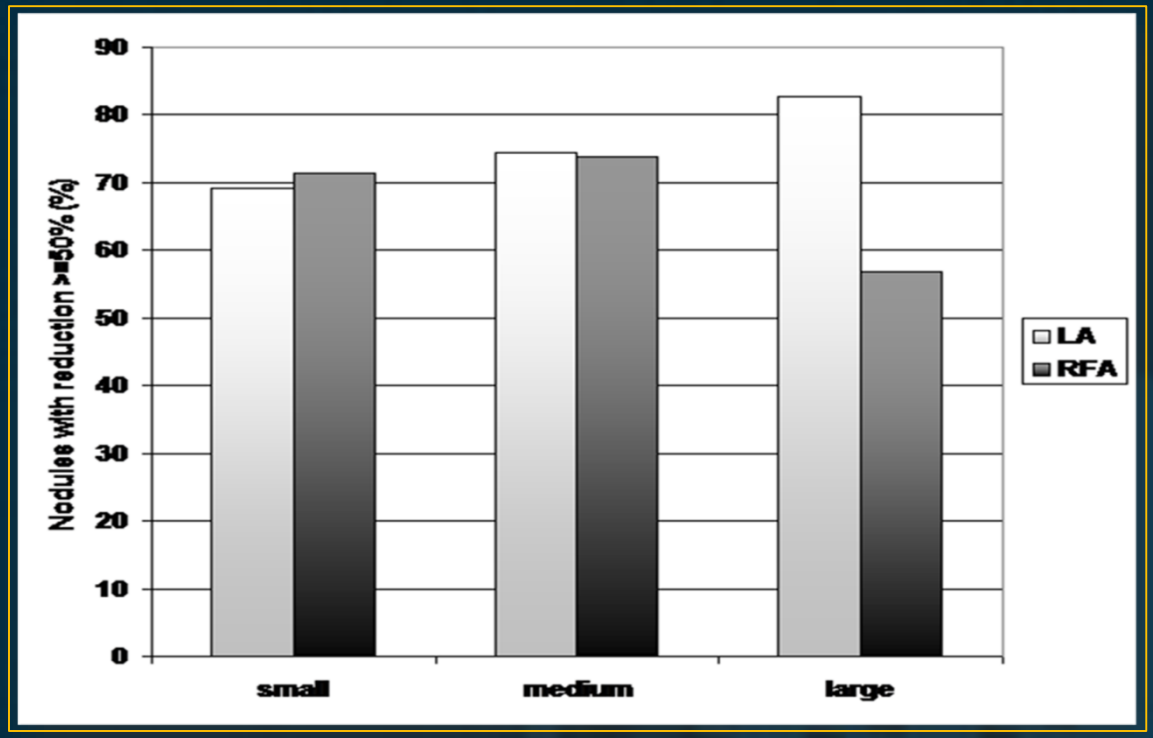
A comparison of laser with radiofrequency ablation for the treatment of benign thyroid nodules: a propensity score matching analysis.

Pacella CM[1], Mauri G[2], Cesareo R[3], Paqualini V[3], Cianni R[3], De Feo P[4], Gambelunghe G[4], Raggiunti B[5], Tina D[5], Deandrea M[6], Limone PP[6], Mormile A[6], Giusti M[7], Oddo S[7], Achille G[8], Di Stasio E[9], Misischi I[10], Papini E[10].

- Retrospective analysis
- Eight centers
- Four performing RF four LA
- 449 patients PLA and 152 RFA
- 138 patients from each group were selected after adjustment with propensity score matching.

