

The Role of Radioiodine after Thyroidectomy in the Primary Management of Low Risk Differentiated Thyroid Carcinoma

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25th Iranian Nuclear Medicine Annual Congress
30 April – 02 May 2025, Tehran - Iran

Case 1:

43 years old female

Total thyroidectomy

Multi focal PTC

Tumor size: 1.6, 0.9, 0.5 cm

Lymphatic invasion: Neg.

Vascular invasion: Neg.

Cervical sonography: Neg.

TSH: 62 mIU/L

Tg: 0.5 ng/mL TgAb: 7 IU/mL

Case 2:

46 years old female

Total thyroidectomy

PTC

Tumor size: 2.5cm

Vascular invasion: Neg.

2/12 dissected CCLN: Pos. (2mm dep.)

Post surgical cervical sonography: Neg.

TSH: 78 mIU/L

Tg: 17 ng/mL TgAb: 12 IU/mL

Management Plan

Management of differentiated Thyroid cancer should be based on risks:

- Risk of Recurrence
- Risk of Death

Management Plan

Needed Information:

- Stage
- Recurrence Risk
- Response to Therapy
- Time

Dynamic Risk Stratification

Recurrence Risk

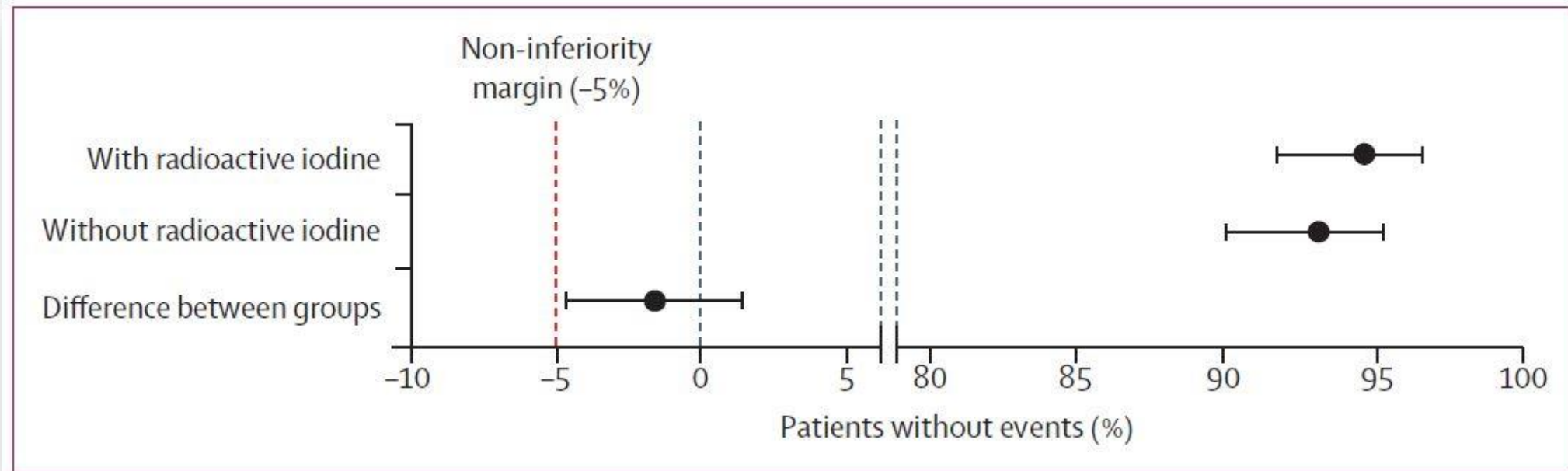
<i>ATA risk</i>	<i>Study</i>	<i>NED, %</i>	<i>Biochemical incomplete, %^b</i>	<i>Structural incomplete, %^c</i>
Low	Tuttle <i>et al.</i> (538)	86	11	3
	Castagna <i>et al.</i> (542)	91	ND ^a	ND ^a
	Vaisman <i>et al.</i> (539)	88	10	2
	Pitoia <i>et al.</i> (543)	78	15	7
Intermediate ^a	Tuttle <i>et al.</i> (538)	57	22	21
	Vaisman <i>et al.</i> (539)	63	16	21
	Pitoia <i>et al.</i> (543)	52	14	34
High	Tuttle <i>et al.</i> (538)	14	14	72
	Vaisman <i>et al.</i> (539)	16	12	72
	Pitoia <i>et al.</i> (543)	31	13	56



Thyroidectomy without radioiodine in patients with low-risk thyroid cancer: 5 years of follow-up of the prospective randomised ESTIMABL2 trial



Sophie Leboulleux, Claire Bournaud, Cecile N Chougnet, Livia Lamartina, Slimane Zerdoud, Christine Do Cao, Bogdan Catargi, Inna Dygai, Antony Kelly, Marie-Luce Barge, Pierre Vera, Daniela Rusu, Olivier Schneegans, Julie Roux, Perrine Raymond, Danielle Benisvy, Marie-Claude Eberle, Sophie Bidault, Camila Nascimento, Delphine Bastie, Anne-Laure Giraudet, Stéphane Bardet, Nathalie Le Moullec, Nathalie Roudaut, Delphine Druil, Yann Godbert, Mohamad Zalzal, Anne Drutel, Olivier Morel, Fritz-Line Velayoudom, Abir Al Ghuzlan, Martin Schlumberger, Camille Buffet, Isabelle Borget



Risk Stratification in Differentiated Thyroid Cancer: From Detection to Final Follow-Up

R. Michael Tuttle¹ and Ali S. Alzahrani²

¹Endocrinology Service, Department of Medicine, Memorial Sloan-Kettering Cancer Center, New York, New York 10065; and ²Department of Medicine, King Faisal Specialist Hospital & Research Centre, Riyadh 12713, Saudi Arabia

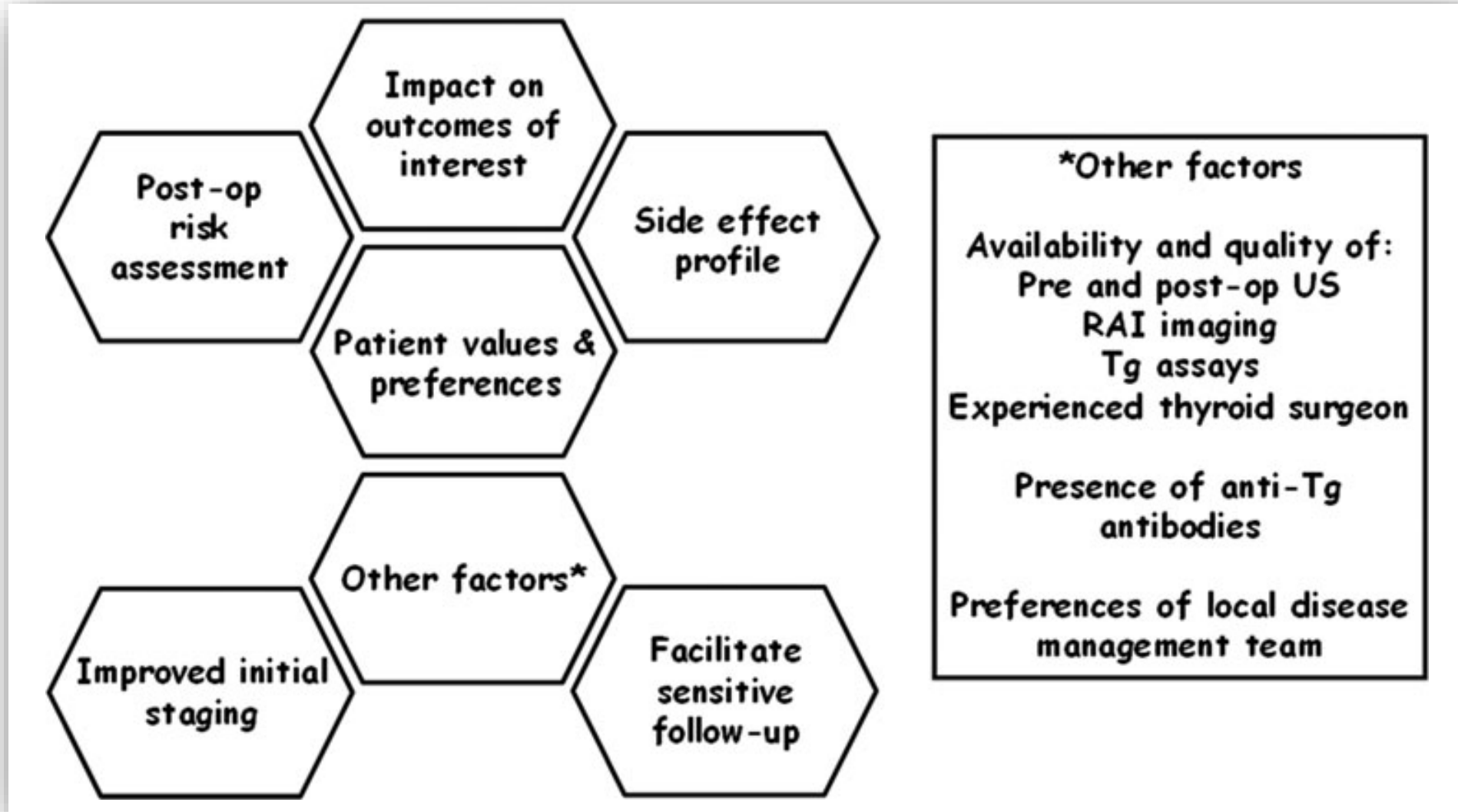
Controversies, Consensus, and Collaboration in the Use of ¹³¹I Therapy in Differentiated Thyroid Cancer: A Joint Statement from the American Thyroid Association, the European Association of Nuclear Medicine, the Society of Nuclear Medicine and Molecular Imaging, and the European Thyroid Association

R. Michael Tuttle,¹ Sukhjeet Ahuja,² Anca M. Avram,³ Victor J. Bernet,⁴ Patrick Bourguet,^{5,6}
Gilbert H. Daniels,⁷ Gary Dillehay,⁸ Ciprian Draganescu,⁵ Glenn Flux,⁹ Dagmar Führer,¹⁰
Luca Giovannella,^{11,12} Bennett Greenspan,¹³ Markus Luster,¹⁴ Kristoff Muylle,^{15,16} Johannes W.A. Smit,¹⁷
Douglas Van Nostrand,¹⁸ Frederik A. Verburg,¹⁴ and Laszlo Hegedüs¹⁹

Tuttle RM, J Clin Endocrinol Metab 2019; 104, 9

Tuttle RM, Thyroid 2019; 29, 4

Key Elements



Outcome, Decision-Making, and Judgment

- Patient Outcome:

 - End result of healthcare practices

- Decision-Making:

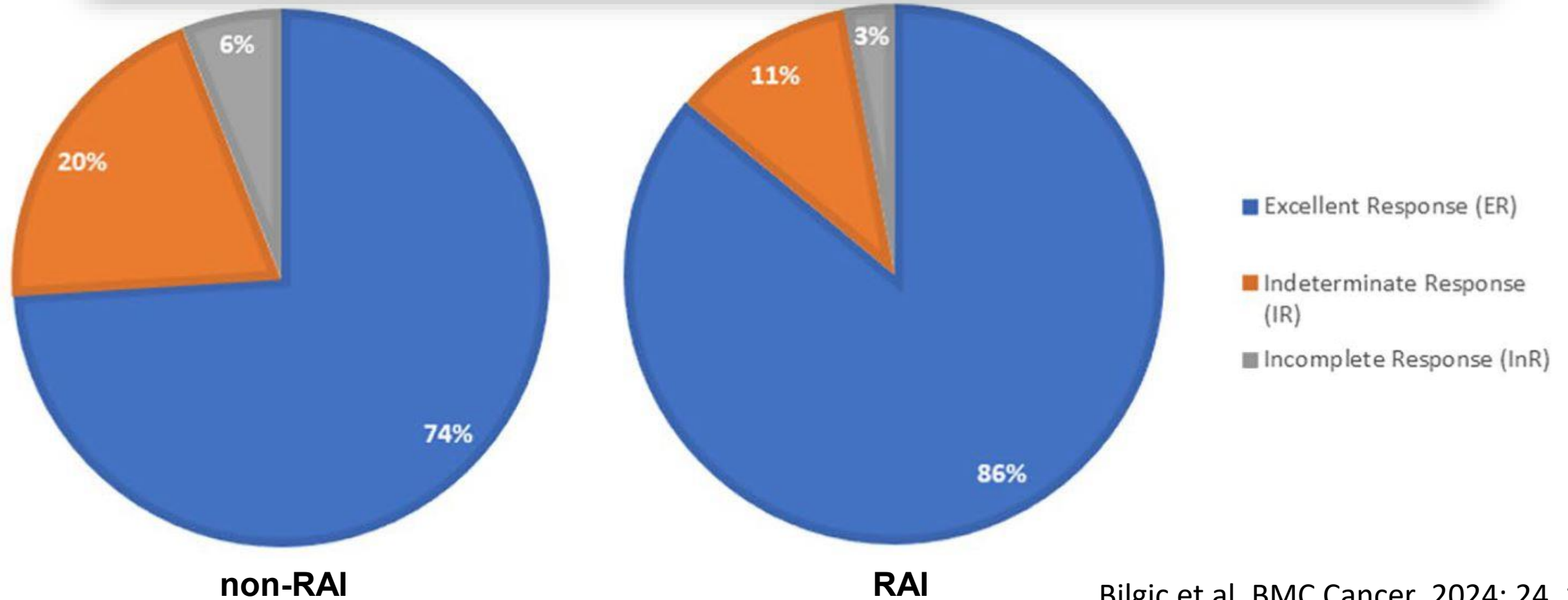
 - Choosing between different treatment options

