



Use of Spironolactone in SARS-CoV-2 ARDS Patients

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Dear Editor,

Since the end of 2019, a pandemic has emerged and spread around the globe with patients presenting with acute respiratory failure. The causative agent was defined as a novel coronavirus, hence Severe Acute Respiratory Coronavirus 2 (SARS-CoV-2), which has similar genetic properties compared with the previous outbreaks seen in the last two decades. It has affected more than a million patients and results in increased mortality, especially in elderly patients (1).

SARS-CoV-2 disturbs the mechanism of the renin-angiotensin-aldosterone (RAAS) system. RAAS is essential in regulating blood pressure, homeostasis and the electrolyte balance. SARS-CoV-2 enters the host cell, i.e. Type II pneumocytes, via an interaction between its spike proteins and Angiotensin Converting Enzyme II (ACE II) receptors. As a consequence these receptors downregulate, leading to disinhibition of Angiotensin Converting Enzyme I on the angiotensin II. Angiotensin II (AT-II) has a myriad of effects, both regional and systemic. A relative increase in the alveolar AT-II levels leads to pulmonary vasoconstriction, increase in capillary permeability, enhanced fibrosis and eventually cytokine storm. Also, it is a robust systemic vasoconstrictor and the primary inducer of aldosterone production (2).

In addition to hypoxemia, hypernatremia and hypokalaemia are also common in SARS-CoV-2 ARDS (3, 4). It is possible that the pathogenesis of the virus and the subsequent secondary hyperaldosteronism caused by increased AT-II levels might be responsible for the outcome (5, 6).

Spironolactone is an aldosterone antagonist which also has anti-inflammatory properties, and it is widely used in cardiac diseases (7, 8). In SARS-CoV-2 patients, diuretics like furosemide may have little value because of the profound electrolyte imbalance. On the other hand, spironolactone reverses this imbalance (9).

In addition to proning, use of neuromuscular blocking agents and a restrictive fluid policy, we opted for administration of spironolactone and observed an improvement in terms of oxygenation. A randomised controlled trial is on the way (NCT04345887) and we believe we may have an answer to this issue in close proximity.

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References

1. Alhazzani W, Møller MH, Arabi YM, Loeb M, Gong MN, Fan E, et al. Surviving Sepsis Campaign: guidelines on the management of critically ill adults with Coronavirus Disease 2019 (COVID-19). *Intensive Care Med* 2020; 1-4. [\[Crossref\]](#)
2. Busse LW, Wang XS, Chalikonda DM, Finkel KW, Khanna AK, Szerlip HM, et al. Clinical Experience With IV Angiotensin II Administration: A Systematic Review of Safety. *Read Online Crit Care Med Soc Crit Care Med* 2017; 45: 1285-94. [\[Crossref\]](#)
3. Gattinoni L, Chiumello D, Caironi P, Busana M, Romitti F, Brazzi L, et al. COVID-19 pneumonia: different respiratory treatment for different phenotypes? *Intensive Care Med* 2020; 1-4. [\[Crossref\]](#)
4. Yang Z, Liu J, Zhou Y, Zhao X, Zhao Q, Liu J. The effect of corticosteroid treatment on patients with coronavirus infection: a systematic review and meta-analysis. *J Infect* 2020; DOI: 10.1016/j.jinf.2020.03.062. [\[Crossref\]](#)
5. Busse LW, Chow JH, McCurdy MT, Khanna AK. COVID-19 and the RAAS-a potential role for angiotensin II? *Crit Care* 2020; 24: 136. [\[Crossref\]](#)
6. Cadejani FA. Can spironolactone be used to prevent COVID-19-induced acute respiratory distress syndrome in patients with hypertension? *Am J Physiol-Endocrinol Metab* 2020; 318: E587-8. [\[Crossref\]](#)
7. Barrera-Chimal J, Rocha L, Amador-Martínez I, Pérez-Villalva R, González R, Cortés-González C, et al. Delayed spironolactone administration prevents the transition from acute kidney injury to chronic kidney disease through improving renal inflammation. *Nephrol Dial Transplant* 2019; 34: 794-801. [\[Crossref\]](#)
8. Butler J, Anstrom KJ, Felker GM, Givertz MM, Kalogeropoulos AP, Konstam MA, et al. Efficacy and Safety of Spironolactone in Acute Heart Failure: The ATHENA-HF Randomized Clinical Trial. *JAMA Cardiol* 2017; 2: 950-8. [\[Crossref\]](#)
9. Desai AS, Liu J, Pfeffer MA, Claggett B, Fleg J, Lewis EF, et al. Incident Hyperkalemia, Hypokalemia, and Clinical Outcomes During Spironolactone Treatment of Heart Failure With Preserved Ejection Fraction: Analysis of the TOPCAT Trial. *J Card Fail* 2018; 24: 313-20. [\[Crossref\]](#)