



Letter to the Editor

## Ramipril for left ventricular diastolic function in patients with pulmonary regurgitation after repair of tetralogy of Fallot



Lin Xie, Ke Lin \*

Department of Cardiovascular Surgery, West China Hospital, Sichuan University, Chengdu, Sichuan, PR China

### ARTICLE INFO

#### Article history:

Received 26 October 2018

Accepted 2 November 2018

#### Keywords:

Ramipril

Left ventricular diastolic function

Tetralogy of Fallot

Krupickova S et al.'s perspective article about Ramipril treatment and left ventricular (LV) diastolic function in stable patients with pulmonary regurgitation after repair of tetralogy of Fallot (TOF) deserved comment [1].

First, only subjects without significant pulmonary stenosis (peak Doppler pulmonary artery or CMR derived velocity  $\leq 3$  m/s), known coronary artery disease were excluded. It is possible that lesser but nonetheless important residual hemodynamic lesions may have contributed to the variance in LV outcomes such as aortic regurgitation and ascending aorta dilatation [2]. Because TOF has unique feature of enhanced aortic pressure wave reflection and excessive ascending aortic dilatation, the pressure wave reflection in adults with repaired TOF has a negative impact on LV function, particularly on diastolic function. [3]

Second, as the author described in the paper, ramipril may be targeting myocardial fibrosis in TOF. However, once ventricular fibrosis has developed, as the molecular correlate of restrictive physiology, it cannot be reversed with ARBs [4]. We think it will be better if the extent of fibrosis was evaluated in the study protocol for cardiac MRI.

In summary, the research has shown that ramipril treatment appears to limit progression of both diastolic and systolic LV function in adults late after tetralogy of Fallot repair. Indeed, the degree to which the RAAS is altered in TOF remains to be determined, because reliance on data from studies on right ventricular failure can be misleading [5]. Further research is needed to elucidate the ramipril treatment in

symptomatic patients with worse LV function and longterm result of LV function after ramipri treatment.

### Competing interests

None declared.

### References

- [1] S. Krupickova, W. Li, M.H. Cheang, M.L. Rigby, A. Uebing, P. Davlouros, et al., Ramipril and left ventricular diastolic function in stable patients with pulmonary regurgitation after repair of tetralogy of Fallot, *Int. J. Cardiol.* 272 (2018) 64–69.
- [2] J.L. Tan, P.A. Davlouros, K.P. McCarthy, M.A. Gatzoulis, S.Y. Ho, Intrinsic histological abnormalities of aortic root and ascending aorta in tetralogy of Fallot: evidence of causative mechanism for aortic dilatation and aortopathy, *Circulation* 112 (2005) 961–968.
- [3] Y. Shiina, T. Murakami, N. Kawamatsu, K. Niwa, Aortopathy in adults with tetralogy of Fallot has a negative impact on the left ventricle, *Int. J. Cardiol.* 228 (2017) 380–384.
- [4] S. Reddy, D. Bernstein, J.W. Newburger, Renin-angiotensin-aldosterone system inhibitors for right ventricular dysfunction in tetralogy of Fallot: quo vadis? *Circulation* 137 (2018) 1472–1474.
- [5] L. Ait Ali, C. Trocchio, R. Crepaz, J. Stuefer, N. Stagnaro, V. Siciliano, et al., Left ventricular dysfunction in repaired tetralogy of Fallot: incidence and impact on atrial arrhythmias at long term-follow up, *Int. J. Card. Imaging* 32 (2016) 1441–1449.

\* Corresponding author at: No. 37 Guo Xue Xiang, Chengdu, Sichuan 610041, PR China.  
E-mail addresses: [xie51871071@163.com](mailto:xie51871071@163.com) (L. Xie), [pangzai356249@126.com](mailto:pangzai356249@126.com) (K. Lin).