

Clinical perspective for wasting in diaphragm, an ever-trained muscle

Dear Editor,

We read with great interest the recent article comparing the mechanisms under muscle wasting in quadriceps and diaphragm using an animal model by Mangner *et al.*¹ While muscle wasting in heart failure (HF) patients is associated with poor exercise capacity and prognosis, current clinical evidences in therapeutic approach have been limited to ones by exercise training.^{2,3} As the author referred in their introduction, however, the function in diaphragm may be impaired in HF even though HF may induce 'training-like' benefit on diaphragm. This notion suggests that there may be some possible mechanisms other than deconditioning under wasting in diaphragm, and the results in this article would be one of them, namely, lack of elevation in oxidative enzyme activity in diaphragm.¹ Besides, malnutrition may disrupt the effect of exercise training,⁴ and anabolic hormone may be insufficient in some patients.⁵ In a recent clinical research,⁶ the prognostic impact of respiratory muscle wasting was not consistent with the results from studies in 1990s,^{7,8} suggesting heterogeneity in the significance of respiratory muscle wasting in HF patients, which may not have been observed in animals. In limb muscle on the other hand, deconditioning may prevalently exist under wasting and attenuate the heterogeneity in the prognostic significance of wasting. Taken together, much more evidence will be needed until we can estimate if

respiratory muscle wasting would be an important therapeutic target in HF patients.

Acknowledgements

M. Konishi, J. Ishida, M. Saitoh and J. Springer declare that they have no conflict of interest.

The authors certify that they comply with the ethical guidelines for publishing in the Journal of Cachexia, Sarcopenia and Muscle: update 2015.⁹

Masaaki Konishi

*Innovative Clinical Trials, Department of Cardiology and Pneumology
University of Göttingen Medical School, Göttingen, Germany
m_koni524@hotmail.com*

Junichi Ishida

*Innovative Clinical Trials, Department of Cardiology and Pneumology
University of Göttingen Medical School, Göttingen, Germany*

Masakazu Saitoh

*Innovative Clinical Trials, Department of Cardiology and Pneumology
University of Göttingen Medical School, Göttingen, Germany*

Jochen Springer

*Innovative Clinical Trials, Department of Cardiology and Pneumology
University of Göttingen Medical School, Göttingen, Germany*

References

1. Mangner N, Weikert B, Bowen TS, Sandri M, Holtriengel R, Erbs S, et al. Skeletal muscle alterations in chronic heart failure: differential effects on quadriceps and diaphragm. *J Cachexia Sarcopenia Muscle* 2015;6:381–90.
2. Morley JE, von Haehling S, Anker SD. Are we closer to having drugs to treat muscle wasting disease? *J Cachexia Sarcopenia Muscle* 2014;5:83–7.
3. Bowen TS, Schuler G, Adams V. Skeletal muscle wasting in cachexia and sarcopenia: molecular pathophysiology and impact of exercise training. *J Cachexia Sarcopenia Muscle* 2015;6:197–207.
4. Wakabayashi H, Sakuma K. Rehabilitation nutrition for sarcopenia with disability: a combination of both rehabilitation and nutrition care management. *J Cachexia Sarcopenia Muscle* 2014;5:269–77.
5. Josiak K, Jankowska EA, Piepoli MF, Banasiak W, Ponikowski P. Skeletal myopathy in patients with chronic heart failure: significance of anabolic-androgenic hormones. *J Cachexia Sarcopenia Muscle* 2014;5:287–96.

6. Habedank D, Meyer FJ, Hetzer R, Anker SD, Ewert R. Relation of respiratory muscle strength, cachexia and survival in severe chronic heart failure. *J Cachexia Sarcopenia Muscle* 2013;**4**:277–85.
7. Meyer FJ, Borst MM, Zugck C, Kirschke A, Schellberg D, Kubler W, et al. Respiratory muscle dysfunction in congestive heart failure: clinical correlation and prognostic significance. *Circulation* 2001;**103**: 2153–8.
8. Witt C, Borges AC, Haake H, Reindl I, Kleber FX, Baumann G. Respiratory muscle weakness and normal ventilatory drive in dilative cardiomyopathy. *Eur Heart J* 1997; **18**:1322–8.
9. von Haehling S, Morley JE, Coats AJS, Anker SD. Ethical guidelines for publishing in the Journal of Cachexia, Sarcopenia and Muscle: update 2015. *J Cachexia Sarcopenia Muscle* 2015; **6**:315–6.