

Background

Thyroid cancer, the most common endocrine malignancy, appears to have a genetic and epigenetic determination. Numerous studies has focused on genes expression in differentiated thyroid cancer. Increased gene expression for galactoside -binding soluble-3 protein, which codes for galectin-3 (Gal-3) was reported, but there are only a few reports demonstrating the correspondence between up-regulation of the gene and the serum levels of Gal-3.

There are several advantages in providing a test for screening, diagnosis and follow-up based on a serum marker analysis (e.g. minimal invasiveness).

Objective

We aimed to evaluate the potential overexpression of Gal-3 in sera from patients with confirmed diagnosis of papillary thyroid carcinoma (PTC).

Patients and methods

We retrospectively investigated serum Gal-3 in 40 patients referred to the surgical department for thyroidectomy. Sera were collected before surgery. We quantified Gal-3 in sera of 40 patients (mean age 48.79 ± 14.15 years): 32 women (82.5%) and 7 men (17.5%). Patients were divided in 4 groups, based on the histopathological stage: nodular goiter, PTC1, PTC2, PTC3/4. Gal-3 was measured by Elisa (Abcam, UK); sensitivity 0.12 ng/ml, CV intra-assay 6.4%, CV inter-assay 11.4%. The study was approved by Ethics Committee of the Institute.

Results

31 patients showed different PTC stages at histopathological exam, as follows: 10 PTC1, 10 PTC2 and 11 PTC3/4, respectively; 9 patients were diagnosed with benign nodular goiter. (Figure 1)