- Clinical judgment:

 - Decision-making logic, especially in gray areas

RAI therapy in low-risk papillary thyroid cancer: recurrence reduction and long-term outcomes in the Turkish population

[Seckin Bilgic](#) , [Rasimcan Meral](#), [M. Sait Sağer](#) & [Kerim Sönmezoğlu](#)



Gray Area

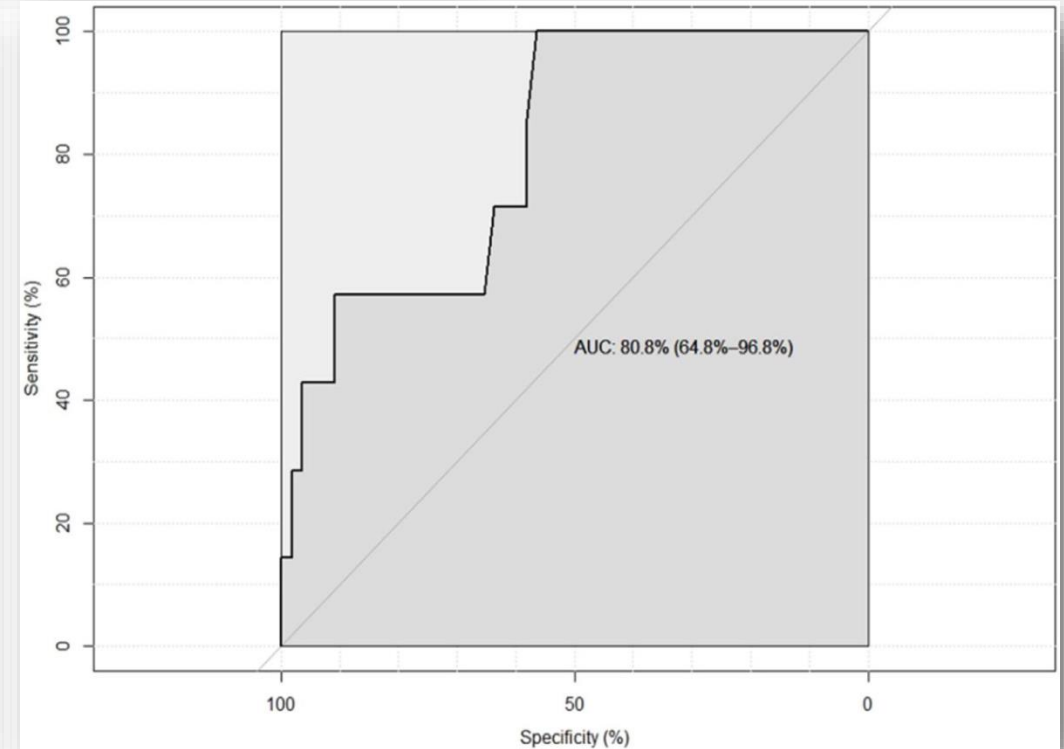
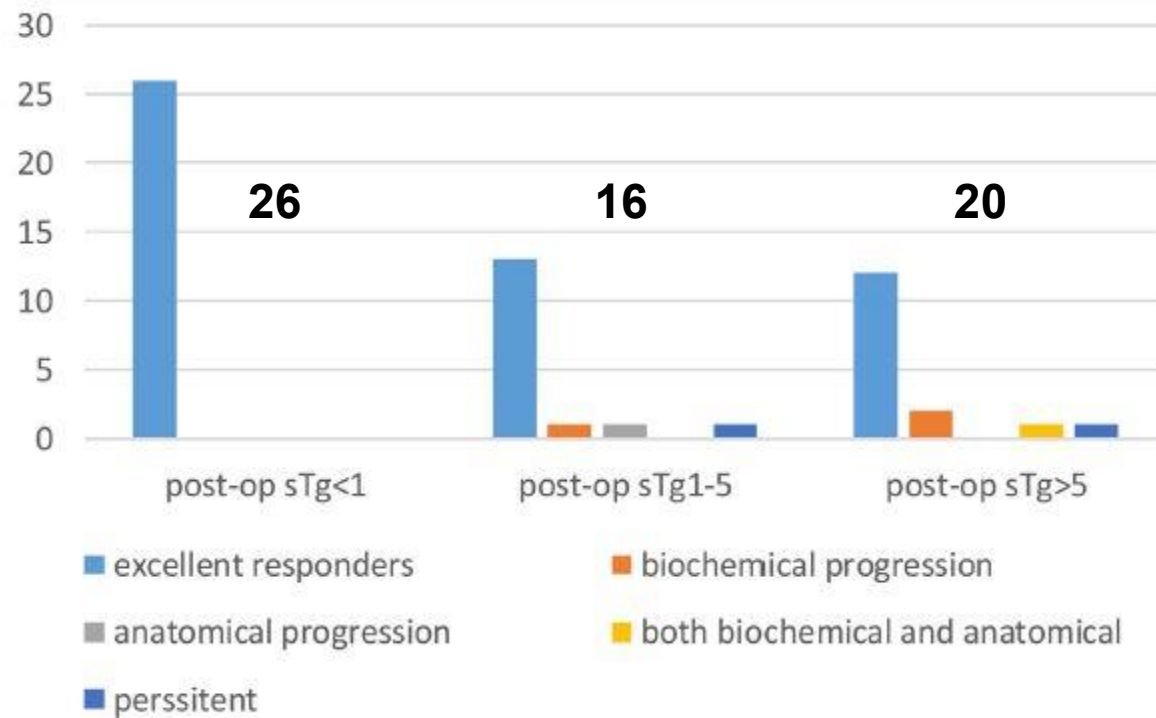
- Postoperative Stimulated Thyroglobulin Levels
- Cervical Lymph Node Metastases

Original article

Prognostic value of postoperative stimulated thyroglobulin in differentiated thyroid cancer

Caroline Elmaraghi*, Magdy Shaaban, Christine Reda

Clinical Oncology department, Ain Shams University, Cairo, Egypt





Article

Predictive Role of Serum Thyroglobulin after Surgery and before Radioactive Iodine Therapy in Patients with Thyroid Carcinoma

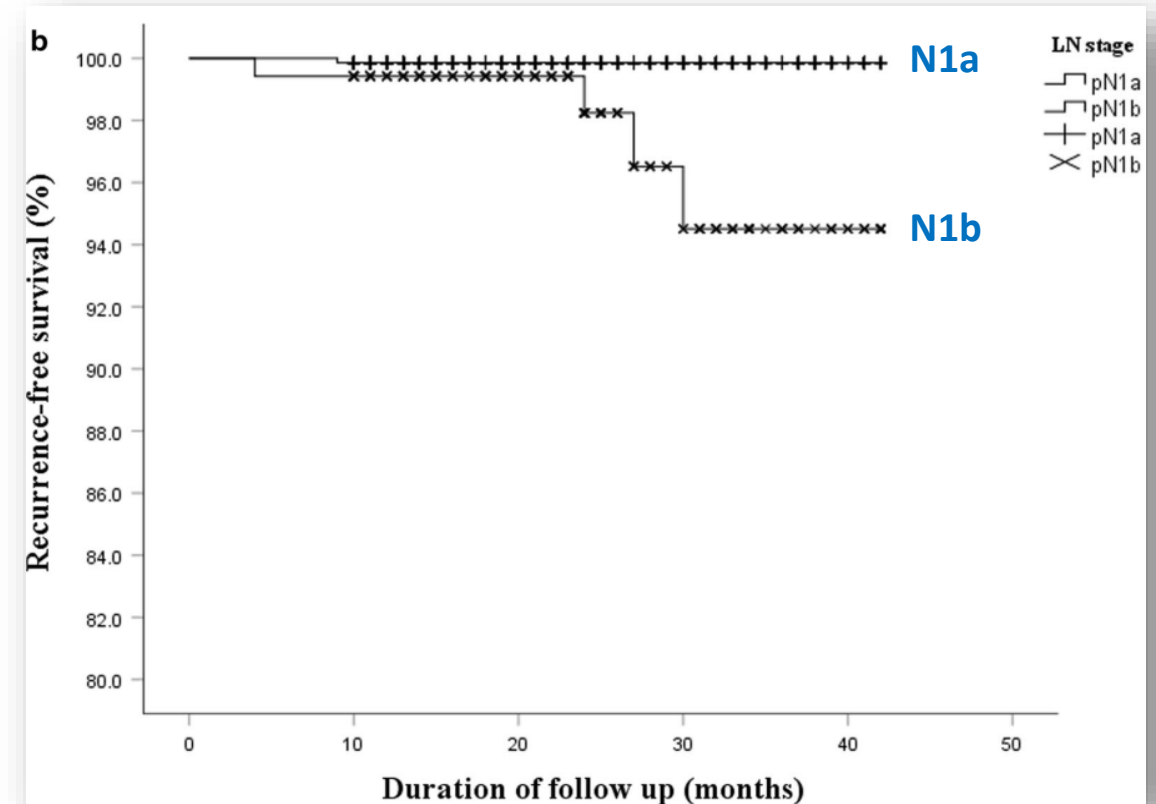
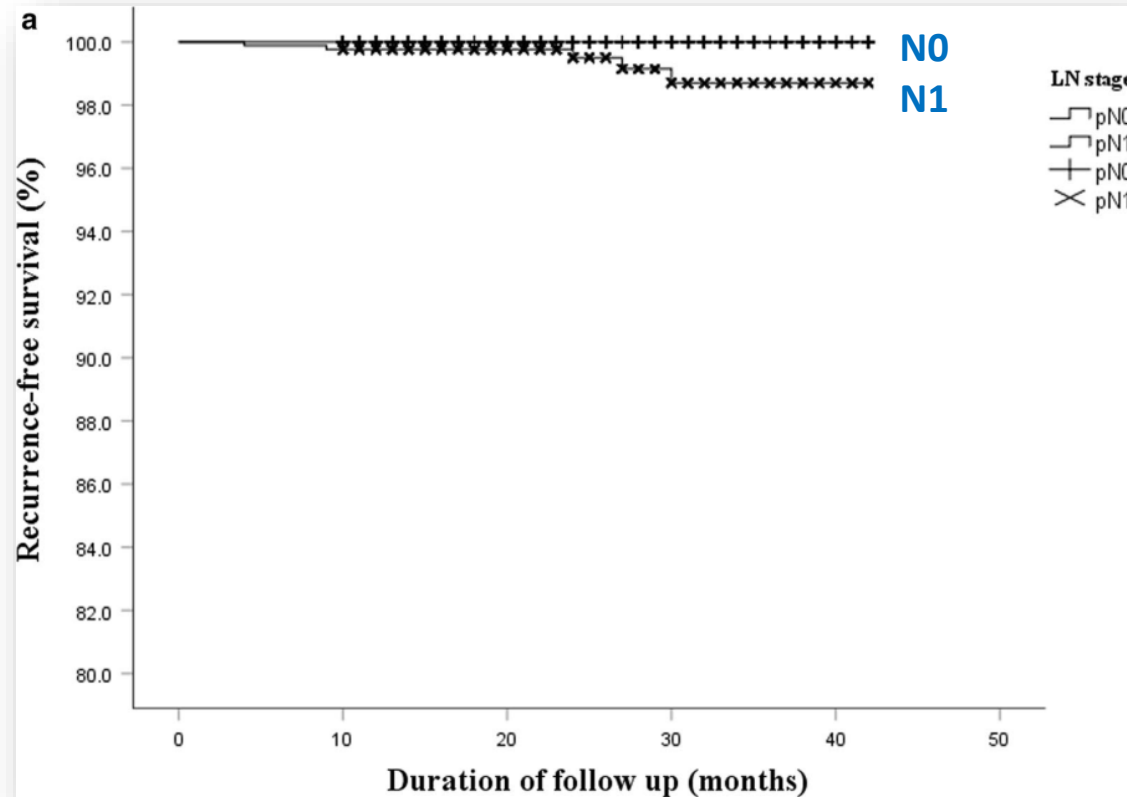
Alberto Signore ^{1,*} , Chiara Lauri ¹ , Arianna Di Paolo ¹, Valeria Stati ^{1,2} , Giuliano Santolamazza ³, Gabriela Capriotti ¹, Daniela Prosperi ⁴, Anna Tofani ⁴, Stefano Valabrega ³ and Giuseppe Campagna ¹

