



Letter to the Editor

Switching from sildenafil to riociguat in patients with persistent or inoperable chronic thromboembolic pulmonary hypertension

Guilherme Watte^{a,b}, Marcelo Mello^b, Stephan Altmayer^{b,*}, Bruno Hochhegger^a^a Postgraduate Program in Clinical Medicine, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, Brazil^b Pulmonary Hypertension Group, Hospital Santa Casa de Misericórdia de Porto Alegre, Porto Alegre, Rio Grande Do Sul, Brazil

ARTICLE INFO

Article history:

Received 19 August 2018

Accepted 21 September 2018

Keywords:

Chronic thromboembolic pulmonary hypertension

Sildenafil

Riociguat

Dear Editor,

We have read with interest the recent publication entitled “Sequential treatment with sildenafil and riociguat in patients with persistent or inoperable chronic thromboembolic pulmonary hypertension (CTEPH) improves functional class and pulmonary hemodynamics” by Darocha et al. [1]. The authors concluded replacing sildenafil with riociguat might improve hemodynamic parameters of patients with inoperable or persistent CTEPH.

We give merit to the authors for the initiative, but there are concerns with the conclusions of the present study. In one-group pre-posttest design, concluding that changes in the post-intervention scores (hemodynamics) are attributable to the independent variable (switching to riociguat) might be misleading. Since there is no control group, several uncontrolled effects (regression towards the mean, and especially lead-time bias) could have contributed to the statistical significance in the

study [2]; these limitations were not acknowledged. Another weaknesses were failing to report normality of the data – which could invalidate the use of paired *t*-tests (particularly in small samples) –, and using chi-squared for paired proportions instead of McNemar test [3]. Ideally, testing the dependent variable in each time point to compare the effect of different interventions would require models with analysis of variance (ANOVA), in which case a control group would also be necessary to control (those patients who remained on sildenafil) for the above-mentioned effects. In conclusion, the study reports an improvement of hemodynamics in CTEPH patients switched from sildenafil to riociguat, but we should acknowledge all limitations to the validity of the conclusions inherent to this particular design.

Conflict of interest

The authors report no relationships that could be construed as a conflict of interest.

References

- [1] S. Darocha, M. Banaszkiewicz, A. Pietrasik, et al., Sequential treatment with sildenafil and riociguat in patients with persistent or inoperable chronic thromboembolic pulmonary hypertension improves functional class and pulmonary hemodynamics, *Int. J. Cardiol.* 269 (2018) 283–288.
- [2] T.R. Knapp, Why is the one-group pretest-posttest design still used? *Clin. Nurs. Res.* 25 (2016) 467–472.
- [3] M. Eliasziw, A. Donner, Application of the McNemar test to non-independent matched pair data, *Stat. Med.* 10 (1991) 1981–1991.

* Corresponding author at: Pulmonary Hypertension Group, Santa Casa de Porto Alegre, Av. Independência, 75, Porto Alegre, Rio Grande Do Sul 90020-160, Brazil.
URL's: marcelo@haprs.com.br (M. Mello), stephanp@ufcspa.edu.br (S. Altmayer), brunoho@ufcspa.edu.br (B. Hochhegger).