Fig.1 Histopathological diagnosis distribution

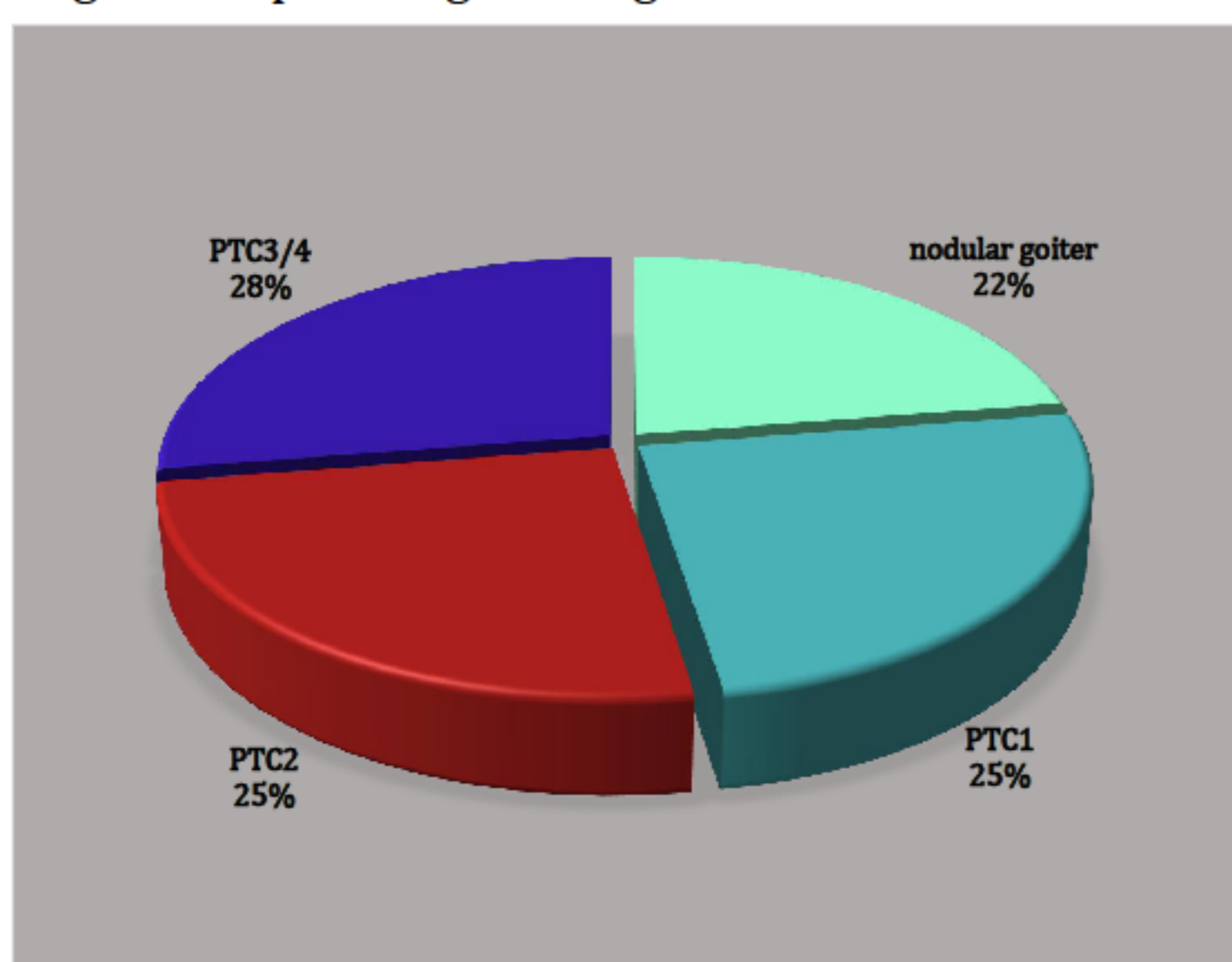


Table 1. Serum Gal-3 before surgery

Group	No of patients	GAL-3 (ng/ml)				p-value (vs. nodular goiter)
		Mean	Std. Dev.	Median	Range	
PTC1	10	8.23	3.48	8.751	3.65-13.02	0.047
PTC2	10	7.43	3.25	6.65	3.44-12.79	0.104
PTC3/4	11	8.81	2.83	9.069	3.85-12.38	0.0097
All cancers	31	8.18	3.13	8.427	3.44-13.02	0.0197
Nodular goiter	9	5.046	3.09	4.402	0.53-9.64	-

We found a significant difference between overall cancers and those with benign thyroid tumors (median Gal-3 - 8.427 ng/ml vs. 4.402 ng/ml, $p=0.019$), (Figure 2). There were also significant differences between PTC3/4 and nodular goiter (median Gal-3 - 9.069 ng/ml vs. 4.402 ng/ml, $p=0.0097$), and between PTC1 and nodular goiter, respectively (median Gal-3 - 8.751 ng/ml vs. 4.402 ng/ml, $p=0.047$).