PLA vs RFA

- Mean PVR of -59±18% and -63±18% at 6 and 12 months.
- No differences between LA and RFA group



- In nodules >30 mL, PVR > 50% was significantly higher in LA than in RFA group

PLA vs RFA

Type of complications (SIR Class)[a]		Complications and side effects no. (%)[b] time of detection: Intra-procedural LA	Intra-procedural RFA	Immediate post-procedural (within 24 h) LA	Immediate post-procedural (within 24 h) RFA	Peri-procedural (within 30 days) LA	Peri-procedural (within 30 days) RFA	Delayed (after 30 days) LA	Delayed (after 30 days) RFA	Time to recovery (days) LA	Time to recovery (days) RFA	*p*
Major												
Voice change[c]	(C)			4 (1.2)	3 (2.7)					28–84	2-permanent[d]	NS
Hyperthyroidism	(C)								1 (0.6)			NS
Minor												
Hematoma	(B)	3 (0.9)	5 (4.5)							5–10	5–10	0.044
Side effects												
Pain	(A)											
Mild		18 (5.5)	12 (10.9)									NS
Moderate		4 (1.3)[e]								1–4		NS
Severe		2 (0.6)[e]	1 (0.9)	2 (0.6)[f]						1–3	1	NS
Vasovagal reaction	(A)	4 (1.2)										NS
Fever (37.5 °C–38.5 °C)	(A)	6 (1.8)								1–4		NS

- No differences in major complications rate
- Higher rate of hematoma in RFA group

Need of standardization

J Ultrasound. 2018 Jan 8. doi: 10.1007/s40477-017-0278-x. [Epub ahead of print]

Urgent need to apply a common language in image-guided thermal ablations.

Mauri G[1], Pisani Mainini A[2], Monaco C[2], Pescatori LC[2], De Angelis C[3], Sconfienza LM[4,5].

⊕ Author information

- Differences in definitions might determine misleading results
  - Is pain a side effect or a minor complication?
  - When a nodule is «small», «medium» or «large»?
  - When a nodule is «predominantly cystic?

Ablation vs surgery

AJNR Am J Neuroradiol. 2015 Jul;36(7):1321-5. doi: 10.3174/ajnr.A4276. Epub 2015 Mar 26.

Treatment of Benign Thyroid Nodules: Comparison of Surgery with Radiofrequency Ablation.

Che Y[1], Jin S[2], Shi C[3], Wang L[4], Zhang X[4], Li Y[5], Baek JH[6].

- Retrospective study
- 200 patients RFA, 200 patients surgery

Table 3: Overall comparison of surgery versus RFA

	Surgery (n = 200)	RFA (n = 200)	P Value
Residue[a]	11.9%	2.9%	.004
Recurrence[b]	2.5%	0.05%	.100
Complications	6%	1%	.002
Postoperative medication	71.5%	0	.002
Mean hospitalization (days)	6.6 ± 1.6	2.1 ± 0.9	.000
Cost (Chinese yuan) (US dollars)	¥15,962 ± ¥1073 ($2556.95 ± $171.88)	¥16,535 ± ¥2309 ($2648.74 ± $369.88)	.99

[a] "Residue" is defined as no complicated treatment in single or multiple nodules.
[b] "Recurrence" is defined as the appearance of a new goiter after treatment.

Table 4: Complications observed following surgery versus RFA[a]

	Surgery (n = 200)	RFA (n = 200)
Hoarseness		
Transient	3	1
Permanent	2	0
Hypoparathyroidism transient	6	0
Hematoma	1	0
Nodule rupture	0	1
Total	12	2

Ablation vs surgery

Int J Endocrinol. 2014;2014:934595. doi: 10.1155/2014/934595. Epub 2014 Jun 22.

Radiofrequency ablation compared to surgery for the treatment of benign thyroid nodules.

Bernardi S[1], Dobrinja C[2], Fabris B[1], Bazzocchi G[3], Sabato N[1], Ulcigrai V[4], Giacca M[2], Barro E[1], De Manzini N[2], Stacul F[3].

- Retrospective study
- 37 patients RFA, 74 patients surgery

Outcomes	RFA (=37)	Surgery (=74)
Efficacy		
Patients with symptoms	13	43
Resolution of nodule-related symptoms	**11**	**43**
Patients with hyperfunctioning nodules	12	20
ATD withdrawal/thyroid function normalization	**4**	**20***
Patients with cosmetic concerns	37	74
Excellent cosmetic results	**35**	**65**

Outcomes	RFA (=37)	Surgery (=74)
Tolerability		
Patients without levothyroxine prior to treatment	31	68
Hypothyroidism	**0**	**17***
Total number of procedures	38	74
Postoperative pain	**2**	**74***
Complication rate	**2**	**10***

*$P < 0.05$ versus RFA. ATD, antithyroid drugs; RFA, radiofrequency ablation.

