

SERUM CALCITONIN, THYROTROPIN, AND GOITER



SAPIENZA
UNIVERSITÀ DI ROMA

Giorgio Grani, Mimma D'Alessandri, Marianna Del Sordo, Giovanni Carbotta,
Martina Vitale, Angela Fumarola
Dept. of Experimental Medicine – Endocrinology Unit – Sapienza University of Rome

BACKGROUND

Recent papers reported that basal calcitonin (CT) level may be related to thyroid volume. This study aims to evaluate if this finding is confirmed in patients undergoing ultrasonography-guided fine-needle aspiration cytology (FNAC) for thyroid nodules.

METHODS

From February 2010 to September 2012, 561 patients underwent ultrasonography-guided FNAC and a complete evaluation including basal serum FT4, FT3, TSH, CT and estimation of the thyroid volume.

Design: Retrospective university-center study.

RESULTS

The mean thyroid volume was 21.10 ± 9.58 mL in males and 13.42 ± 6.48 mL in females ($p < 0.001$). Thyroid was found to be atrophic in 18 cases and goiter was diagnosed in 128 patients. A linear regression analysis was performed between serum CT levels and thyroid volume, showing a **weak direct relationship** ($R^2 = 0.023$, $p < 0.001$). There is no correlation between serum TSH and CT levels. In patients grouped according to morphologic diagnosis (atrophy, normal volume and goiter), CT levels are slightly higher in the high-volume groups: the mean value was 2.02 ± 0.09 in the atrophy group, 2.86 ± 1.73 in the normal volume group, and 3.00 ± 1.66 in the goiter group ($p = 0.02$). When males and females are computed separately the statistical significance is lost.

CONCLUSIONS

The small difference in basal CT levels is probably due to a genetically determined higher thyroid volume and increased number of C-cells rather than to an acquired goiter. Gender may act as a “surrogate marker” of thyroid volume and the application of a gender-specific cut-off can probably overcome this issue.