Fig.2 Gal-3 median values in multinodular goiter and in thyroid cancer cases

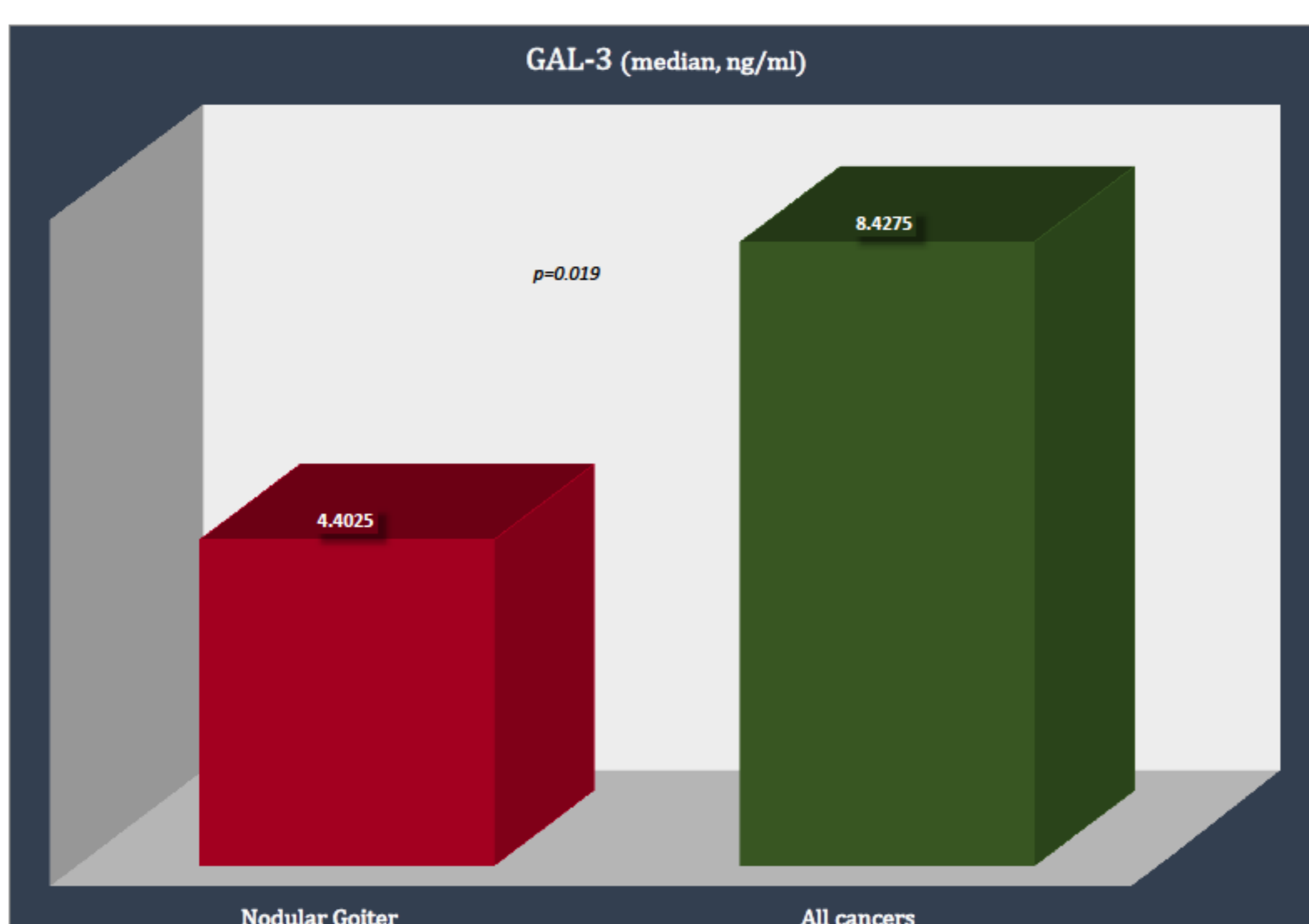


Fig.3 Gal-3 median values in nodular goiter and thyroid cancer patients

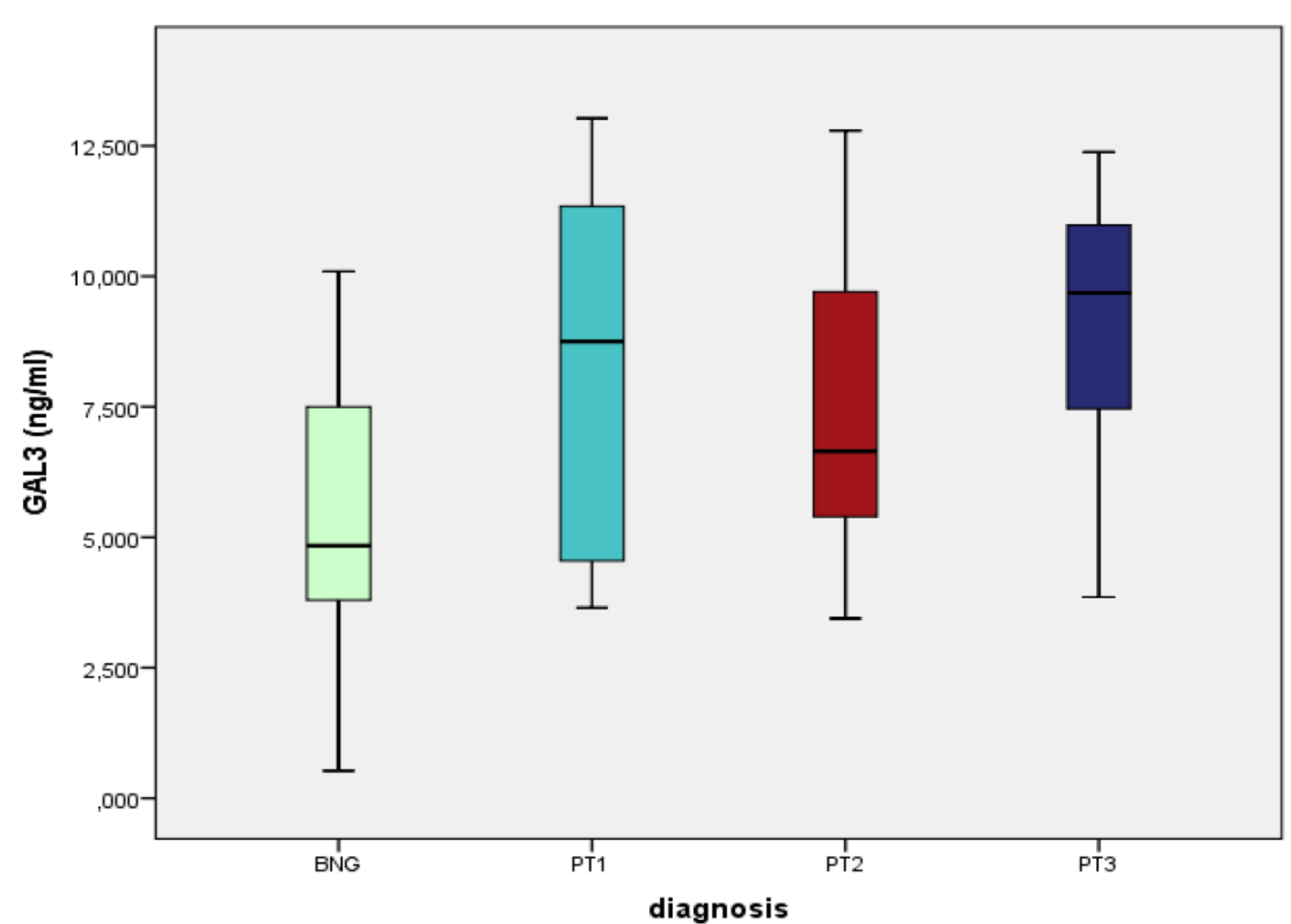
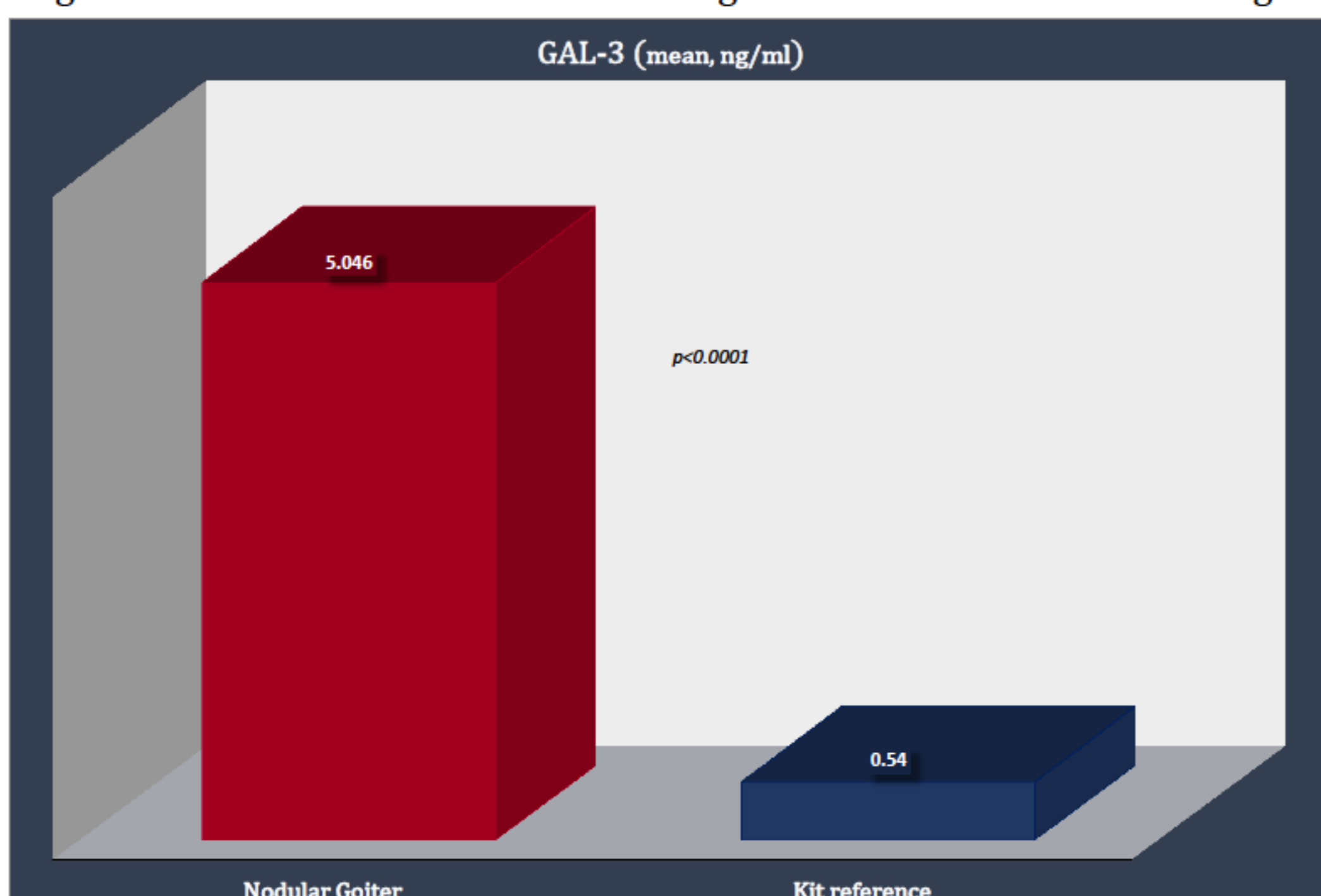


Fig.4 Gal-3 mean values in multinodular goiter vs Elisa kit reference range



In our study, we noticed higher values in the nodular goiter group vs. reference ranges of the kit (mean 5.046 (2.28-7.81) ng/ml vs. 0.54 (0-2.28) ng/ml, $p<0.0001$). (Figure 4)

However, serum Gal-3 did not discriminate between different PTC stages.

Intra-assay CV% in our hands was 3.57%.

Conclusions

Our results showed a significant difference between serum Gal-3 levels in PTC patients and those with benign pathology.

Our preliminary data showed no association of serum Gal-3 with tumor aggressiveness.

Serum Gal-3 might be considered as an early circulating tumor marker in thyroid cancer.

Bibliography

Makki F.M. et al. Serum biomarkers of papillary thyroid cancer. Journal of Otolaryngology - Head and Neck Surgery 2013, 42:16

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