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Introduction

In this study, we aimed to evaluate the usefulness of ratio of primary tumor diameter to total tumor diameter as a new parameter for the differentiation of aggressive and favorable papillary thyroid microcarcinomas (PTMC).

Methods

➤ The diameter of the largest tumor focus was taken as the primary tumour diameter (PTD). For multifocal tumors, total tumor diameter (TTD) was calculated as the sum of the maximal diameter of each lesion. A ratio was obtained by dividing PTD to TTD and defined as tumor diameter ratio (TDR) (PTD/TTD=TDR). Positive (PPV) and negative predictive values (NPV) and sensitivity and specificity of TDR to predict capsular invasion, extrathyroidal extension (ETE) and lymph node metastasis (LNM) were determined.

Results

➤ Mean TDR significantly decreased as number of tumor foci increased. In multifocal PTMCs, the sensitivities of TDR for the detection of LNM, ETE and capsular invasion were 100%, 100% and 94.2%, respectively, the specificities were 86.2%, 88% and 94.7%, respectively. TDR had a PPV of 99.3% and NPV of 100% for LNM; PPV of 58.5% and NPV of 100% for ETE; and PPV of 89.1% and NPV of 97.3% for capsular invasion. In patients with multifocal PTC>10 mm, mean TDR was significantly lower in patients with LNM compared to ones without LNM (0.76±0.12 vs 0.44±0.10; p<0.001) (Table 1).

Conclusion

Decreased TDR was associated with capsular invasion, ETE and LNM in patients with multifocal PTMC. It was also predictive for LNM even in patients without capsular invasion or ETE. This new parameter might be particularly helpful for the detection of aggressive behavior in multifocal PTMCs.

Table 1

	ROC curve statistics	LNM	Capsular invasion	ETE
PTMC	AUC	0.945	0.971	0.944
	Standart Error	0.018	0.012	0.017
	95% CI	0.899-0.975	0.932-0.991	0.897-0.974
	p value	<0.001	<0.001	<0.001
	Cut off value	≤0.56	≤0.62	≤0.57
	Sensitivity	100%	94.2%	100%
	Specificity	86.2%	94.7%	88%
	+LR	7.2%	18.0%	8.4%
	-LR	0%	0.1%	0%
	PPV	99.3%	89.1%	58.5%
NPV	100.0%	97.3%	100.0%	
PTC	AUC	0.998	0.883	0.838
	Standart Error	0.002	0.033	0.033
	95% CI	0.971-1.000	0.819-0.931	0.767-0.894
	p value	<0.001	<0.001	<0.001
	Cut off value	≤0.57	≤0.69	≤0.63
	Sensitivity	100%	87.5%	87.9%
	Specificity	98.3%	88.5%	77.1%
	+LR	58.5%	7.6%	3.8%
	-LR	0%	0.1%	0.2%
	PPV	92.6%	86.2%	53.7%
NPV	100%	89.6%	95.5%	

PTMC: Papillary thyroid microcarcinoma, PTC: Papillary thyroid carcinoma, AUC: Area under the curve, 95% CI: 95% confidence interval, LR: Likelihood ratio, PPV: Positive predictive value, NPV: Negative predictive value, LNM: Lymph node metastasis, ETE: Extrathyroidal extension