

## Letters to the Editor

**Main challenges of electrolyte imbalance in older patients with COVID-19 and risk of QT prolongation****Principales desafíos del desequilibrio electrolítico en pacientes geriátricos con COVID-19 y riesgo de prolongación del intervalo QT****To the Editor,**

We read with interest the recent article published by Bonanad et al.<sup>1</sup>

The topic of this consensus document is valuable and important; however, we encountered ambiguities and questions in one part of the article.

In table 3 of the article, in the description of the adverse cardiovascular effects of drugs investigated for COVID-19 treatment, the authors state that correction of hyperkalemia and hypermagnesemia is vital, while correction of hypokalemia and hypomagnesemia may be particularly imperative since low serum levels of potassium and magnesium enhances the possibility of QT prolongation.<sup>2</sup>

Hypokalemia, probably by modification of ion potassium channel function, can prolong the QT interval in a manner that results in heterogeneity and dispersion of repolarization. Similarly, hypomagnesemia is a well-established predisposing risk factor for torsade de pointes.<sup>3</sup> In addition, potassium deficiency seems to be common in severe coronavirus disease 2019 (COVID-19).<sup>4</sup> Several findings indicated that serum potassium should be maintained in the high normal range

(4.5–5.0 mmol/L), although more evidence is needed to support this practice.<sup>3,5</sup>

Amir Rezazadeh<sup>a,b</sup> and Niayesh Mohebbi<sup>a,b,\*</sup>

<sup>a</sup>Department of Clinical Pharmacy, Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran

<sup>b</sup>Research Center for Rational Use of Drugs, Tehran University of Medical Sciences, Tehran, Iran

\* Corresponding author:

E-mail address: [nmohebbi@sina.tums.ac.ir](mailto:nmohebbi@sina.tums.ac.ir) (N. Mohebbi).

Available online 4 August 2020

**REFERENCES**

1. Bonanad C, García-Blas S, Tarazona-Santabalbina FJ, et al. Coronavirus: the geriatric emergency of 2020. Joint document of the Section on Geriatric Cardiology of the Spanish Society of Cardiology and the Spanish Society of Geriatrics and Gerontology. *Rev Esp Cardiol.* 2020;73:569–576.
2. Kallergis EM, Goudis CA, Simantirakis EN, Kochiadakis GE, Vardas PE. Mechanisms, risk factors, and management of acquired long QT syndrome: a comprehensive review. *ScientificWorldJournal.* 2012;2012:212178.
3. Drew BJ, Ackerman MJ, Funk M, et al. Prevention of torsade de pointes in hospital settings: a scientific statement from the American Heart Association and the American College of Cardiology Foundation endorsed by the American Association of Critical-Care Nurses and the International Society for Computerized Electrocardiology. *J Am Coll Cardiol.* 2010;55:934–947.
4. Lippi G, South AM, Henry BM. Electrolyte imbalances in patients with severe coronavirus disease 2019 (COVID-19). *Ann Clin Biochem.* 2020;57:262–265.
5. Thomas SH, Behr ER. Pharmacological treatment of acquired QT prolongation and torsades de pointes. *Br J Clin Pharmacol.* 2016;81:420–427.

<https://doi.org/10.1016/j.rec.2020.07.012>  
1885-5857/

© 2020 Sociedad Española de Cardiología. Published by Elsevier España, S.L.U. All rights reserved.

**SEE RELATED CONTENT:**

<https://doi.org/10.1016/j.rec.2020.05.001>

<https://doi.org/10.1016/j.rec.2020.08.018>

**Main challenges of electrolyte imbalance in older patients with COVID-19 and risk of QT prolongation. Response****Principales desafíos del desequilibrio electrolítico en pacientes geriátricos con COVID-19 y riesgo de prolongación del intervalo QT. Respuesta****To the Editor,**