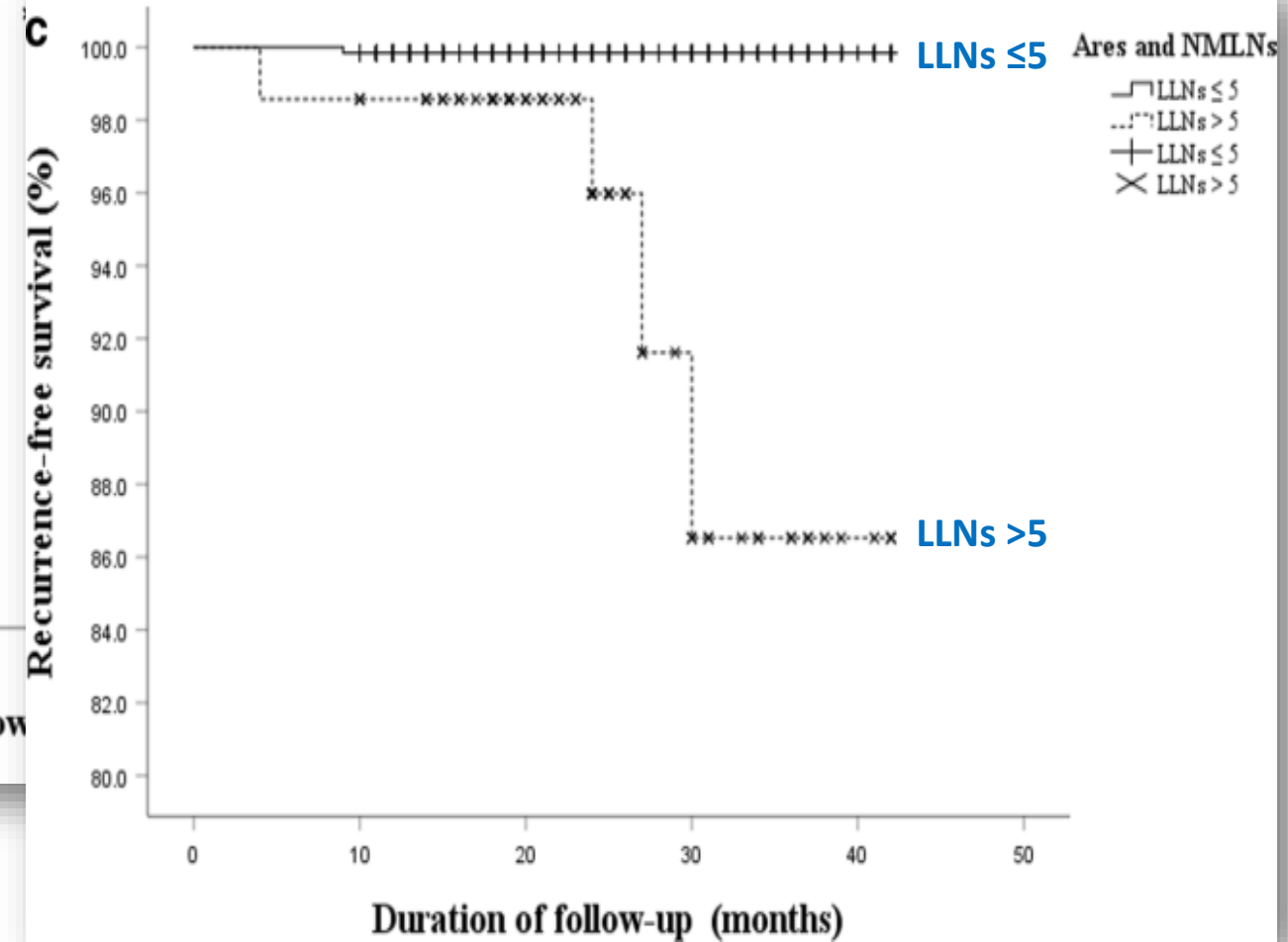
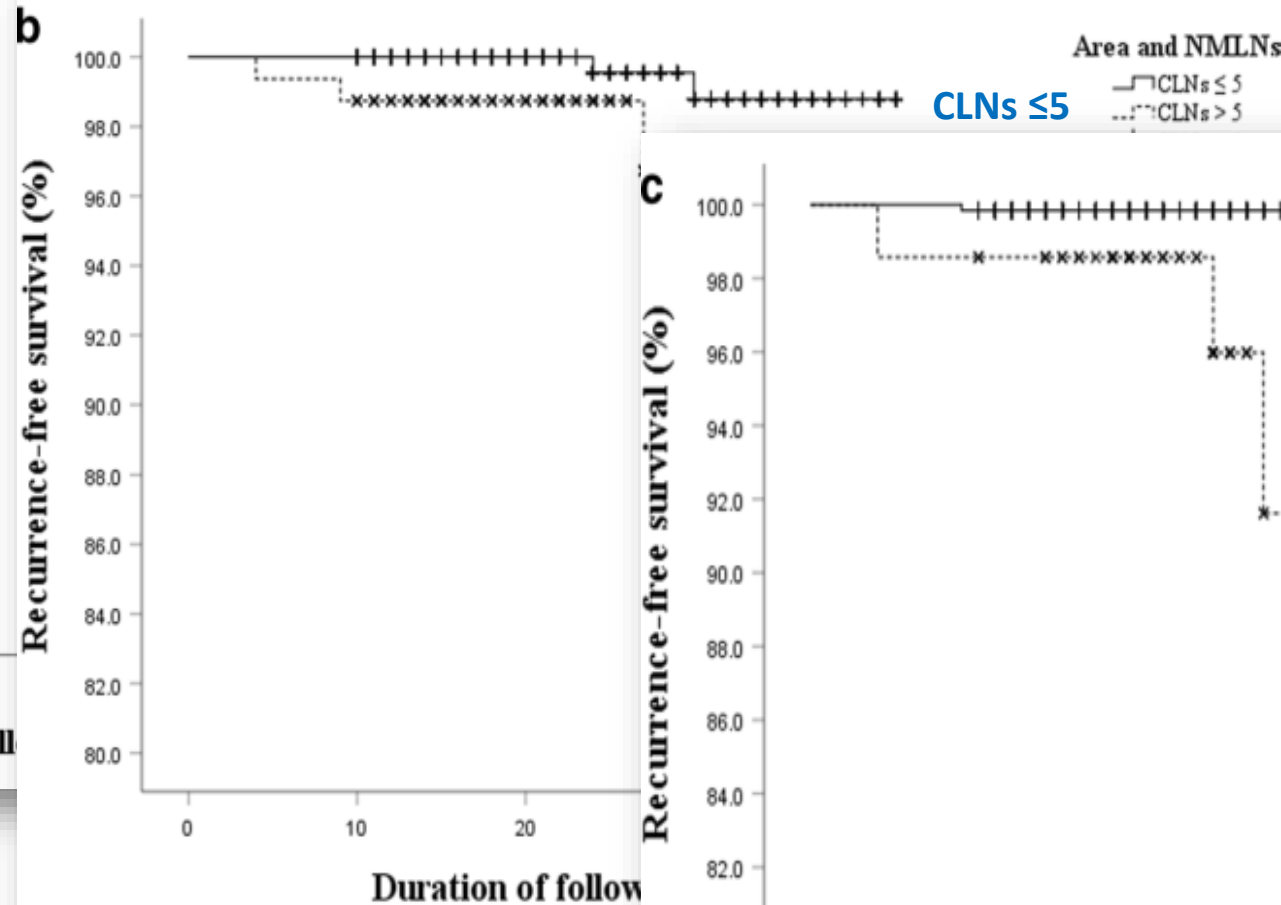
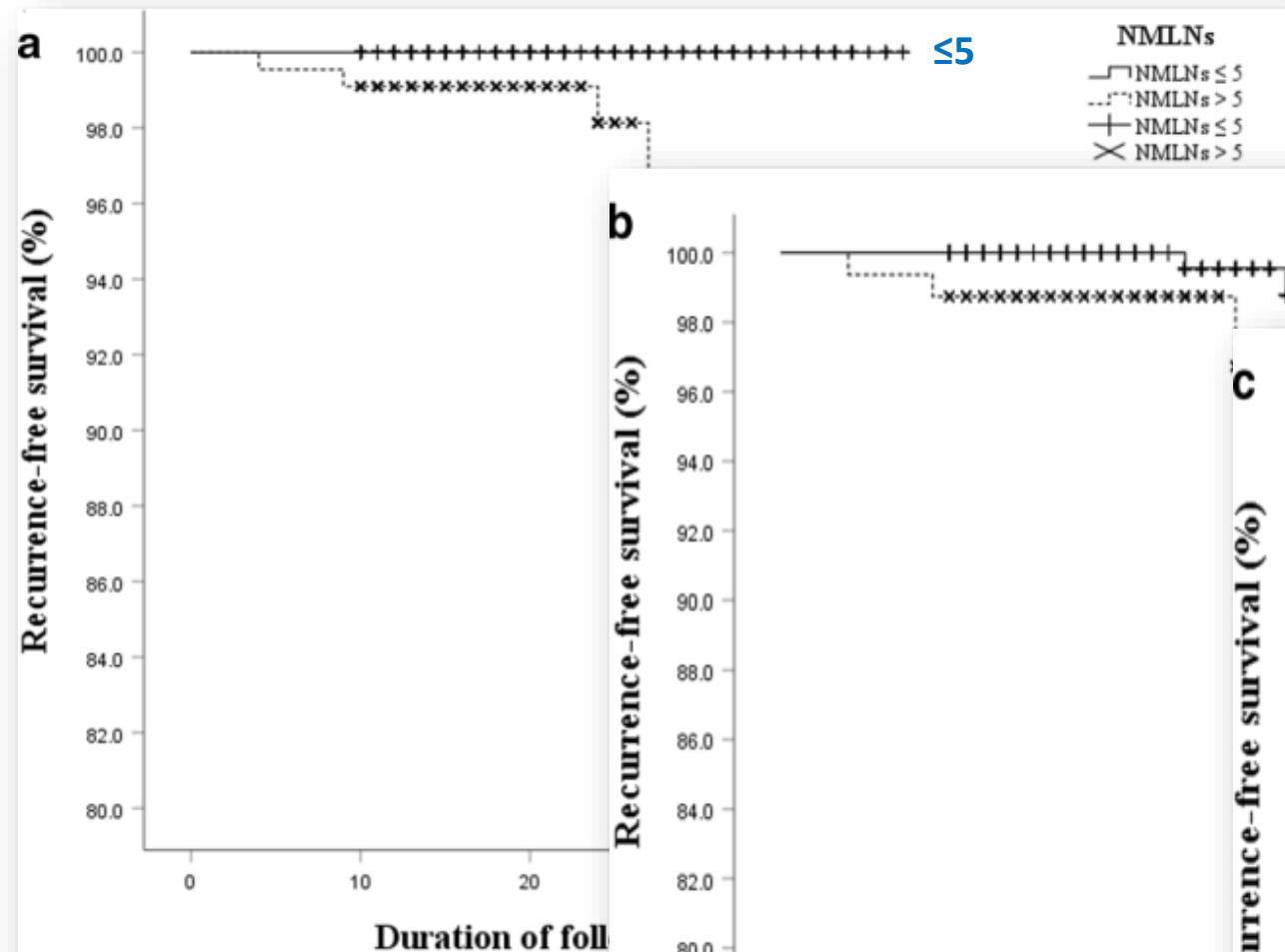
Table 3. Comparisons of thyroglobulin, TSH at multiple time points and ^{131}I administered activity among five groups of patients.

	ND Median (95%CI) (Min to Max)	DD Median (95%CI) (Min to Max)	R Median (95%CI) (Min to Max)	NED-I Median (95%CI) (Min to Max)	NED-L Median (95%CI) (Min to Max)	<i>p</i>
Tg ₋₃₀ (ng/mL)	3.50 (1.62 to 5.00) (1.30 to 8.60)	28.80 (16.00 to 189.00) (16.00 to 189.00)	1.50 (0.40 to 2.93) (0.30 to 2.93)	0.47 (0.30 to 0.64) (0.09 to 1.50)	0.48 (0.30 to 0.63) (0.00 to 1.45)	<0.0001
Tg ₀ (ng/mL)	15.26 (5.92 to 38.43) (0.97 to 64.00)	159.40 (33.00 to 2095.00) (33.00 to 2095.00)	7.82 (0.98 to 149.00) (0.61 to 149.00)	1.38 (0.59 to 2.20) (0.00 to 25.31)	1.59 (0.43 to 3.08) (0.00 to 81.90)	<0.0001
Tg _{0H}	33.70 (2.49 to 64.00) (2.49 to 64.00)	359.00 (159.40 to 2095.00) (159.40 to 2095.00)	74.99 (0.98 to 149.00) (0.49 to 149.00)	1.97 (0.30 to 6.54) (0.00 to 14.68)	2.73 (1.33 to 4.80) (0.00 to 39.80)	0.002
Tg _{0TSH}	7.41 (0.97 to 38.43) (0.97 to 38.43)	59.24 (33.00 to 85.49) (33.00 to 85.49)	7.15 (0.61 to 20.32) (0.61 to 20.32)	0.59 (0.00 to 3.07) (0.00 to 25.31)	0.44 (0.23 to 3.08) (0.00 to 81.90)	0.004
<i>p</i>	0.11	0.15	0.84	0.21	0.08	
Tg ₊₇ (ng/mL)	82.00 (40.00 to 308.50) (0.69 to 515.00)	169.70 (100.00 to 900.00) (100.00 to 900.00)	13.70 (1.91 to 211.20) (1.91 to 211.20)	23.81 (5.60 to 50.60) (0.00 to 99.40)	18.58 (7.39 to 37.00) (0.00 to 872.00)	0.005
Tg _{+7H}	85.95 (40.00 to 515.00) (40.00 to 515.00)	534.85 (169.70 to 900.00) (169.70 to 900.00)	139.50 (88.00 to 191.00) (88.00 to 191.00)	33.85 (4.43 to 96.50) (0.00 to 99.40)	36.40 (6.39 to 78.70) (0.00 to 283.00)	0.036
Tg _{+7TSH}	78.99 (0.69 to 183.00) (0.69 to 183.00)	100.00 (100.00 to 100.00) (100.00 to 100.00)	11.46 (1.91 to 211.20) (1.91 to 211.20)	18.42 (0.54 to 50.60) (0.00 to 211.20)	12.80 (5.12 to 35.00) (0.00 to 872.00)	0.37
<i>p</i>	0.08	0.54	0.33	0.24	0.36	
TSH ₋₃₀ (mIU/L)	0.49 (0.13 to 0.80) (0.00 to 0.87)	0.50 (0.08 to 1.26) (0.08 to 1.26)	0.45 (0.07 to 1.35) (0.04 to 1.35)	0.11 (0.09 to 0.25) (0.00 to 0.71)	0.17 (0.12 to 0.21) (0.00 to 1.34)	0.14
TSH ₀ (mIU/L)	101.67 (79.29 to 138.38) (26.51 to 160.97)	102.86 (64.30 to 244.41) (64.30 to 244.41)	171.61 (79.34 to 498.00) (43.33 to 498.00)	106.59 (82.74 to 121.00) (36.20 to 232.43)	98.59 (84.18 to 116.10) (20.28 to 299.23)	0.32
Activity (mCi)	120 (100 to 120) (30 to 150)	150 (100 to 150) (100 to 150)	100 (80 to 150) (50 to 150)	100 (100 to 120) (50 to 120)	80 (80 to 100) (50 to 150)	<0.0001
Activity (MBq)	4440 (3700 to 4440) (1110 to 5550)	5550 (3700 to 5550) (3700 to 5550)	3700 (2960 to 5550) (1850 to 5550)	3700 (1850 to 4440) (3700 to 4440)	2960 (2960 to 3700) (1850 to 5550)	<0.0001

Clinical and prognosis value of the number of metastatic lymph nodes in patients with papillary thyroid carcinoma

Ling Zhan^{1,2†}, Hong-fang Feng^{1,3†}, Xi-zi Yu¹, Ling-rui Li¹, Jun-long Song¹, Yi Tu¹, Jing-ping Yuan⁴, Chuang Chen¹ and Sheng-rong Sun^{1*}





Original Reports

How Many Nodes to Take? Lymph Node Ratio Below 1/3 Reduces Papillary Thyroid Cancer Nodal Recurrence

Rachel E. Weitzman MD, MPH, MS ✉, Natalie S. Justicz MD, Dipti Kamani MD, Natalia Kyriazidis MD, Ming-Hsu Chen MD, Gregory W. Randolph MD, FACS, FACE

Conclusion

This study demonstrates characteristics to help assess risk of nodal recurrence of PTC and suggests LNR of lower than 0.3 is optimal to reduce risk of recurrence. The next steps include cohort studies to validate findings and weight variable analysis to optimize the extent of surgical therapeutic dissection.



