Galectin-3: a new promising cardiac biomarker in sports endurance?

Le Goff C.1, Devaux S.1, Brevers E., Feeters S.1, Kaux J.-F.2, Fillet M.3, Melon P.4, Cavalier E.1

1 Department of Clinical Chemistry, University Hospital of Liege, Belgium
2 Department of Motility Sciences, University of Liege, Belgium
3 Department of Analytical Pharmaceutical Chemistry, University of Liege, Belgium
4 Department of Cardiology, University Hospital of Liege, Belgium

Purpose:
Galectin-3 (Gal-3) is well-known as a very interesting biomarker for heart failure and myocardial fibrosis. Gal-3 is a carbohydrate binding lectin produced by macrophages, upregulated in hypertrophied heart, emerging as an important mediator for fibrosis development and cardiac remodeling. We aimed to examine the evolution of Gal-3 in some endurance runners compared to sedentary subjects and the correlation of its evolution with other cardiac and renal biomarkers.

Methods:
- Twenty-eight males (mean age 37 ± 8.5 yo), 9 healthy non-elite marathon runners (42 km), 10 ultratour runners (67 km) and 9 sedentary subjects (10 km, <2h of sport/week).
- Blood samples were taken just before (T0), just after (T1) and 3 hours (T3) after the race.
- The biomarkers used for the correlation were: highly sensitive troponin T (TnThs), N-terminal-pro brain natriuretic peptide (NT-proBNP), myoglobin (MYO), myeloperoxydase (MPO), cystatine C (CYSC), creatinin (Cr).
- The analyses were performed on the VIDAS (Biomerieux) and COBAS (Roche Diagnostics) according to the manufacturer’s specifications. The study was approved by the Ethical Committee of our University Hospital.

Results:
The concentration of all biomarkers measured in the post-race (T1 and T3) samples was remarkably increased, compared with the values obtained on baseline (T0) specimens. Plasma Gal-3 increased from baseline to post exercise and decreased in the 3 hours after the end of the exercise. Indeed, at T1, we observed that the level is higher in marathon runner (mean at T1 = 25 ± 5.08 ng/ml) than in ultratour (mean at T1 = 18.7 ± 4.45ng/ml) and in the sedentary runners (mean at T1 = 11.88 ± 2.09 ng/ml). The concentrations obtained for the marathon runners at T1 could be considered as a risk predictor of cardiovascular event in the general population.

Interestingly, baseline plasma levels of Gal-3 were in normal range but higher than in healthy sedentary controls. There is a correlation between the increase of Gal-3 and TnThs, NT-proBNP, MYO, MPO, CYSC, Cr.

Conclusions:
The results of this study demonstrate that exercises of different intensity are associated with biochemical abnormalities that may reflect adverse consequences on cardiac structure as fibrosis and biology.