

# CARDIAC TROPONINS AND NATRIURETIC PEPTIDES IN RUNNERS: USEFUL FOR CARDIAC RISK SCREENING?

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## Background:

Our aim was to compare cTnT and NT-proBNP levels before and after the stress tests, in sportive subjects. Cardiac troponins (cTn) are considered as the best biomarkers for detection of myocardial cell injury and NT-proBNP as the best for the cardiac insufficiency.

## Materials and Methods:

Two populations were compared

- a group of 28 marathon runners (44,1 ± 8,37 years old)
- a group of 33 ultra-trail runners (45,8 ± 8,7 years old)

Three blood tests were drawn

- one just before
- one just after
- the last three hours after the end of the race

Two cardiac biomarkers were measured:

- Highly Sensitive Troponin T
- Natriuretic peptide (NT-proBNP)



Main outcome measurements: cTnT concentrations were measured by high sensitive methods (hsTnT, Roche Diagnostics) on heparin plasma. The NT-proBNP was also determined with the kit Roche on heparin plasma. The ultra-trail runners will be subject to an echocardiography and an ECG pre- and post-race. All statistical analyses were performed using Medcalc version 8.1 for Windows. P-value <.01 was regarded as statistically significant.

## Results (Table 1) :

A significant difference between hsTnT concentrations at T0 and T1 (P<.001), and between T0 and T3 (P<.001) for NT-proBNP have been observed, but not between T1 and T3 (Figure 1). This observation appeared only after a strenuous exercise. However, up to now this type of exercise is not reproducible easily in a laboratory. Moreover, nobody knows if these observations would have cardiac consequences at long terms.

Medical imaging in ultra-trail runners present cardiac adaptations to endurance training, as left ventricular hypertrophy (LVH) and incomplete right bundle branch block (IRBBB). A decrease of systolic and diastolic volumes of the left ventricle and a decrease of longitudinal strain were observed by echocardiography at the end of the race.

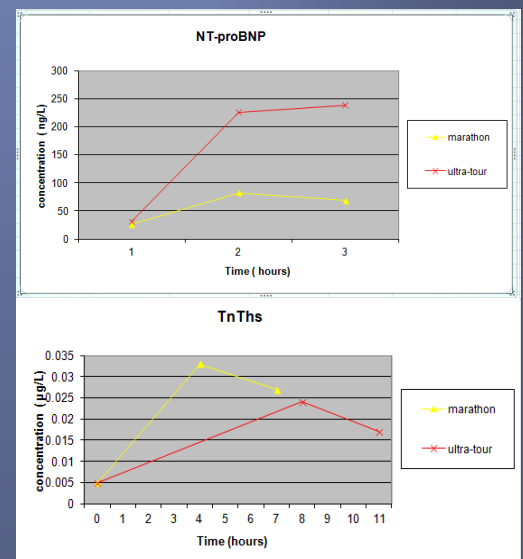
Table 1: Results for TnT and NT-proBNP

TnT	n	T0	T1	T3
M	28	0,005 (0,005 – 0,0055)	0,033 (0,018 – 0,048)	0,027 (0,018 – 0,038)
UT	33	0,005 (0,005 – 0,005)	0,024 (0,013 – 0,037)	0,017 (0,010 – 0,028)

NT-proBNP	n	T0	T1	T3
M	28	25,6 (13,7 - 35,9)	81,9 (58,3 - 108,8)	68,9 (48,1 - 120,1)
UT	33	32,0 (16,9 - 51,7)	225,8 (156,0 - 362,5)	238,6 (124,6 - 364,8)

Fig. 1: Kinetic of the cardiac biomarkers released during the 2 races



## Conclusions:

Measurement of cardiac troponins by high sensitive methods allows detecting significant release of biomarkers from the heart during exercise. The value of NT-proBNP are also significant but less than TnThs. We think that the TnThs could be an interesting tool in the future to help sport medicine to detect risk of developing a cardiac problem in the future or a sudden death.

For the medical imaging, it was observed a myocardial adaptation to training and a transient impairment of ventricular function due to dehydration.

Acknowledgement: This experimentation was partially financed by “Adeps 2012” grants (Léon Frédéricq Funds).