Article

Lymph Node Ratio Predicts Recurrence in Patients with Papillary Thyroid Carcinoma with Low Lymph Node Yield

Il Ku Kang ¹, Joonseon Park ², Ja Seong Bae ², Jeong Soo Kim ² and Kwangsoon Kim ^{2,*}

Table 2. Baseline clinicopathologic characteristics according to LNR.

<u>LNR 0.29</u>	Low LNR (<i>n</i> = 675)	High LNR (<i>n</i> = 234)	<i>p</i> -Value
Age (years)	50.21 ± 12.3 (range, 21–83)	47.17 ± 13.2 (range, 20–82)	0.001
Female	551 (81.6%)	182 (77.8%)	0.212
Tumor size (cm)	0.87 ± 0.6 (range, 0.08–5.5)	1.04 ± 0.6 (range, 0.1–3.6)	<0.001
Multifocal (uni/bilateral)	79 (11.7%)/192 (28.4%)	30 (12.8%)/72 (30.8%)	0.131
ETE (minimal/gross)	245 (36.3%)/28 (4.1%)	130 (55.6%)/18 (7.7%)	0.225
Lymphatic invasion	55/559 (9.0%)	108/217 (49.8%)	<0.001
Vascular invasion	10/600 (1.6%)	4/209 (1.9%)	0.762
Perineural invasion	10/603 (1.6%)	7/210 (3.3%)	0.159
BRAF mutation	483/576 (83.9%)	176/201 (87.6%)	0.253
Positive LNs	0.1 ± 0.3	2.0 ± 1.1	<0.001
Harvested LNs (LNY)	3.3 ± 1.4	3.2 ± 1.3	0.485
Postoperative RAI ablation	333 (49.3%)	214 (91.5%)	<0.001
T stage			0.129
T1/T2/T3a/T3b	618 (91.6%)/26 (3.9%)/ 3 (0.4%)/28 (4.1%)	206 (88.0%)/10 (4.3%)/0 (0%)/18 (7.7%)	
N stage			<0.001
N0/N1a	602 (89.2%)/73 (10.8%)	0 (0%)/234 (100%)	
TNM stage			<0.001
I/II	636 (94.2%)/39 (5.8%)	172 (73.5%)/62 (26.5%)	
Recurrence	17 (2.5%)	29 (12.4%)	<0.001

Radioiodine Ablation

How Much Radioiodine is necessary for ablation?

Several studies showed that lower dosage (30 mCi) of I-131 may be just as effective as higher dosage (100 mCi) for ablation.

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Strategies of Radioiodine Ablation in Patients with Low-Risk Thyroid Cancer

Martin Schlumberger, M.D., Bogdan Catargi, M.D., Ph.D., Isabelle Borget, Pharm.D., Ph.D., Désirée Deandreis, M.D., Slimane Zerdoud, M.D., Boumédiène Bridji, M.D., Ph.D., Stéphane Bardet, M.D., Laurence Leenhardt, M.D., Ph.D., Delphine Bastie, M.D., Claire Schvartz, M.D., Pierre Vera, M.D., Ph.D., Olivier Morel, M.D., Danielle Benisvy, M.D., Claire Bournaud, M.D., Françoise Bonichon, M.D., Catherine Dejax, M.D., Marie-Elisabeth Toubert, M.D., Sophie Leboulleux, M.D., Marcel Ricard, Ph.D., and Ellen Benhamou, M.D.,
for the Tumeurs de la Thyroïde Refractaires Network for the Essai Stimulation Ablation Equivalence Trial*

Ablation with Low-Dose Radioiodine and Thyrotropin Alfa in Thyroid Cancer

Ujjal Mallick, F.R.C.R., Clive Harmer, F.R.C.P., Beng Yap, F.R.C.P., Jonathan Wadsley, F.R.C.R., Susan Clarke, F.R.C.P., Laura Moss, F.R.C.P., Alice Nicol, Ph.D., Penelope M. Clark, F.R.C.Path., Kate Farnell, R.C.N., Ralph McCready, D.Sc., James Smellie, M.D., Jayne A. Franklyn, F.Med.Sci., Rhys John, F.R.C.Path., Christopher M. Nutting, M.D., Kate Newbold, F.R.C.R., Catherine Lemon, F.R.C.R., Georgina Gerrard, F.R.C.R., Abdel Abdel-Hamid, F.R.C.R., John Hardman, F.R.C.R., Elena Macias, M.D., Tom Roques, F.R.C.R., Stephen Whitaker, M.D., Rengarajan Vijayan, F.R.C.R., Pablo Alvarez, M.Sc., Sandy Beare, Ph.D., Sharon Forsyth, B.Sc., Latha Kadalayil, Ph.D., and Allan Hackshaw, M.Sc.

Schlumberger M et al. N Engl J Med 2012; 366(18): 1663-1673

Mallick U et al. N Engl J Med 2012; 366(18): 1674-1685

Table 3. Follow-up Testing of Thyroid Ablation 6–10 Months after ^{131}I Administration in the 684 Patients Who Could Be Evaluated, According to Thyrotropin-Stimulation Method and ^{131}I Dose.

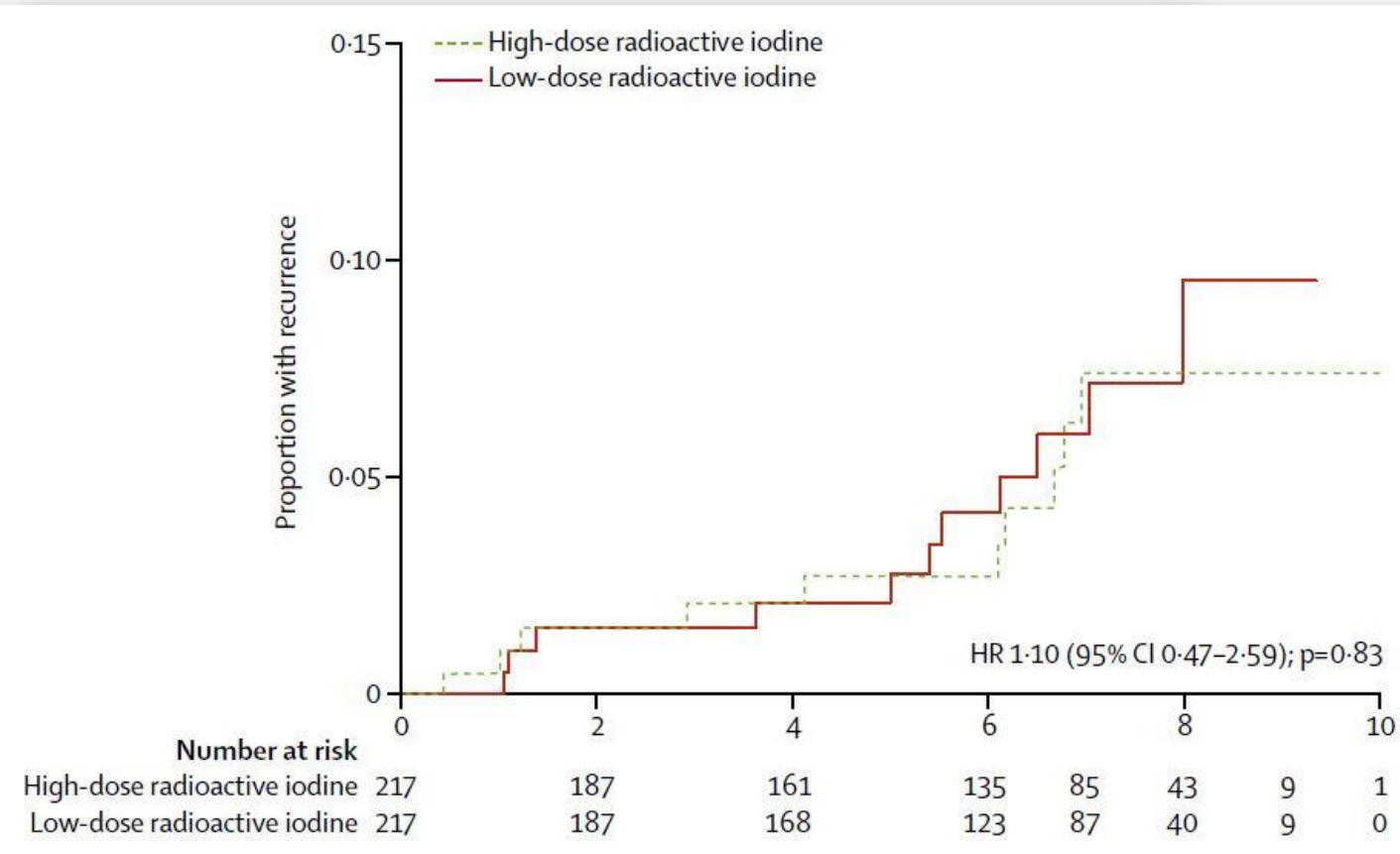
Characteristic	Recombinant Human Thyrotropin		Thyroid Hormone Withdrawal	
	1.1 GBq (N=177)	3.7 GBq (N=171)	1.1 GBq (N=170)	3.7 GBq (N=166)
Neck ultrasonography — no. (%)	30mCi	100mCi	30mCi	100mCi
Normal	171 (97)	161 (94)	163 (96)	157 (95)
Suspicious	6 (3)	10 (6)	7 (4)	9 (5)
Cytologic test normal	1 (<1)	3 (2)	1 (<1)	3 (2)
Cytologic test abnormal	0	1 (<1)	0	2 (1)
Cytologic test not performed	5 (3)	6 (4)	6 (4)	4 (2)
Presence of antithyroglobulin antibody — no. (%)	10 (6)	4 (2)	10 (6)	8 (5)
Total-body scan normal	6 (3)	3 (2)	7 (4)	7 (4)
Total-body scan abnormal	0	0	1 (<1)	0
Total-body scan not performed*	4 (2)	1 (<1)	2 (1)	1 (<1)
Absence of antithyroglobulin antibody				
Local determination				
Thyroglobulin ≤ 1 ng/ml — no./total no. (%)	157/167 (94)	160/167 (96)	152/160 (95)	152/158 (96)
Central determination				
Thyroglobulin ≤ 1 ng/ml — no./total no. (%)	148/158 (94)	155/160 (97)	146/152 (96)	142/148 (96)
Thyroglobulin ≤ 1.4 ng/ml — no./total no. (%)	150/158 (95)	156/160 (98)	146/152 (96)	143/148 (97)
Missing data — no.	9	7	8	10
Thyroid ablation				
With local thyroglobulin determination — no. (%)				
Complete	<u>160 (90)</u>	<u>159 (93)</u>	<u>156 (92)</u>	<u>156 (94)</u>
Incomplete	17 (10)	12 (7)	14 (8)	10 (6)
With central thyroglobulin determination — no./total no. (%)†				
Complete	<u>151/168 (90)</u>	<u>154/164 (94)</u>	<u>150/162 (93)</u>	<u>145/156 (93)</u>
Incomplete	17/168 (10)	10/164 (6)	12/162 (7)	11/156 (7)

* A total-body scan was not performed in patients with a suspicious finding on neck ultrasonography or a thyroglobulin level greater than 1 ng per milliliter.

† For each column, the total number of patients includes both patients for whom central thyroglobulin determination was available (and who had no detectable antithyroglobulin antibody) and patients with antithyroglobulin antibody.

Recurrence after low-dose radioiodine ablation and recombinant human thyroid-stimulating hormone for differentiated thyroid cancer (HiLo): long-term results of an open-label, non-inferiority randomised controlled trial

Hakim-Moulay Dehbi, Ujjal Mallick, Jonathan Wadsley, Kate Newbold, Clive Harmer, Allan Hackshaw



Case 1:

43 years old female

Total thyroidectomy

Multi focal PTC

Tumor size: 1.6, 0.9, 0.5 cm

Lymphatic invasion: Neg.

Vascular invasion: Neg.