We appreciate the interest and comments from Rezazadeh et al.<sup>1</sup> regarding our article, and we agree on the relevance of electrolyte imbalance in patients with coronavirus 2019 disease (COVID-19), in particular hypokalemia and hypomagnesemia; the reference to hyperkalemia and hypermagnesemia corresponds to a translation error in the document, which has already been corrected. We would

like to point out that hypokalemia, as well as hyponatremia and hypocalcemia, appear to be common in patients with severe clinical forms of COVID-19.<sup>2–4</sup> Infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) occurs thanks to the binding of the virus to angiotensin-converting enzyme 2, reducing the expression of the enzyme with a consequent increase in circulating angiotensin II, which promotes renal potassium loss.<sup>2,3,5</sup> In addition, the inflammatory state and gastrointestinal losses can contribute to these imbalances, with potentially significant consequences due to the association with arrhythmic events secondary to QT interval prolongation (especially torsade de pointes), the risk for which increases with the use of certain drugs and also with the inflammatory state itself.<sup>1,5,6</sup> The infection may also predispose to myocardial damage, especially in patients with existing cardiovascular disease.<sup>2,3</sup> The pathophysiological changes in aging make older patients particularly vulnerable to electrolyte imbalances, so adequate monitoring and early correction are essential.<sup>7</sup>

Clara Bonanad,<sup>a</sup> Pablo Díez-Villanueva,<sup>b,\*</sup> Sergio García-Blas,<sup>a</sup> and Manuel Martínez-Sellés<sup>c,d</sup>

**SEE RELATED CONTENT:**

<https://doi.org/10.1016/j.rec.2020.07.012>

<sup>a</sup>Servicio de Cardiología, Hospital Clínico Universitario de Valencia, Valencia, Spain

<sup>b</sup>Servicio de Cardiología, Hospital Universitario de La Princesa, Madrid, Spain

<sup>c</sup>Servicio de Cardiología, Hospital General Universitario Gregorio Marañón, Universidad Europea, Universidad Complutense, Madrid, Spain

<sup>d</sup>Centro de Investigación en Red de Enfermedades Cardiovasculares (CIBERCV), Spain

\* Corresponding author:

E-mail address: [pablo\\_diez\\_villanueva@hotmail.com](mailto:pablo_diez_villanueva@hotmail.com)

(P. Díez-Villanueva).

Available online 1 October 2020

## REFERENCES

1. Bonanad C, García-Blas S, Tarazona-Santabalbina FJ, et al. Coronavirus: the geriatric emergency of 2020 Joint document of the Section on Geriatric Cardiology of the

Spanish Society of Cardiology and the Spanish Society of Geriatrics and Gerontology. *Rev Esp Cardiol.* 2020;73:569–576.

2. Lippi G, South AM, Henry BM. Electrolyte imbalances in patients with severe coronavirus disease 2019 (COVID-19). *Ann Clin Biochem.* 2020;57:262–265.
3. Chen D, Li X, Song Q, et al. Assessment of hypokalemia and clinical characteristics in patients with coronavirus disease 2019 in Wenzhou China. *JAMA Network Open.* 2020;3:e2011122.
4. Wang D, Li R, Wang J, et al. Correlation analysis between disease severity and clinical and biochemical characteristics of 143 cases of COVID-19 in Wuhan China: a descriptive study. *BMC Infect Dis.* 2020;20:519.
5. Clerkin KJ, Fried JA, Raikhelkar J, et al. COVID-19 and cardiovascular disease. *Circulation.* 2020;141:1648–1655.
6. Lazzarini PE, Acampa M, Laghi-Pasini F, et al. Cardiac arrest risk during acute infections: systemic inflammation directly prolongs QTc interval via cytokine-mediated effects on potassium channel expression. *Circ Arrhythm Electrophysiol.* 2020. <https://doi.org/10.1161/CIRCEP.120.008627>
7. Schlanger LE, Bailey JL, Sands JM. Electrolytes in the aging. *Adv Chronic Kidney Dis.* 2010;17:308–319.

<https://doi.org/10.1016/j.rec.2020.08.018>  
1885-5857/

© 2020 Sociedad Española de Cardiología. Published by Elsevier España, S.L.U. All rights reserved.