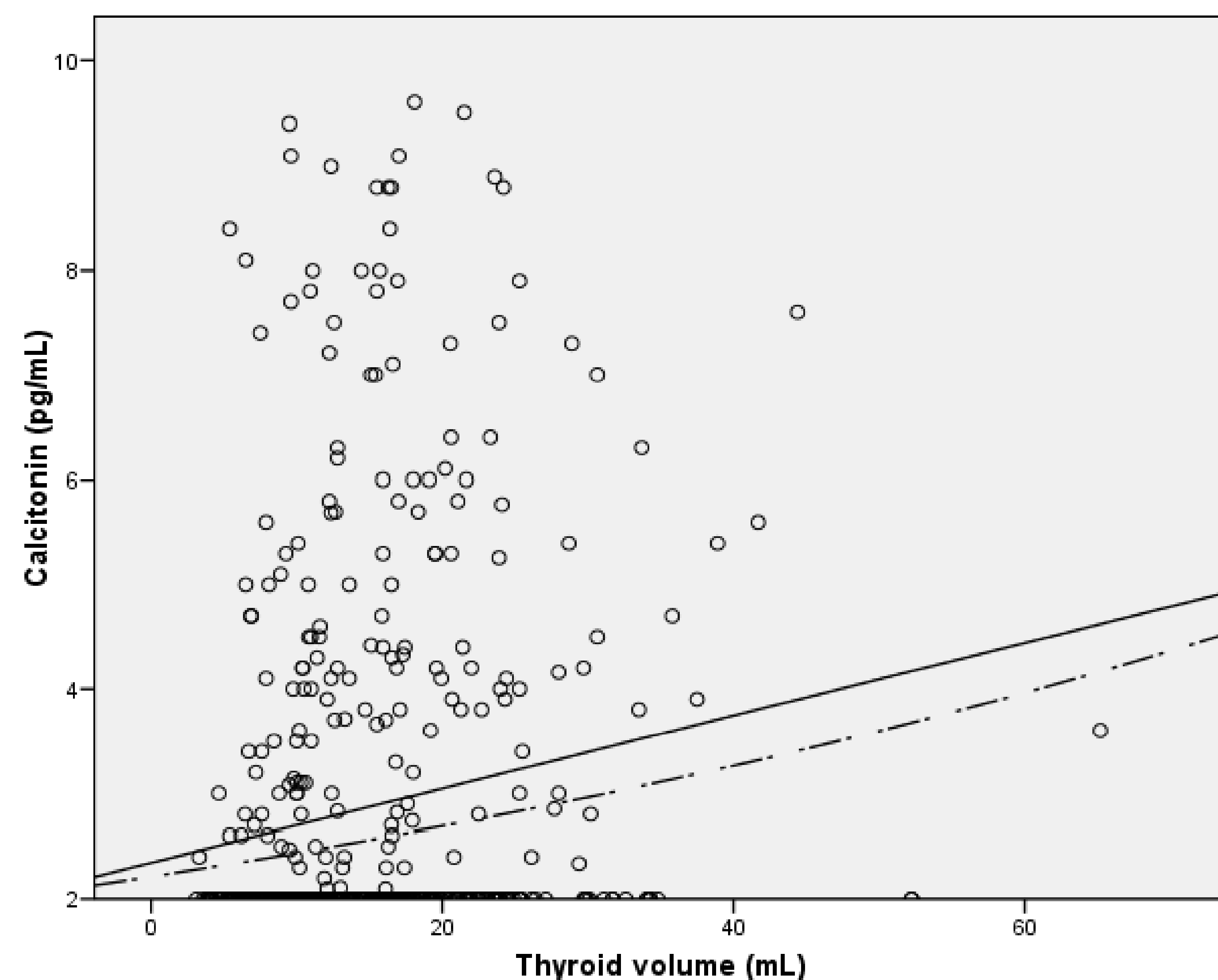
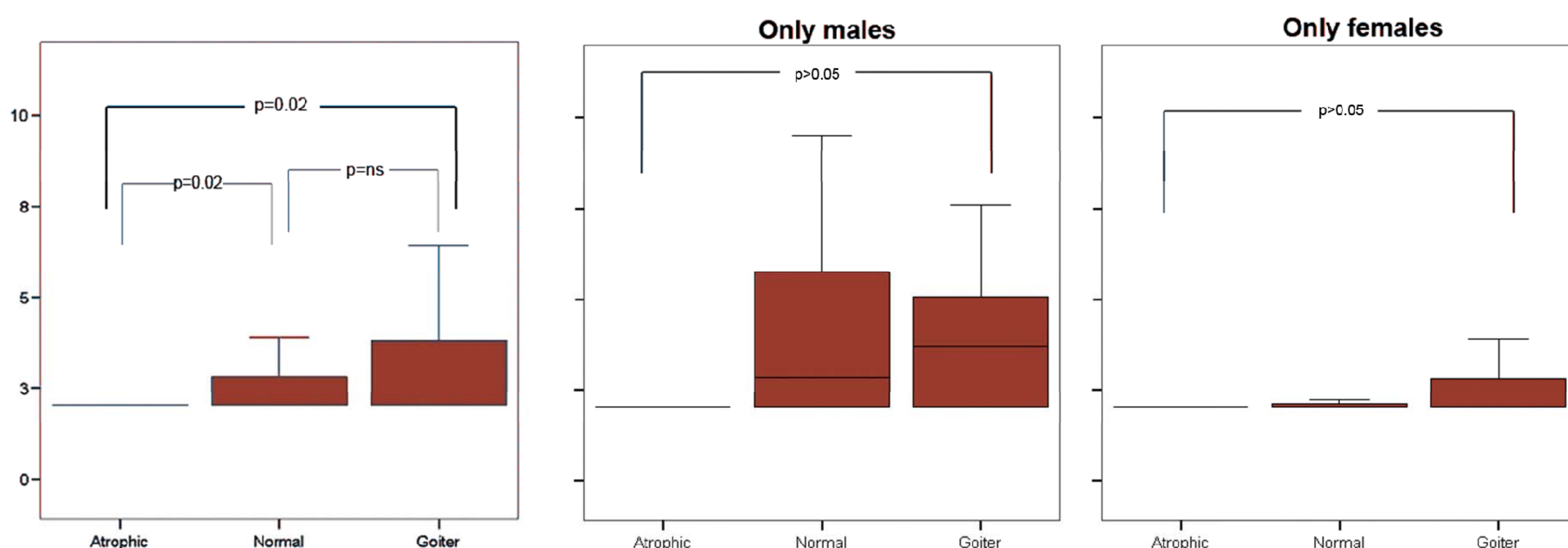


Figure 1: Relationship between CT values and thyroid volume; linear (solid line) and exponential (dashed line) regressions ($R^2 = 0.025$ and 0.03 respectively, $p < 0.001$)

Figure 2: Median serum CT value in patients grouped by thyroid volume. The box represents the interquartile range. The line across the box marks the median.

Glands with an estimated volume < 4.5 mL (females) and < 5.5 mL (males) were considered atrophic; meanwhile thyroid volume > 18 mL in women and > 25 mL in men, which corresponds to the mean + 3SD in iodine-sufficient population, was diagnosed as goiter

REFERENCES

- Martín-Lacave, I., Borrero, M.J., Utrilla, J.C., Fernández-Santos, J.M., de Miguel, M., Morillo, J., Guerrero, J.M., García-Marín, R. & Conde, E. (2009) C cells evolve at the same rhythm as follicular cells when thyroïdal status changes in rats. *J Anat* 214, 301-309.
- Giovanella, L., Imperiali, M., Ferrari, A., Palumbo, A., Lippa, L., Peretti, A., Graziani, M.S., Castello, R. & Verburg, F.A. (2012) Thyroid volume influences serum calcitonin levels in a thyroid-healthy population: results of a 3-assay, 519 subjects study. *Clin Chem Lab Med* 50, 895-900.