- RFA costed €1,661.50, surgery costed €4,556.30,

Ablation vs surgery

J Vasc Interv Radiol. 2015 Jan;26(1):55-61. doi: 10.1016/j.jvir.2014.09.015. Epub 2014 Nov 18.

Radiofrequency ablation is a thyroid function-preserving treatment for patients with bilateral benign thyroid nodules.

Ji Hong M[1], Baek JH[2], Choi YJ[1], Lee JH[1], Lim HK[3], Shong YK[4], Hong SJ[5].

Table 2. Changes in Nodule Size, Volume, Symptom and Cosmetic Scores, and Serum Levels of Hormones after RF Ablation

Characteristic	Enrollment	1–6 Months	6–12 Months	Last Follow-up
Diameter (cm)	4.1 ± 1.9	3.3 ± 1.4 ($P < .001$)	2.8 ± 1.5 ($P < .001$)	2.5 ± 1.4 ($P < .001$)
Volume (mL)	24.4 ± 32.2	11.2 ± 13.7 ($P < .001$)	9.2 ± 12.3 ($P < .001$)	6.3 ± 19.0 ($P < .001$)
Symptom score	2.4 ± 2.0			1.4 ± 1.3 ($P < .001$)
Cosmetic score	3.8 ± 0.5			2.5 ± 1.0 ($P < .001$)
Thyrotropin (mU/mL)	1.0 ± 0.6			1.3 ± 1.1 ($P = .687$)
fT4 (ng/dL)	1.3 ± 0.3			1.3 ± 0.2 ($P = .382$)
Triiodothyronine (ng/dL)	152.5 ± 18.6			143.0 ± 16.5 ($P = .170$)

Note.–Each value is the mean ± SD.
fT4 = free thyroxine; RF = radiofrequency.

Thyroid. 2013 Mar;23(3):289-93. doi: 10.1089/thy.2012.0171. Epub 2013 Feb 19.

Radiofrequency ablation of benign thyroid nodules does not affect thyroid function in patients with previous lobectomy.

Ha EJ[1], Baek JH, Lee JH, Sung JY, Lee D, Kim JK, Shong YK.

EFSUMB Recommendations

Ultrasound Med Biol. 2018 Jan;44(1):14-36. doi: 10.1016/j.ultrasmedbio.2017.08.1889. Epub 2017 Nov 7.

Statement and Recommendations on Interventional Ultrasound as a Thyroid Diagnostic and Treatment Procedure.

Dietrich CF[1], Müller T[2], Bojunga J[3], Dong Y[4], Mauri G[5], Radzina M[6], Dighe M[7], Cui XW[8], Grünwald F[9], Schuler A[10], Ignee A[11], Korkusuz H[9].

Author information

- *Recommendation 12.* Local ablative thermal treatment can be considered in patients with benign symptomatic thyroid nodules as an alternative to surgery or radioiodine therapy

- *Recommendation 14.* The choice of local ablative thermal treatment (RFA, MWA, LA, HIFU) depends on local expertise.

Conclusions

- Image-guided thermal ablations are effective in treating symptomatic benign thyroid nodules
- Evidence of benefit over LT4 or follow-up
- Evidence of long term sustained efficacy
- Evidence of low complication rate
- PLA and RFA seems to achieve similar results in experienced hands
- Similar results in comparison with surgery, with lower complications and less cost

Int J Hyperthermia. 2016 Nov 22:1-2. [Epub ahead of print]

Percutaneous ablation holds the potential to substitute for surgery as first choice treatment for symptomatic benign thyroid nodules.

Mauri G[1], Sconfienza LM[2].

Thank you!!

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PLA vs RFA: meta-analysis

- Systematic review of the literature and metanalysis
- Pubmed, Embase, Cochrane Database
- 284 articles retrieved,
- 216 excluded on abstract
- 42 excluded after paper reading
- 26 included