Cervical sonography: Neg.

TSH: 62 mIU/L

Tg: 0.5 ng/mL TgAb: 7 IU/mL

Case 2:

46 years old female

Total thyroidectomy

PTC

Tumor size: 2.5cm

Vascular invasion: Neg.

2/12 dissected CCLN: Pos. (2mm dep.)

Post surgical cervical sonography: Neg.

TSH: 78 mIU/L

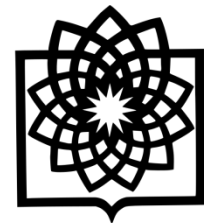
Tg: 17 ng/mL TgAb: 12 IU/mL

Summary

- Low-risk patients with DTC should be carefully selected, especially in the gray zone.
- Low dose radioiodine in low risk DTC:
 - Improve initial staging
 - Facilitate highly sensitive follow-up
 - Does not reduce recurrence or improve survival
- Consensus of the treatment team members

Thank You

Management of Postoperative Recurrence of Cervical Lymph Node Metastasis



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25th Iranian Nuclear Medicine Annual Congress
30 April – 02 May 2025, Tehran - Iran

Case Presentation

34-year-old male

Thyroidectomy ↓

1401

1402

1403

- Papillary Thyroid Carcinoma, Classic Variant
- Unifocal, 1.1 x 0.5 x 0.4 cm, left lobe
- Encapsulation: Negative
- Extrathyroid Extension: Negative
- Lymphatic Invasion: Suspicious (psammomatous spread)
- Central Cervical Lymph Nodes:
 - 7/9 involved (1.8 cm deposition)
 - Extranodal Extension: Positive

Case Presentation



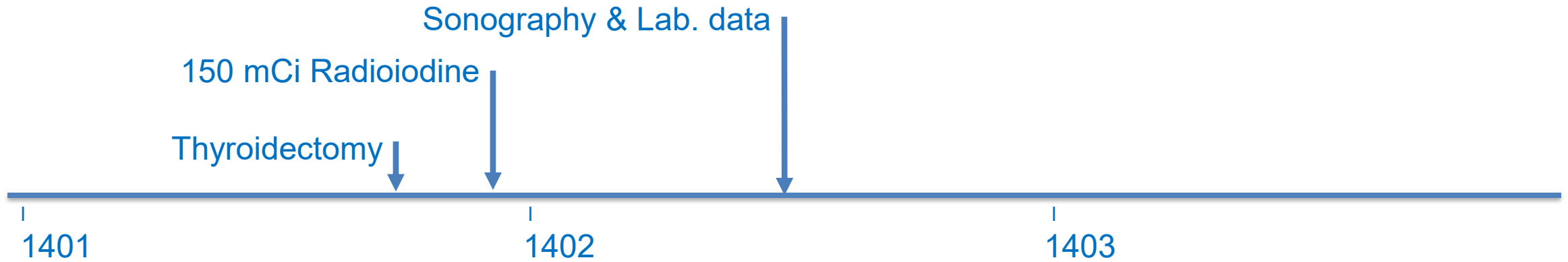
150 mCi Radioiodine

- TSH= 33 mU/L
- Tg= 3.7 ng/mL
- TgAb< 20 IU/mL

Post Treatment Scan

- Minimal remnant in Thyroid bed
- Negative for regional or distant metastasis

Case Presentation



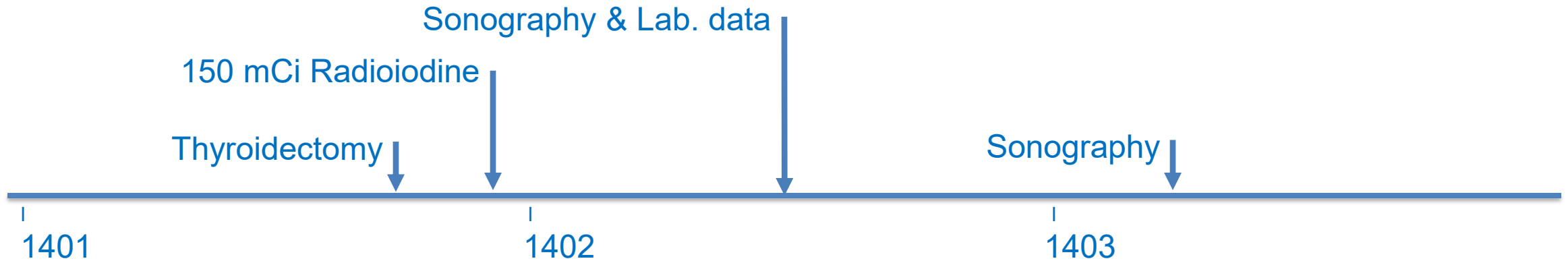
Cervical Sonography:

- 14.6x8.5x4.8 mm lymph node in left level IV, with microcalcification

Laboratory Data:

- TSH= 42 mU/L
- Tg= 4.1 ng/ml
- TgAb < 20 IU/mL

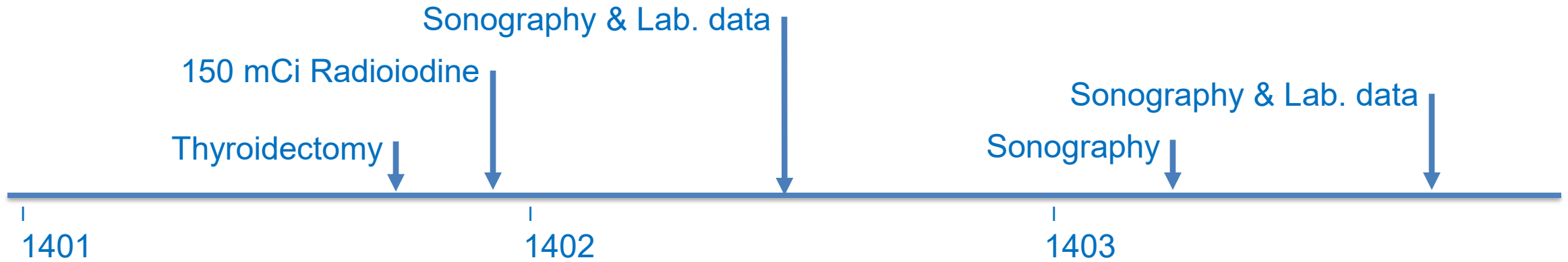
Case Presentation



Cervical Sonography:

- 14.1x8.5x5 mm lymph node in left level IV, with microcalcification (stable)

Case Presentation



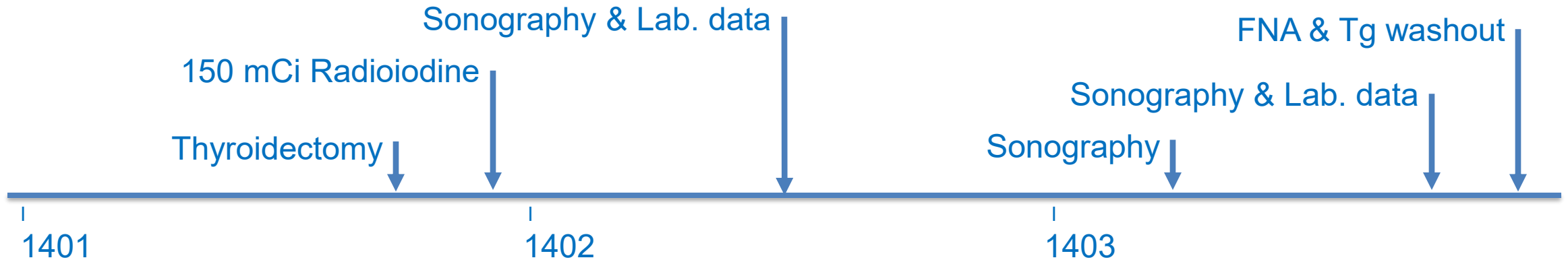
Cervical Sonography:

- 15x8.4x4.6 mm lymph node in left level IV, with microcalcification (stable)

Laboratory Data:

- TSH= 1.43 mU/L
- Tg= 0.17 ng/ml
- TgAb < 20 IU/mL

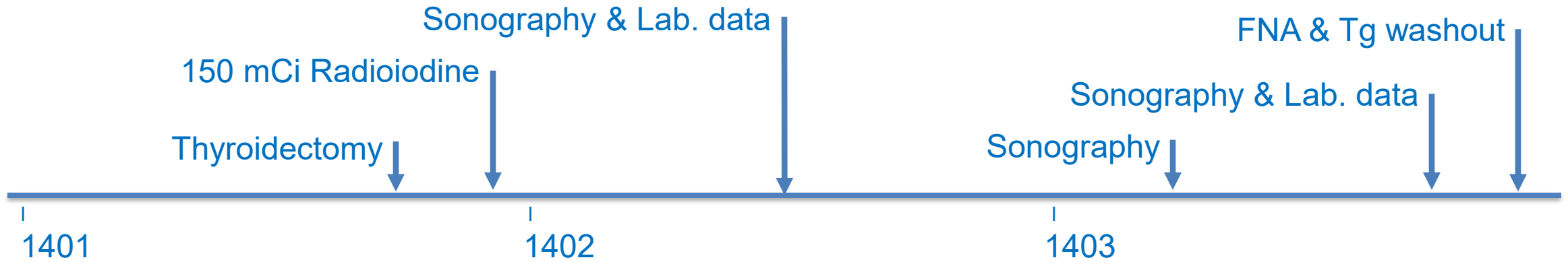
Case Presentation



Lymph Node Cytology and Tg washout:

- Positive for malignancy
- Tg washout > 300 ng/ml

Case Presentation



Summery:

- 34-year-old male
- T1b, N1b, M0 (Stage I)
- High Risk for Recurrence
- Structural Incomplete Response
- Stable Solitary Lymph Node Metastasis for recent 1½ Years

Important Points in Pathology Report of Metastatic Lymph Node

Tg Washout Method and Tg Cutoff

Protocol for the reporting of regional lymph nodes in a patients with thyroid carcinoma

- ✓ ***Regional lymph node status***
 - ✓ Not applicable (no regional lymph nodes submitted or found)
 - ✓ Regional lymph nodes present
 - ✓ All regional lymph nodes negative for tumor
 - ✓ Tumor present in regional lymph node(s)
- ✓ ***Number of lymph nodes with tumor***
- ✓ ***Nodal level(s) involved***
- ✓ ***Size of largest metastatic deposit***, (specify in cm)
- ✓ ***Extranodal extension***
- ✓ ***Number of lymph nodes examined***
- ✓ ***Nodal level(s) examined***

Thyroglobulin Washout (FNA-Tg)

- ✓ **Needle:** Using same needle that employed for cytology sampling to prepare FNA-Tg washout
- ✓ **Type of wash solution:** Saline solution, phosphate buffered saline (PBS), Tg-free solution
- ✓ **Type of tube:** Plane tube
- ✓ **Volume of wash solution:** ≤ 1 mL
- ✓ **Reported unit:** ng/mL or ng/FNA
- ✓ **Functional sensitivity of Tg assay:** ranging from 0.1 to 3 ng/mL in different studies
- ✓ **Cut off values:**
 - ✓ FNA-Tg < 1 ng/mL is **reassuring** (the probability of N1 disease increases with higher Tg levels.)
 - ✓ FNA-Tg >10 ng/mL is **highly suspicious**
 - ✓ FNA-Tg 1 and 10 ng/mL is **moderately suspicious** (comparison of the FNA-Tg and serum Tg should be considered.)
 - ✓ Cut off value of 1 ng/mL for the highest sensitivity
 - ✓ Cut off value of 40 ng/mL for the highest specificity
- ✓ **False positive and false negative results**
- ✓ **Hook effect**
- ✓ **Interference of Tg-Ab**

Role of Second Adjuvant Radioiodine Therapy in Recurrence of Cervical Lymph Node Metastasis

- Unresectable
- Post Reoperation Gross residual disease
- Not Amenable to Radical Surgery

Reoperation in Persistent/Recurrent Cervical Lymph Node Metastasis

Case Selection
Extent of Reoperation

Role of Radiofrequency Ablation in Recurrence Thyroid Cancer Management

Guidelines Recommendations

European
Thyroid Journal

Guidelines

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European Thyroid Association and Cardiovascular and Interventional Radiological Society of Europe 2021 Clinical Practice Guideline for the Use of Minimally Invasive Treatments in Malignant Thyroid Lesions

Giovanni Mauri^{a,b} Laszlo Hegedüs^c Steven Bandula^d Roberto Luigi Cazzato^e
Agnieszka Czarniecka^f Oliver Dudeck^g Laura Fugazzola^{h,i}
Romana Netea-Maier^j Gilles Russ^k Göran Wallin^l Enrico Papini^m

ETA & CIRSE 2021

MITs in Neck Recurrences of Thyroid Cancer:

- LAP size $\leq$ 3 cm
- No limitation for number of LAPs
- Preferable previous LND

2023 European Thyroid Association Clinical Practice Guidelines for thyroid nodule management

Cosimo Durante^{1,*}, Laszlo Hegedüs^{2,*}, Agnieszka Czarniecka³, Ralf Paschke⁴, Gilles Russ⁵,
Fernando Schmitt⁶, Paula Soares⁷, Tamas Solymosi⁸ and Enrico Papini⁹

ETA 2023 Guideline

- **Recurrent LAPs:**
- MIT may be employed as an alternative to surgical neck dissection:
 - patients with limited life expectancy
 - previous neck dissection
 - surgical complications
 - small size (<20mm)
 - limited number (<4)
 - Laterocervical metastasis
- Should be avoid except for Palliation:
 - Extensive Lymph nodes
 - Central Lymph nodes
 - Evidence for RAI uptake
 - Aggressive pathology