## Neurohormonal treatment in tako-tsubo cardiomyopathy precipitated by COVID-19



### Tratamiento neurohormonal en miocardiopatía de tako-tsubo precipitada por COVID-19

#### To the Editor,

We read with interest the case report by Oyarzabal et al.<sup>1</sup> on tako-tsubo cardiomyopathy precipitated by the novel coronavirus disease 2019 (COVID-19). The reported case study should raise awareness among clinicians regarding the diversity of cardiovascular complications associated with COVID-19, which now includes tako-tsubo cardiomyopathy. Due to the rarity of this complication, it may be useful to document the treatment and clinical outcomes of such patients. Although Oyarzabal et al.<sup>1</sup> mentioned the use of neurohormonal treatment in their patient with tako-tsubo cardiomyopathy, the specifics of the regimen were not detailed.

Indeed, the evidence concerning the use of neurohormonal treatment in patients with tako-tsubo cardiomyopathy is thus far inconclusive. This treatment approach usually comprises beta-blockade or renin-angiotensin system inhibition. However, beta-blocker therapy has not been found to be effective in preventing the recurrence of tako-tsubo cardiomyopathy. In a systematic review and meta-analysis of the incidence and correlates of tako-tsubo cardiomyopathy recurrence, it was reported that the recurrence rate was independent of the clinical use of a beta-blocker.<sup>2</sup> In addition, over 30% of the 1750 patients in the International Takotsubo Registry study were receiving beta-blockers at the time when tako-tsubo cardiomyopathy developed.<sup>3</sup> The study also reported no evidence of a mortality benefit at 1 year with the use of a beta-blocker upon discharge after tako-tsubo cardiomyopathy admission. Moreover, in a retrospective analysis of 2672 patients with tako-tsubo cardiomyopathy, 423 of whom received beta-blocker therapy within the first 2 days of diagnosis,

there was no significant association between the use of beta-blockers and 30-day in-hospital mortality.<sup>4</sup>

There is mixed evidence on the use of a renin-angiotensin system blocker in patients with tako-tsubo cardiomyopathy. As reported in the International Takotsubo Registry study, the use of an angiotensin-converting enzyme inhibitor or angiotensin receptor blocker was associated with a survival benefit at 1 year.<sup>3</sup> However, a subsequent Mayo Clinic study that included 265 patients with tako-tsubo cardiomyopathy found that the use of an angiotensin-converting enzyme inhibitor at discharge was not a significant predictor of 1-year survival.<sup>5</sup>

It is nonetheless possible that the clinical outcomes associated with the use of neurohormonal treatment differ according to precipitating condition. Therefore, it would be useful for the authors to detail the treatment regimen of their patient, as well as the outcomes, to add to the literature regarding what treatments may or may not be valuable in tako-tsubo cardiomyopathy precipitated by COVID-19.

Chia Siang Kow<sup>a,\*</sup> and Syed Shahzad Hasan<sup>b,c</sup>

<sup>a</sup>School of Postgraduate Studies, International Medical University, Kuala Lumpur, Malaysia

<sup>b</sup>Department of Pharmacy, University of Huddersfield, Huddersfield, United Kingdom

<sup>c</sup>School of Biomedical Sciences & Pharmacy, University of Newcastle, Callaghan, Australia

\* Corresponding author:

E-mail address: [chiasiang\\_93@hotmail.com](mailto:chiasiang_93@hotmail.com) (C.S. Kow).

Available online 19 September 2020

## REFERENCES

1. Oyarzabal L, Gómez-Hospital JA, Comin-Colet J. Tako-tsubo syndrome associated with COVID-19. *Rev Esp Cardiol.* 2020;73:846.
2. Singh K, Carson K, Usmani Z, Sawhney G, Shah R, Horowitz J. Systematic review and meta-analysis of incidence and correlates of recurrence of takotsubo cardiomyopathy. *Int J Cardiol.* 2014;174:696–701.
3. Templin C, Ghadri JR, Diekmann J, et al. Clinical features and outcomes of takotsubo (stress) cardiomyopathy. *N Engl J Med.* 2015;373:929–938.

SEE RELATED CONTENT:

<https://doi.org/10.1016/j.rec.2020.06.022>

<https://doi.org/10.1016/j.rec.2020.09.024>