

# Determinants of circulating calcitonin value in a population with histological exclusion of medullary thyroid carcinoma



Trimboli P <sup>1,2</sup>, Pelsoni G <sup>3</sup>, Confalonieri D <sup>3</sup>, Gamarra E <sup>1</sup>, Piticchio T <sup>4</sup>, Frasca F <sup>4</sup>, Makovac P <sup>3</sup>, Piccardo A <sup>5</sup>, Ruinelli L <sup>1,6,7</sup>

<sup>1</sup> Servizio di Endocrinologia e Diabetologia, Ospedale Regionale di Lugano, Ente Ospedaliero Cantonale (EOC), 6900, Lugano, Switzerland

<sup>2</sup> Facoltà di Scienze Biomediche, Università della Svizzera Italiana (USI), 6900, Lugano, Switzerland

<sup>3</sup> Servizio di Chirurgia, Ospedale Regionale di Mendrisio, Ente Ospedaliero Cantonale (EOC), 6900, Lugano, Switzerland

<sup>4</sup> Endocrinology Section, Department of Clinical and Experimental Medicine, Garibaldi Nesima Hospital, University of Catania, Catania, Italy

<sup>5</sup> Servizio di Medicina Nucleare, E.O. "Ospedali Galliera", Gneoa, Italy

<sup>6</sup> Team Data Science & Research, Area ICT, Ente Ospedaliero Cantonale, 6500, Bellinzona, Switzerland

<sup>7</sup> Clinical Trial Unit, Ente Ospedaliero Cantonale (EOC), Bellinzona, Switzerland



## Introduction

Calcitonin (Ctn) measurement is crucial “for” the early diagnosis of medullary thyroid carcinoma (MTC). However, Ctn levels can be skewed/elevated due to other reasons and its upper reference value remains debated. In this field, studies have heterogenous setting, published data controversial, and no evidence has been achieved. Study aim was to evaluate all previously investigated Ctn determinants in a population with histological exclusion of MTC.

## Methods

The institutional records from 2010 to 2022 were reviewed to select patients with thyroid nodules, undergone total thyroidectomy with histological exclusion of MTC, and tested “for” Ctn just before surgery. Thyroid features, demographic and anthropometric data, comorbidities, medications, and lifestyle information were collected. Univariate and multivariate analyses were performed. No funding supported this study.

## Results

127 cases were included. Median age on thyroidectomy was 51 years. Median Ctn was 1.04 pg/mL (IQR 1.04-2.77) with two cases having value above 10 pg/mL. In univariate analysis, Ctn was correlated with gender ( $p < 0.001$ , see Fig. 1), body weight ( $p = 0.016$ ), height ( $p = 0.031$ ), body surface area ( $p = 0.016$ , see Fig. 2), thyroid size ( $p = 0.03$ ), thyroglobulin ( $p < 0.001$ ), and chronic kidney disease ( $p < 0.001$ ). After multivariate analysis, the model with highest accuracy included gender, chronic kidney disease, and TSH with adjusted R-squared of 0.4.