Recommendation and Guideline

eISSN 2005-8330

<https://doi.org/10.3348/kjr.2024.0963>

Korean J Radiol 2025;26(1):10-28

Korean Journal of Radiology

KJR

Radiofrequency Ablation for Recurrent Thyroid Cancers: 2025 Korean Society of Thyroid Radiology Guideline

Eun Ju Ha^{1*}, Min Kyoung Lee^{2*}, Jung Hwan Baek³, Hyun Kyung Lim⁴, Hye Shin Ahn⁵,
Seon Mi Baek⁶, Yoon Jung Choi⁷, Sae Rom Chung³, Ji-hoon Kim⁸, Jae Ho Shin⁹, Ji Ye Lee⁸,
Min Ji Hong¹⁰, Hyun Jin Kim¹¹, Leehi Joo³, Soo Yeon Hahn¹², So Lyung Jung¹³, Chang Yoon Lee¹⁴,
Jeong Hyun Lee³, Young Hen Lee¹⁵, Jeong Seon Park¹⁶, Jung Hee Shin¹², Jin Yong Sung¹⁷,
Miyoung Choi¹⁸, Dong Gyu Na¹⁹; Guideline Committee for the Korean Society of Thyroid Radiology
(KSThR) and Korean Society of Radiology

KSThR recommendations 2025

Curative Ablation :

number (≤ 3)

Small tumors (size ≤ 2 cm)

No distant lesion

No invasion to critical organs

Palliative Ablation:

Invasion to critical organs

Numerous lesions

Distant lesions

Combination with TKI & EBRT

PROCEDURE:

Local anesthesia : perilesional lidocaine injection
± Sedative Drugs

Hydro-dissection : Cold 5% dextrose water

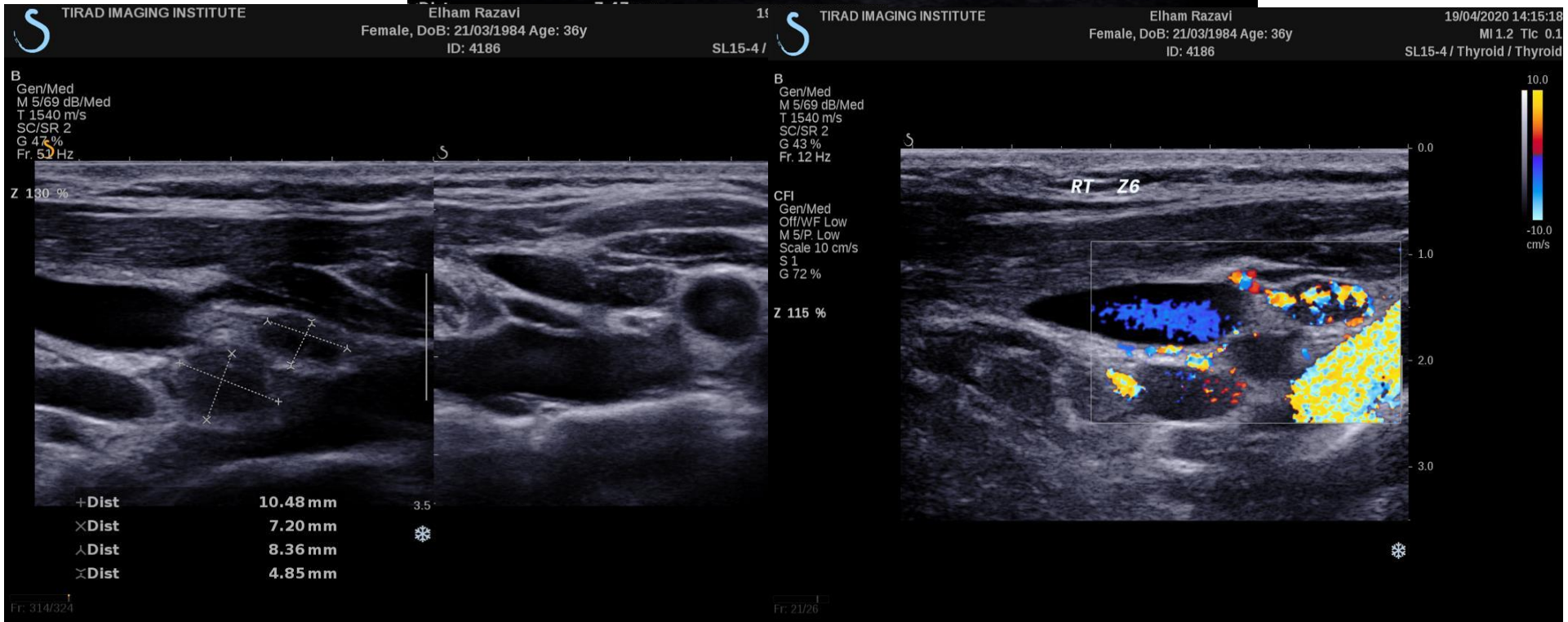
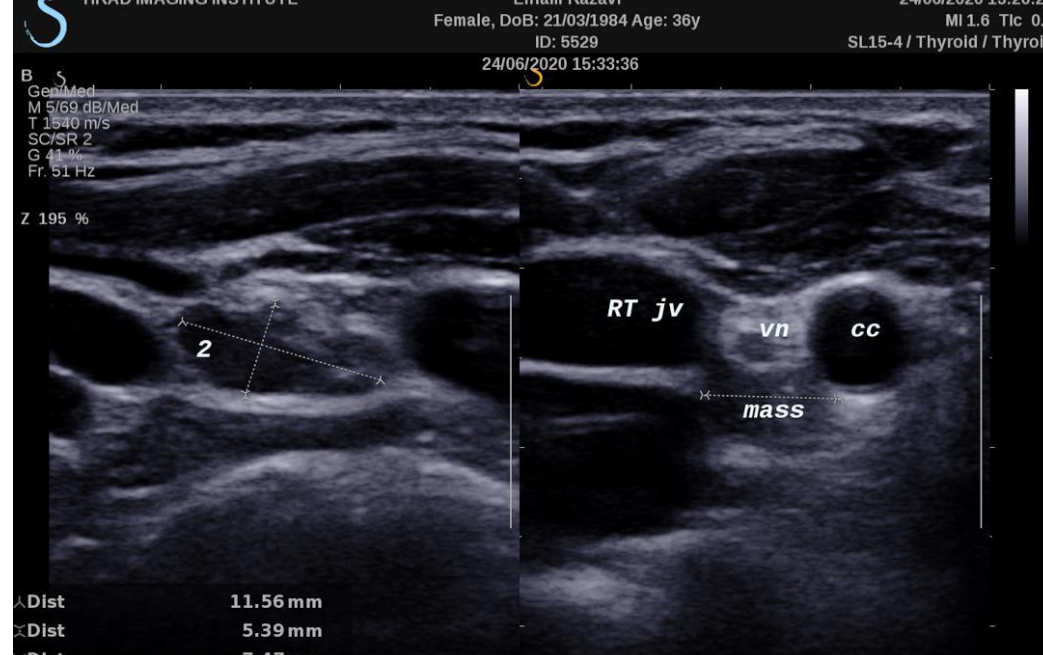
Ablation technique: The moving-shot technique(Standard)
The fixed-electrode technique (size <5 mm)
Stent-assisted RFA RTCs with intraluminal tracheal invasion

Combination therapy: EBRT / TKI (Invasion to vital structures)

Nerve Injury: Bolus injection of cold 5% dextrose (± Dexamethasone)

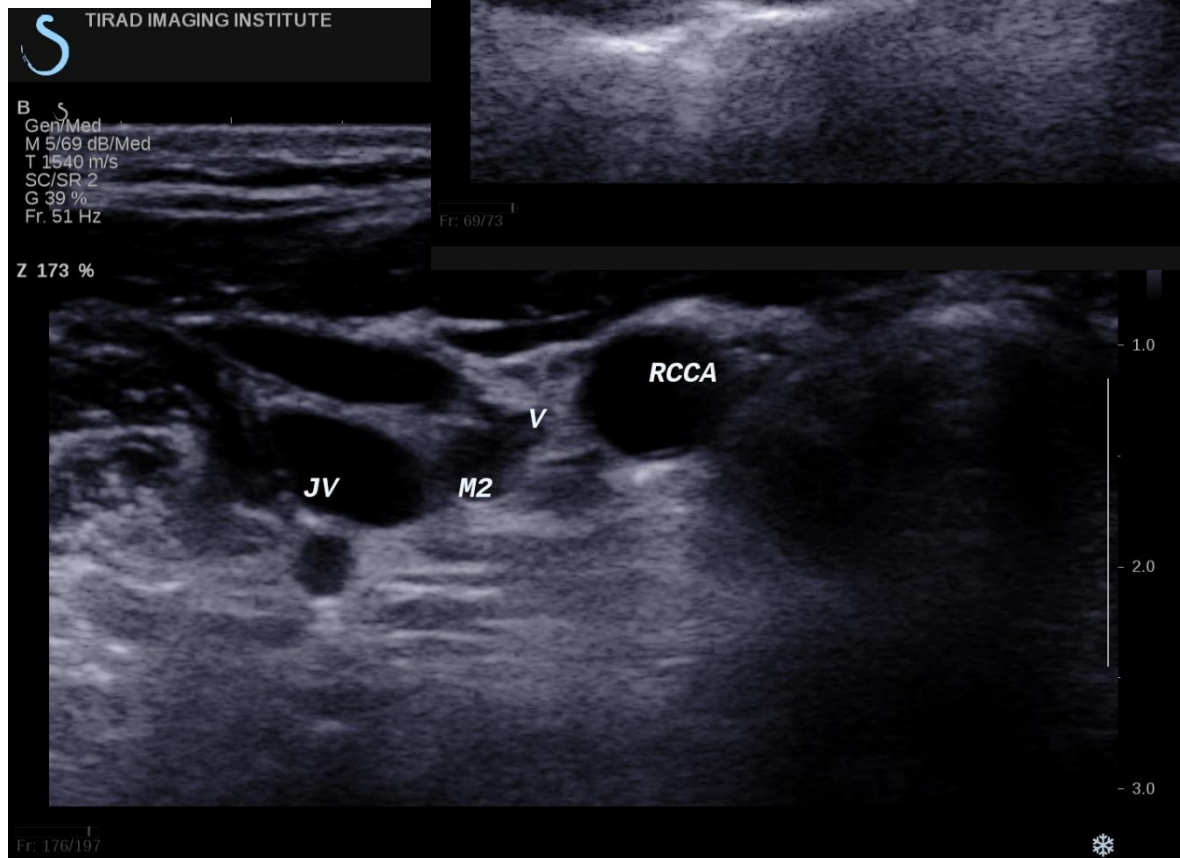
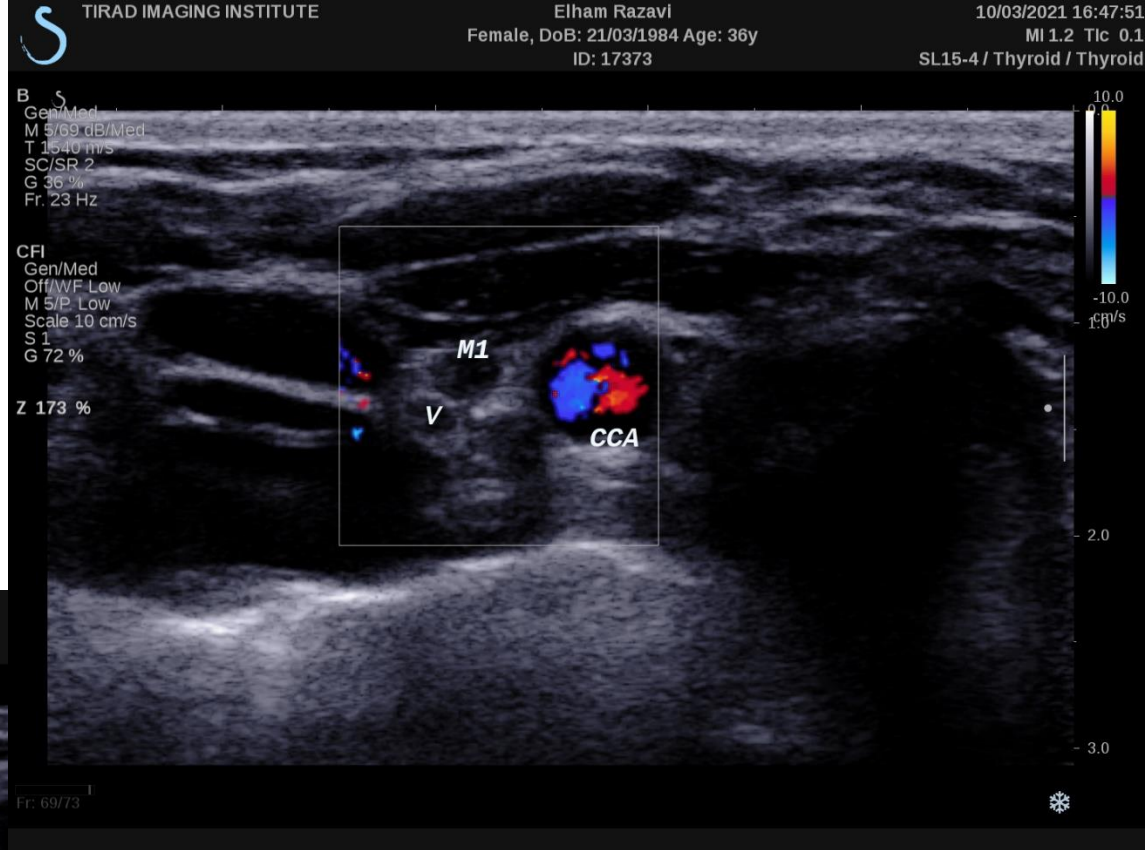


