



Response to the Letter to the Editor by Dr. Rosario: “The calcium-to-phosphorous (Ca/P) ratio in the diagnosis of primary hyperparathyroidism and hypoparathyroidism: a multicentric study”

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In reply to Dr Rosario, we would like to thank Dr Rosario for his interest in our article and the constructive comments [1]. Focusing on the diagnosis of normocalcemic primary hyperparathyroidism (NPHPT), the use of ionized Ca (iCa) is recommended in those patients with normal total calcium (Ca) and elevated parathyroid hormone, especially in the absence of an apparent cause of secondary hyperparathyroidism. Unfortunately, in our retrospective study [2] we did not report any data about iCa measurements since it was available only in few patients with NPHPT. For future research purposes, we agree with Dr Rosario that it would be interesting to analyze the sensitivity of calcium-to-phosphorus (Ca/P) ratio in NPHPT patients with normal iCa. Literature would have helped in exploring this issue. At present, biochemical characterization of NPHPT by using iCa is focused on the Ca × P product [3], which is an index so far studied only in nephropathic patients, but not on the Ca/P ratio.

However, from a clinical practical standpoint, the measurement of iCa can present several difficulties and it is not always accessible in the real-life setting. Although the sensitivity of Ca/P ratio is lower in patients with normocalcemia than in those with hypercalcemia, it is precisely in this context that the Ca/P ratio would gain value, representing a further unexpensive marker, easily applicable in

case of NPHPT suspicion. At the same time, in patients with either serum Ca or serum P within the normal range, the Ca/P ratio can help in detecting NPHPT, especially when managed by clinicians not skilled in Ca-P metabolism disorders.

In conclusion, we sincerely appreciate Dr Rosario’s suggestions to test the diagnostic performance of the Ca/P ratio in a particular setting of patients with NPHPT presenting both normal total Ca and iCa. Currently, we have just proposed the use of Ca/P ratio as a very simple index to be used when an alteration of the Ca-P metabolism is suspected in any healthcare context [2]. It should be highlighted that the Ca/P ratio alone is not sufficient to be diagnostic, as well as other recommended parameters, but they should be combined together. Indeed, the combined use of Ca/P ratio and serum Ca had the best diagnostic performance [2].

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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References

1. Rosário P.W. An analysis of calcium-to-phosphorus ratio in the diagnosis of normocalcemic primary hyperparathyroidism. *Endocrine* (2020)
2. B. Madeo, S. De Vincentis, A. Repaci, P. Altieri, V. Vicennati, E. Kara et al. The calcium-to-phosphorous (Ca/P) ratio in the diagnosis of primary hyperparathyroidism and hypoparathyroidism: a multicentric study. *Endocrine* **68**(3), 679–687 (2020)
3. A. Palermo, A.M. Naciu, G. Tabacco, S. Falcone, A. Santonati, D. Maggi et al. Clinical, Biochemical, and Radiological Profile of Normocalcemic Primary Hyperparathyroidism. *J. Clin. Endocrinol. Metab.* **105**(7), dgaa174 (2020)

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