

Impact of an ultra-trail of 330 km on plasma levels of cardiac biomarkers

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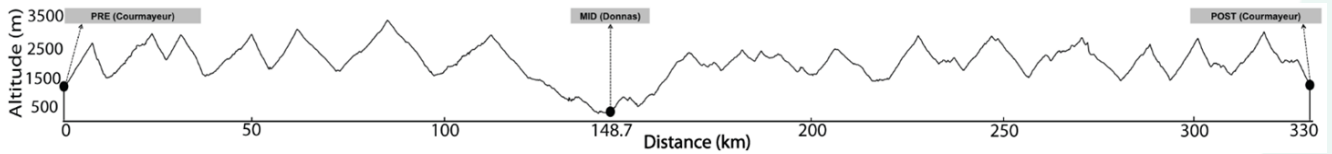
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Objectives:

While a moderate exercise produces beneficial effects on the cardiovascular system, consequences of a supraphysiological effort are not yet clear. The aim of our study was to evaluate the consequences of such an effort on cardiac markers, markers of inflammation but also markers of renal function. This project also studied the evolution of new biomarkers of cardiac fibrosis such as the ST2 and galectin-3.

Keywords. Endurance, cardiac biomarkers, inflammation, kidney function



Materials and Methods:

51 people attending the Tor des Géants (330 km, with an altitude range of 24,000 meters) have been followed. The study is conducted on 33 participants having reached at least half of the race (148.7 km).

Blood and urine samples were collected at four different times:

- T1:halfway.
- T0:before the race.
- T2:at the finish .
- T3:three days after arrival.



Several biomarkers were assayed on different analyzers such COBAS®, KRYPTOR®, VIDAS® and ETIMAX®. Meanwhile, the ST2 was measured manually.

Results:

During this ultra-endurance effort, the plasma levels of cardiac markers (hsTnT(Fig1), NT-proBNP (Fig3), copeptin (Fig4), H-FABP (Fig5), ST2 (Fig6), Gal-3 (Fig7)), muscle (CK (Fig2), myoglobin) and inflammation (CRP DFO, GB) have increased significantly to halfway (148.7 km). Meanwhile, the markers of renal function (urinary NGAL and plasma and urinary creatinine) have only slightly varied, excepting plasma creatinine.

Figure 1: hsTnT kinetic

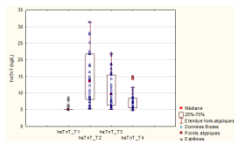


Figure 2: CKMB/CK ratio kinetic

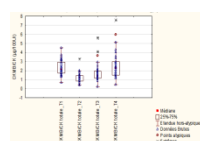


Figure 3: NT-ProBNP kinetic

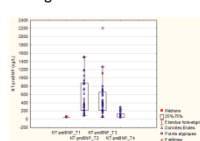


Figure 4: Copeptin kinetic

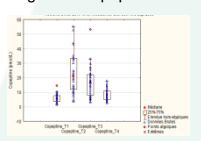


Figure 5: HFABP kinetic

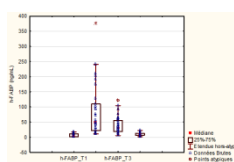


Figure 6: ST2 kinetic

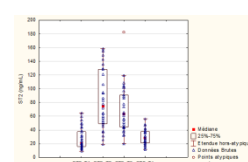
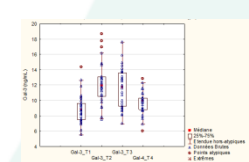


Figure 7: Gal 3 kinetic



Conclusions: The study suggests that there is no permanent structural damage at the myocardium level. However, the low pace adopted by the runners, due to fatigue, caused an inflammatory response as well as muscle damage less important than a shorter race. Nevertheless, an endurance race as the Tor des Géants means an intense physical and psychological effort.