Case 1: intracarotid sheath LAPs 19/04/2020



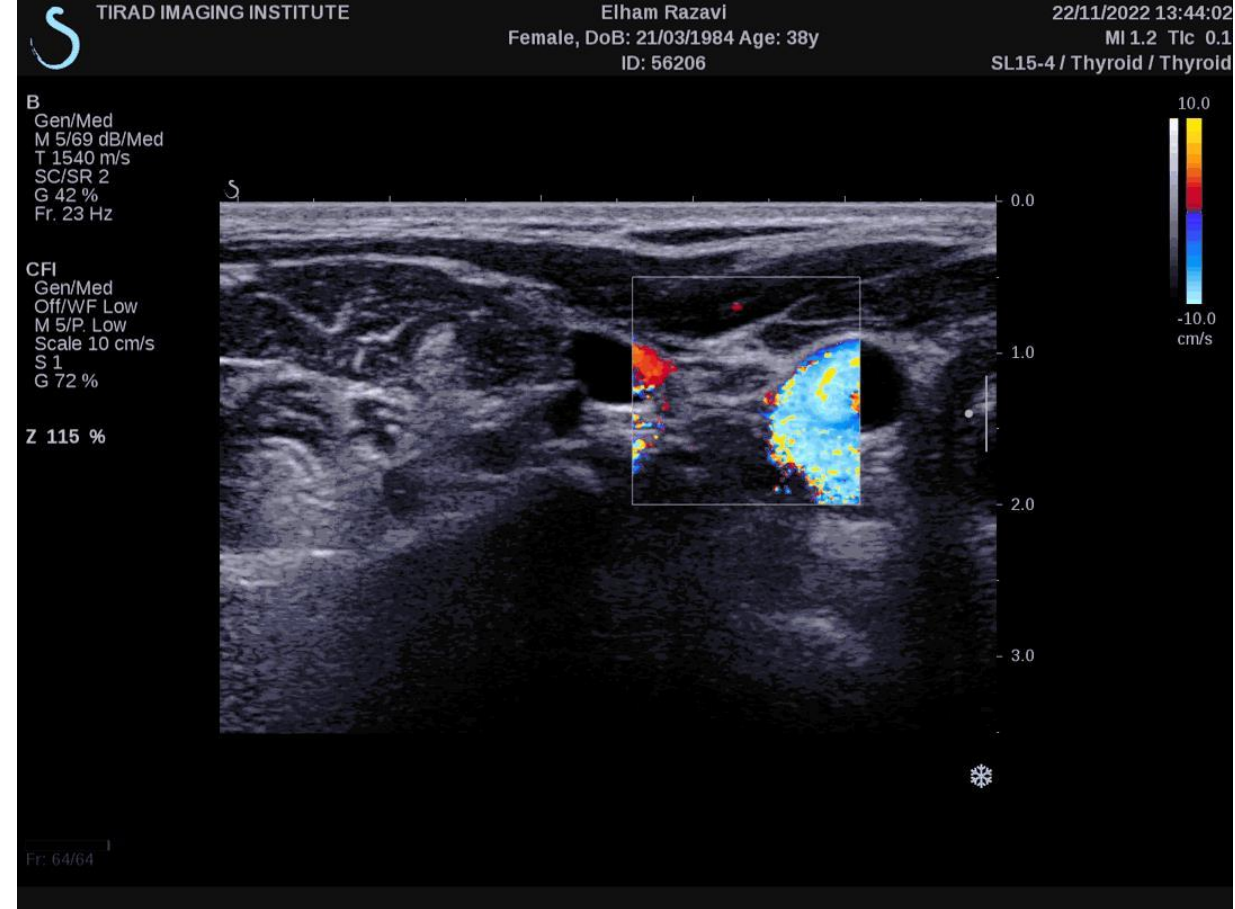


1 month





13 month

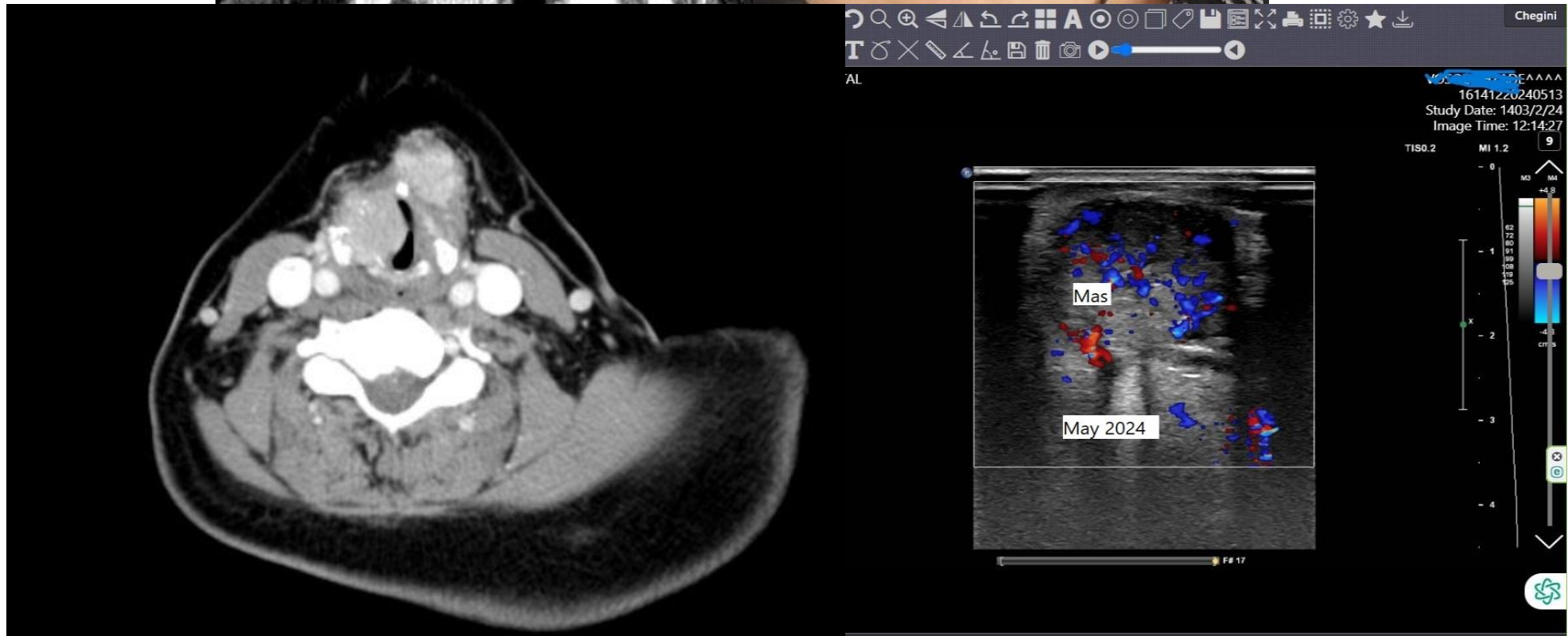


Completely resolved and no
recurrence till now



Challenging case2:

- **Hx:** 65 Y/F Total thyroidectomy 10 years ago + 4 neck surgery and 600mCi RAI.
- **Presentation :** Stridor, hoarseness odynophagia due to bilateral Laryngeal involvement
- **US and CT scan:** bilateral laryngeal mass involving right hemi larynx with near total airway obstruction, subdermal involvement
- **Lab test :** Thyroglobulin : 50 ng/ml,
- **Laryngoscopy :** Right vocal cord was fixed, near total airway Obstruction.





Age: 20F
36-08-10
Study Date: 1403/2/24
Image Time: 17:37:01

Ablation
2024 May

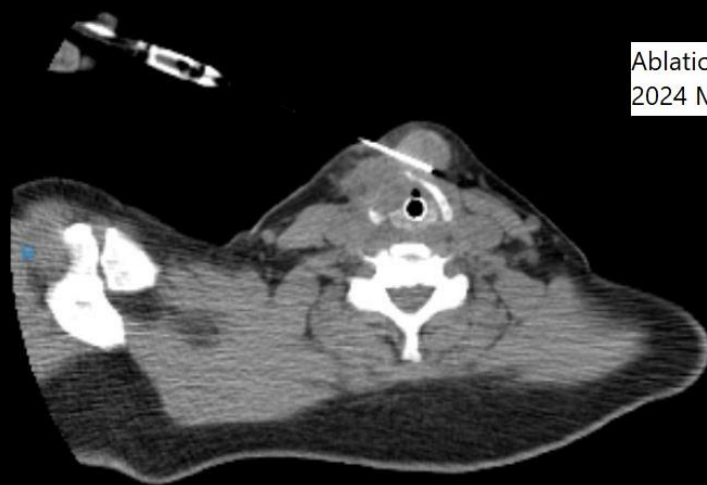


IRANMEHR HOSPITAL
SE: 4
IM: 64 of 114

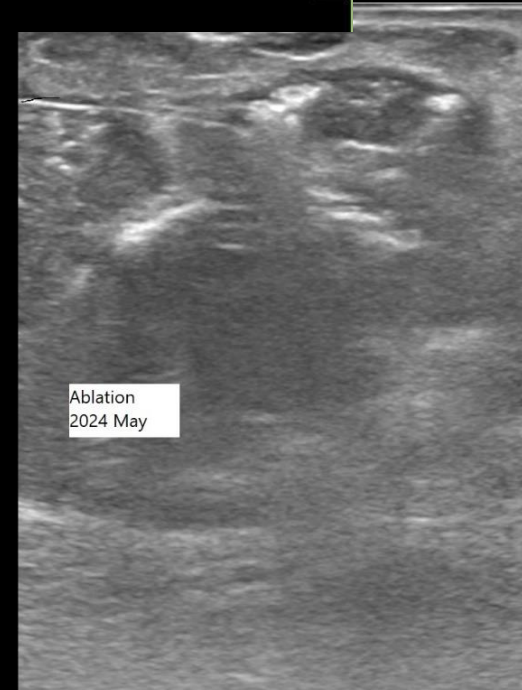
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Zoom: 1.94
WW:1226 WL:-211

36-08-10
Study Date: 1403/2/24
Image Time: 17:37:01

Ablation
2024 May



Thickness: 5
Zoom: 1.94
WW:400 WL:40



TIS0.3 MI 1.3





204 Dec



B

2024 Dec



D

March 2025



C

March 2025

Thyroid Inclusions (ectopic thyroid tissue) in Cervical Lymph Nodes

Thyroid Inclusions (ectopic thyroid tissue) in Cervical Lymph Nodes

- ✓ Ectopic thyroid: relatively infrequent (4.7% of unselected autopsies), (0.6%- 1.5% patients with head and neck carcinoma) treated with neck dissection
- ✓ Location: head and neck, mediastinum, and struma ovarii

Thyroid tissue in lymph node:

Favor benign thyroid inclusion:

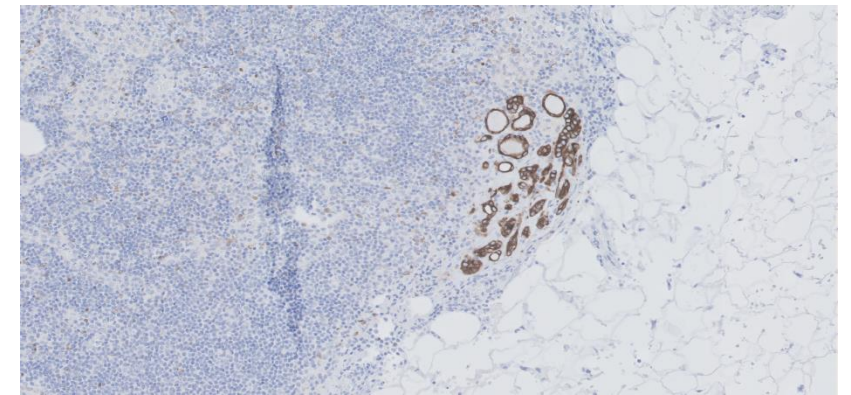
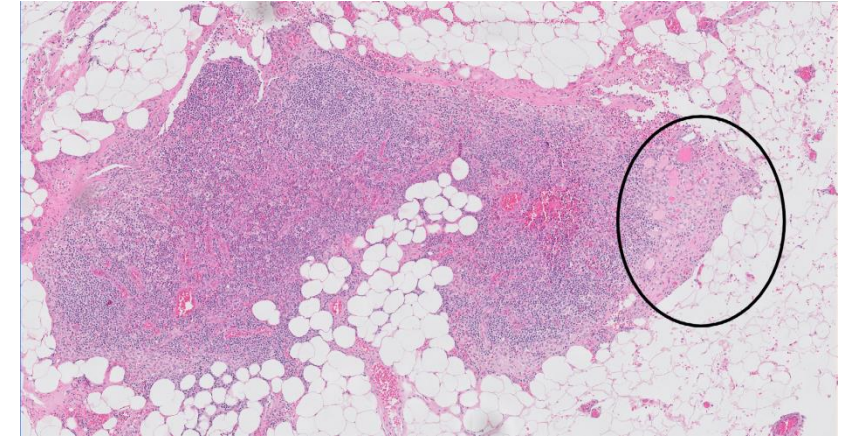
After, Obtaining multiple deeper section

Close evaluation to look for focal/or subtle abnormal cytomorphologic features

- Seen in one or two lymph nodes only
- Small in size (few follicles)
- Located in subcapsular or subcortical areas
- Microfollicles with a wedge-shaped arrangement (base pointing toward the capsule)
- No architecture or cyto-morphologic abnormality
- No morphologic features of malignancy
- No psammoma bodies
- No desmoplastic stroma
- No molecular/or IHC (CK-19, BRAF VE1, HBME-1, galectin-3) evidence of thyroid carcinoma
- Usually located in midline or medial to jugular vein and should not be seen in lymph node lateral to carotid sheath and jugular vein

Suspicious lymph node (D/D: Metastatic thyroid carcinoma)

- Benign appearing thyroid follicles replacing majority of the lymph node (>1/3)
- Involves multiple lymph nodes
- Findings beyond the above mentioned inclusion criteria of benign LN



- Barbieri A et al. Thyroid tissue outside the thyroid gland: Differential diagnosis and associated diagnostic challenges. *Ann Diagn Pathol.* 2020. PMID: 32871503
- Triantafyllou A et al, Incidental findings of thyroid tissue in cervical lymph nodes: old controversy not yet resolved? *Eur Arch Otorhinolaryngol.* 2016, 273(10):2867-75.

