

Thyroid malignancy risk in different clinical thyroid diseases

Ahmet Dirikoc¹, Sevgul Faki¹, Husniye Baser¹, Didem Ozdemir¹, Cevdet Aydin¹, Reyhan Ersoy¹, Mehmet Kilic², Aydan Kilicarslan³, Bekir Cakir¹

¹ Ankara Yildirim Beyazit University, School of Medicine, Department of Endocrinology and Metabolism, Ankara

² Ankara Yildirim Beyazit University, School of Medicine, Department of General Surgery, Ankara

³ Ankara Yildirim Beyazit University, School of Medicine, Department of Pathology, Ankara

Objectives: To evaluate malignancy risk and compare tumoral features in different clinical thyroid diseases classified according to functional and nodular status.

Methods: Patients who underwent thyroidectomy between June 2007 and June 2014 were classified as euthyroid nodular goiter (ENG), euthyroid multinodular goiter (EMNG), hypothyroidism with single nodule, hypothyroidism with multiple nodules, toxic nodular goiter (TNG), toxic multinodular goiter (TMNG), Graves', Graves' with solitary nodule and Graves' with multiple nodules according to preoperative functional status, etiology of hyperthyroidism and presence of solitary/multiple nodules. Postoperative malignancy rates and tumoral characteristics were compared.

Results: There were 2203 (76.8%) female and 667 (23.2%) male patients. 1719 (59.9%) were euthyroid, 962 (33.5%) were hyperthyroid and 189 (6.6%) were hypothyroid (Table 1). Overall malignancy was detected in 980 (34.1%) patients and 47.9% was incidental. Malignancy rates were 42.1%, 42.9% and 18.3% in euthyroid, hypothyroid and hyperthyroid patients, respectively (p<0.001). 41.4% of ENG and 46.3% of EMNG patients had malignant histopathology (p=0.169). Mean tumor size, capsular invasion and vascular invasion were lower in EMNG than ENG (p<0.001, p=0.003 and p=0.015, respectively). Among hypothyroid patients, 45.7% of patients with solitary and 42.2% of patients with multiple nodules were malignant (p=0.705). Sex distribution, mean age and tumoral characteristics were similar. Malignancy rates were similar in all subgroups of hyperthyroidism, exceptionally Graves' had lower malignancy rate compared to others (p=<0.01 for each). When TMNG and TNG were analysed together, malignancy rate was 24.7% (104/421), and when Graves' with nodule/nodules were considered, it was 19.7% (59/299).

Conclusions: In hypothyroid or euthyroid patients who underwent thyroidectomy for various reasons, malignancy rate was higher than 40%. Although prevalence of malignancy was lower in hyperthyroid patients, it does not confer protection against thyroid cancer. Patients with multiple nodules carry a similar risk of malignancy as patients with solitary nodule independent of the functional status.

Table 1: Comparison of demographic features, malignancy rates and tumoral characteristics in patients with euthyroidism, hypothyroidism and hyperthyroidism

	Euthyroid n=1719 (59.9%)	Hypothyroid n=189 (6.6%)	Hyperthyroid n=962 (33.5%)	p
Sex				
Male	343 (20.0%)	16 (8.5%)	308 (32.0%)	<0.001
Female	1376 (80.0%) ^b	173 (91.5%) ^{a,c}	654 (68.0%)	
Age	49.09±11.93	48.78±12.37	49.38±13.08	0.767
AntiTPO positivity (n=1836)	205 (18.4%)	76 (55.1%)	218 (37.4%)	<0.001
AntiTg positivity (n=1831)	221 (20.0%)	54 (42.5%)	166 (27.8%)	<0.001
Histopathology				
Benign	996 (57.9%)	108 (57.1%)	786 (81.7%)	<0.001
Malignant	723 (42.1%)	81 (42.9%)	176 (18.3%) ^{b,c}	
Malignant foci (n=1387)	n=1051 (75.8%)	n=115 (8.3%)	n=221(15.9%)	
Tumor type				
Papillary	979 (93.2%)	109 (94.8)	205 (92.8%)	0.705
Follicular	22 (2.1%)	1 (0.9%)	8 (3.6%)	
Hurthle cell	15 (1.4%)	0	1 (0.5%)	
TT-UMP	18 (1.7%)	1 (0.9%)	5 (2.3%)	
Medullary	12 (1.1%)	2 (1.7%)	1 (0.5%)	
Undifferentiated	5 (0.5%)	2 (1.7%)	1 (0.5%)	
Tumor size (mm)	11.16±12.86 ^b	9.98±9.05	8.09±10.07	
Microcarcinoma	641 (61.0%)	68 (59.1%)	166 (75.1%) ^{b,c}	<0.001
Capsular invasion	234 (22.3%)	28 (24.3%)	36 (16.3%)	0.419
Vascular invasion	46 (4.4%)	4 (3.5%)	5 (2.3%)	0.508
Extrathyroidal extension	102 (9.7%)	15 (13%)	20 (9%)	0.601
Lymph node metastasis	n=700	n=80	n=171	
	58 (8.3%)	11 (13.8%) ^c	8 (4.7%)	0.046
Incidental	471 (44.8%) ^a	46 (40%)	147 (66.5%) ^{b,c}	<0.001

a: p<0.05 for euthyroid vs hypothyroid, b: p<0.05 for euthyroid vs hyperthyroid, c: p<0.05 for hypothyroid vs hyperthyroid