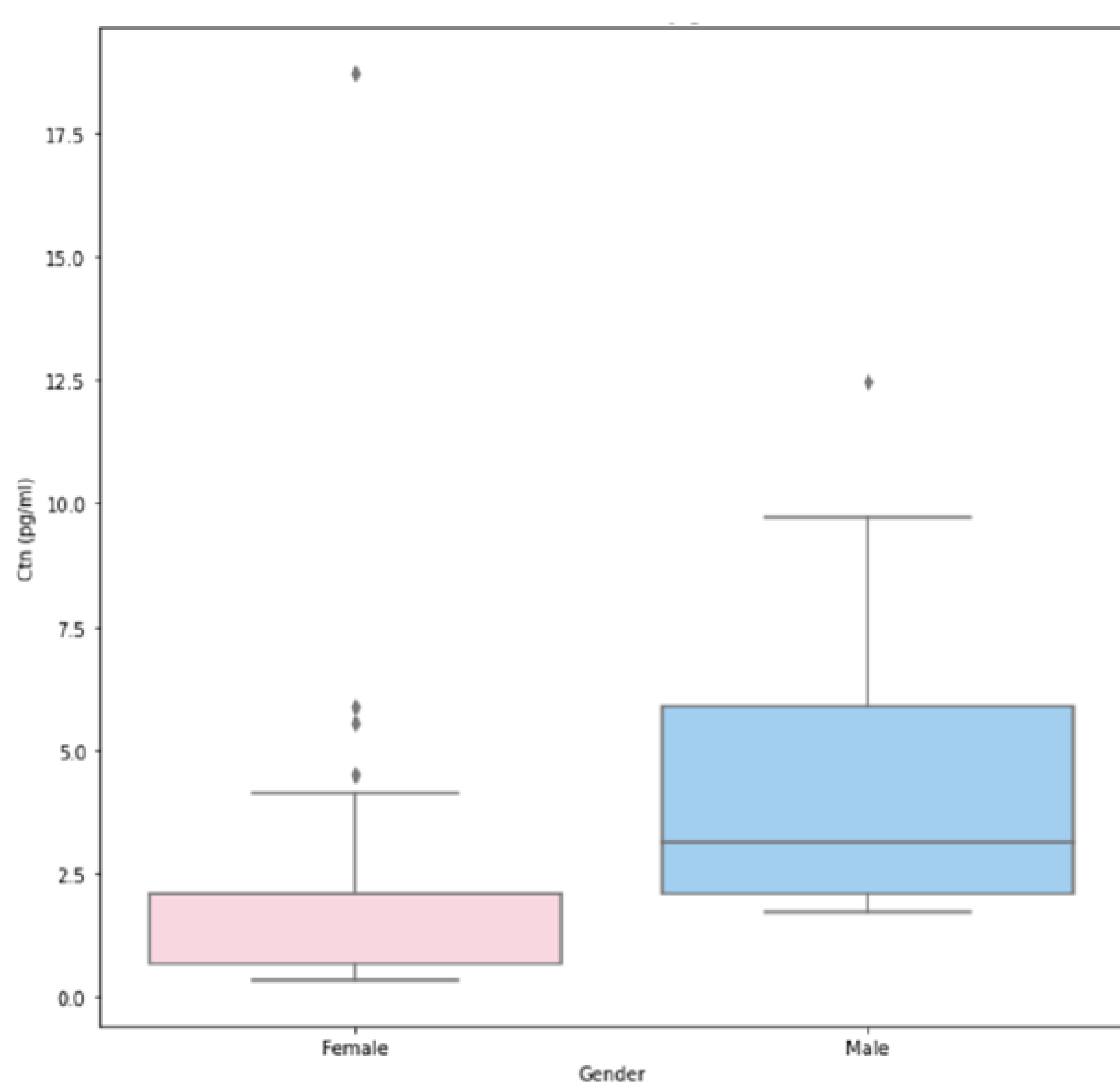


Fig.1 – Ctn values of male compared to female

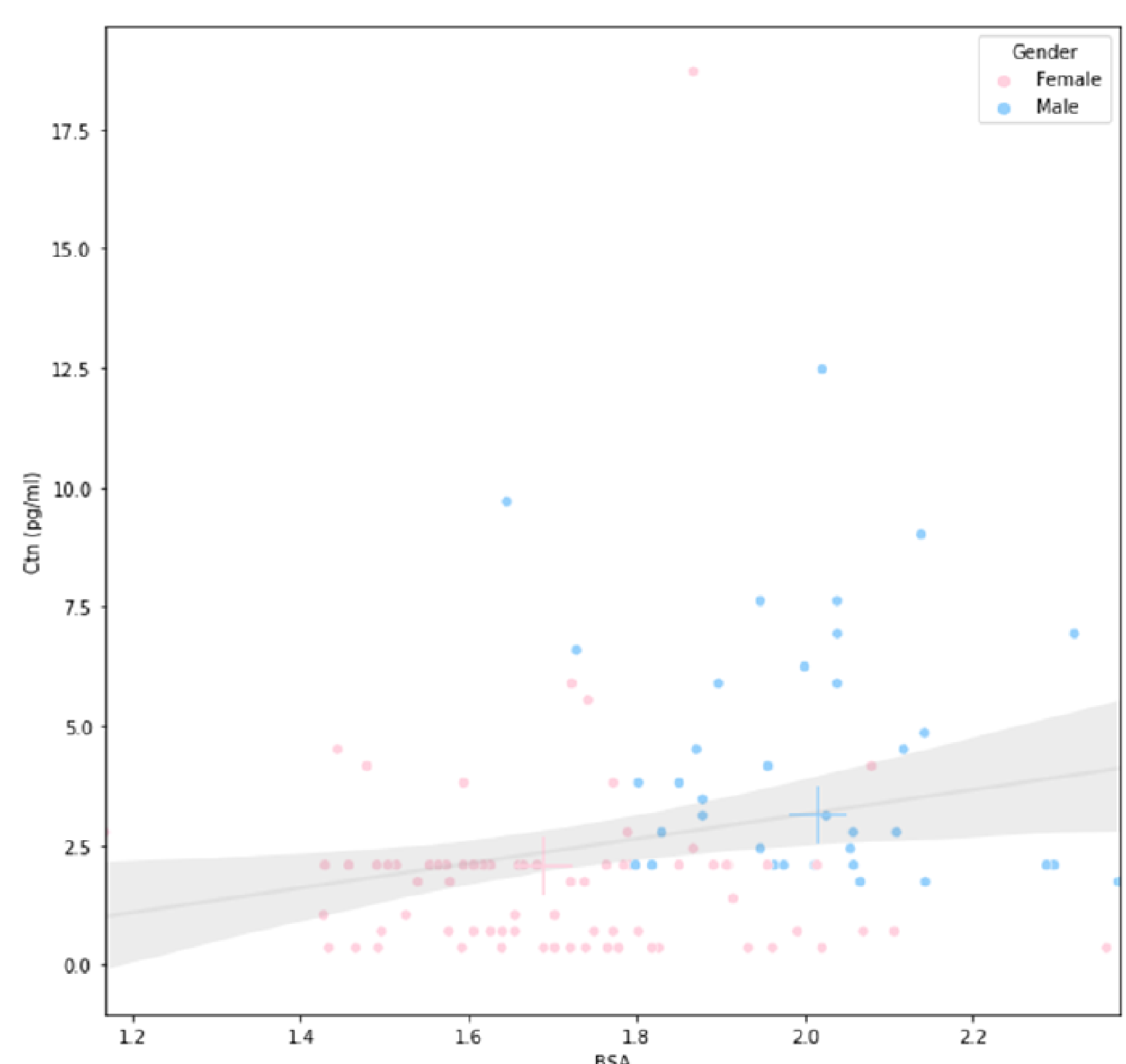


Fig. 2 – Correlation between BSA and Ctn

## Conclusions

This study demonstrates, in a population histologically proven as MTC-free, that Ctn value is mainly influenced by gender, anthropometric/thyroid features, and chronic kidney disease, with further impact of TSH.