Management of Persistent/Recurrent Cervical Lymph Node Metastasis

	Stage	Eighth Edition Description	Eighth Edition Published 10-Year DSS
Younger patients (<55 y)	I	Age <55 y All patients without distant metastases regardless of tumor size, lymph node status, or extrathyroidal extension	≈99%
	II	Age <55 y Distant metastases	≈65%

ATA intermediate risk	Microscopic invasion of tumor into the perithyroidal soft tissues RAI-avid metastatic foci in the neck on the first posttreatment whole-body RAI scan Aggressive histology (e.g., tall cell, hobnail variant, columnar cell carcinoma) Papillary thyroid cancer with vascular invasion Clinical N1 or >5 pathologic N1 with all involved lymph nodes <3 cm in largest dimension ^a Multifocal papillary microcarcinoma with ETE and <i>BRAF</i> ^{V600E} mutated (if known) ^a
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Differentiating “Detectable Findings” from “Actionable Findings”
Risk Stratification Decision Making Framework

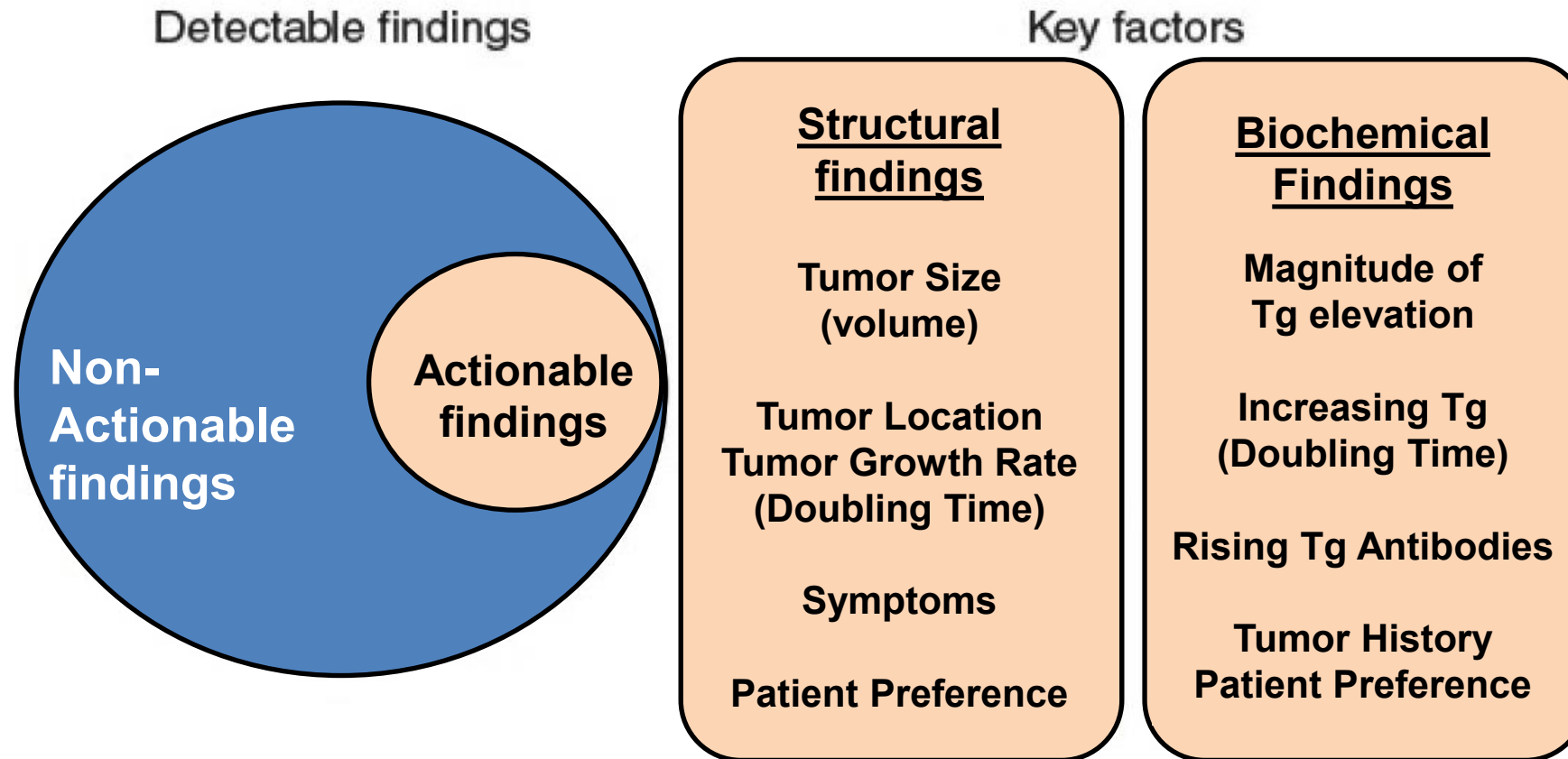


FIGURE 57-2. Differentiating “Detectable Findings” from “Actionable Findings.” Tg, thyroglobulin.

Risk Stratification in Patients With Complete Tumor Resection and No Evidence of Distant Metastasis at Initial Risk Stratification

Response Category	Tg After Total Thyroidectomy and RAI Ablation (ng/mL)
Excellent	<0.2
Indeterminate	0.2-1.0
Biochemical incomplete	>1.0

Initial Estimate of Risk of Recurrence	Testing Modality	Follow-Up Time Points	
		6 mo	12 mo
ATA low and ATA intermediate	Suppressed Tg, anti-Tg antibodies, TSH	X	X
	Stimulated Tg	–	Not required if serum Tg assay has a sensitivity of <0.2 ng/mL
	Neck ultrasonography	6–12 mo	
	Diagnostic RAI whole-body scan	Not required ^a	
	Cross-sectional imaging (CT, MRI)	Not required ^a	
	FDG-PET scanning	Not required ^a	

What is the optimal directed approach to patients with suspected structural neck recurrence?

& RECOMMENDATION 71

“Therapeutic compartmental central and/or lateral neck dissection in a previously operated compartment, sparing uninvolved vital structures, should be performed for patients with biopsy-proven persistent or recurrent disease for central neck nodes ≥ 8 mm and lateral neck nodes ≥ 10 mm in the smallest dimension that can be localized on anatomic imaging.”

Through thorough patient and multidisciplinary collaborative discussions, metastatic nodes >8 – 10 mm can be carefully observed in properly selected patients with serial clinical and radiographic follow-up, with surgery being offered if they progress during follow-up and conservative follow-up being maintained if they are stable over time.



Active surveillance of nodal metastasis in differentiated thyroid carcinoma: a systematic review and meta-analysis

Anita Lavarda Scheinpflug¹ · Laura Marmitt¹ · Leonardo Barbi Walter¹ · Dimitris Varvaki Rados² ·

Development of distant metastasis and cancer related death during AS of metastatic cervical LN were quite uncommon

Methods: A systematic review and meta-analysis, encompassing a total of 486 patients with metastatic nodal DTC.

Results:

Among the patients who underwent AS;

- Females: 69.5%,
- PTC: 99.8 %
- Mean age: 41-51 years,
- Lymph nod size: range from 0.4 up to 2.5 Cm,
- Mean follow-up time: 28-86 months,
- US per year: 1-4

- ✓ *Disease progression: 28 %*
- ✓ *New LN metastasis: 19 %*
- ✓ *LN growth ≥ 3 mm: 21 %*
- ✓ *New LN metastasis or LN growth ≥ 3 mm: 26 %*
- ✓ *Neck dissection during AS: 18 %*

Conclusion: AS seems to be a suitable strategy for selected DTC patients with small nodal disease, avoiding or postponing surgical reintervention.

به طور کلی، به نظر می‌رسد در این بیمار جوان مبتلا به PTC کاملاً تمایز یافته با متاستاز موضعی به غدد لنفاوی گردن، که طی دو سال پیگیری تیروگلوبولین کمتر از 0.2 ng/mL داشته و اندازه غدد لنفاوی بدون تغییر بوده است، پیش‌آگهی بسیار مطلوبی برای بیمار وجود دارد. در این خصوص، لازم است گفت‌وگوی کامل و جامع با بیمار انجام شود تا با استناد به مستندات علمی معتبر، اطمینان لازم به وی منتقل گردد.

لذا، پس از بحث و تبادل نظر در قالب یک تیم درمانی چندرشته‌ای (Multidisciplinary Team)، موارد زیر به عنوان پیشنهادات درمانی قابل مدنظر قرار می‌گیرند:

1. در صورت نگرانی بیمار نسبت به نتایج TG-washout و یافته سونوگرافی مثبت، انجام Minimally Invasive Procedures مانند رادیوفرکانسی (RF) به عنوان گزینه‌ای مناسب و در درجه اول پیشنهاد می‌گردد.
2. با توجه به سیر بیماری و وسعت غدد لنفاوی متاستاتیک، در این مرحله جراحی جایگاه بالایی ندارد؛ اما در صورت نگرانی بیمار و عدم تمایل وی به انجام اقدامات حداقلی، جراحی به عنوان یک رویکرد درمانی قابل بررسی خواهد بود.
3. ادامه پیگیری بیمار با انجام سونوگرافی‌های شش ماهه و اندازه‌گیری سطح مارکرهای TG و Anti-TG بدون انجام اقدامات اضافه می‌تواند به عنوان یک رویکرد مناسب در این بیمار می‌تواند مد نظر قرار گیرد.

Complementary Adjuvant Radioiodine Therapy Following Reoperation of Cervical Lymph Node Metastasis

Indications from American Thyroid Association and Society of Nuclear Medicine and Molecular Imaging guidelines regarding radioiodine treatment

Locoregional disease

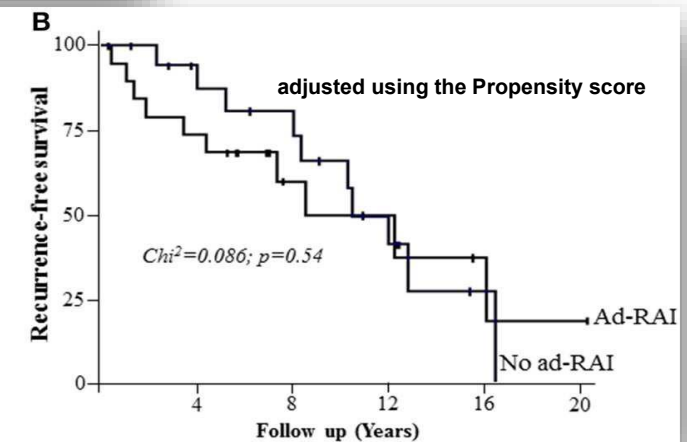
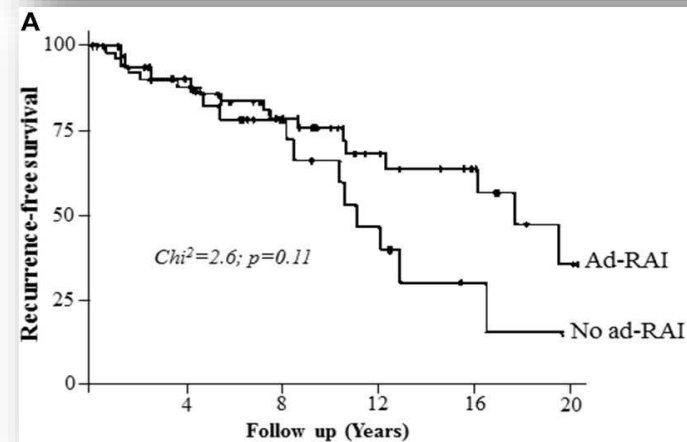
ATA	RAI may be used in patients with low-volume disease or in combination with surgery in case of bulky disease.
SNMMI	Advanced local or regional disease may be treated first with surgical debulking, then with ¹³¹ I. In general ¹³¹ I therapy is less effective in bulky disease with a diameter greater than 1–2 cm.

The efficacy of adjuvant radioactive iodine after reoperation in patients with persistent or recurrent differentiated thyroid cancer: a systematic review

Jaivikash Raghupathy ^{# 1}, Benjamin Kye Jyn Tan ^{# 1}, Harris J J M D Song ¹, Alys Z Q Chia ¹, Yi Zhao Tan ¹, Samantha Peiling Yang ^{2 3}, Rajeev Parameswaran ^{4 5}

Re-treatment With Adjuvant Radioactive Iodine Does Not Improve Recurrence-Free Survival of Patients With Differentiated Thyroid Cancer

Clément Bouvet¹, Bertrand Barres^{1,2}, Fabrice Kwiatkowski³, Marie Batisse-Lignier^{4,5}, Meryem Chafai El Alaoui¹, Philippe Kauffmann⁶, Florent Cachin^{1,2,7}, Igor Tauveron^{2,4,5}, Antony Kelly¹ and Salwan Maqdasy^{2,4,5*}



Question & Discussion