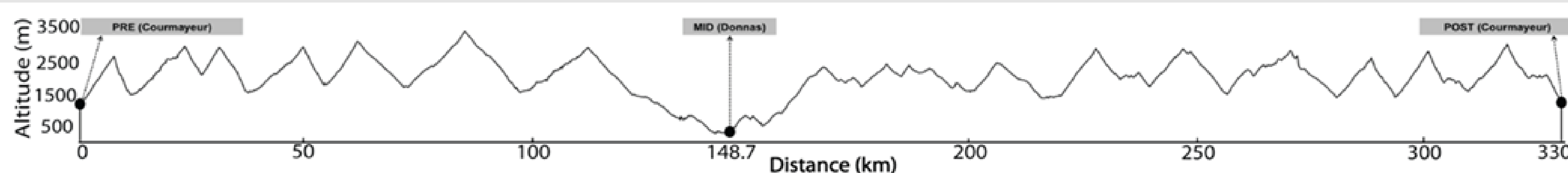


Cardiac fibrosis markers: Galectin-3 and Suppression of Tumorigenicity 2 measurement in participants at the “Tor des Géants”

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Background:

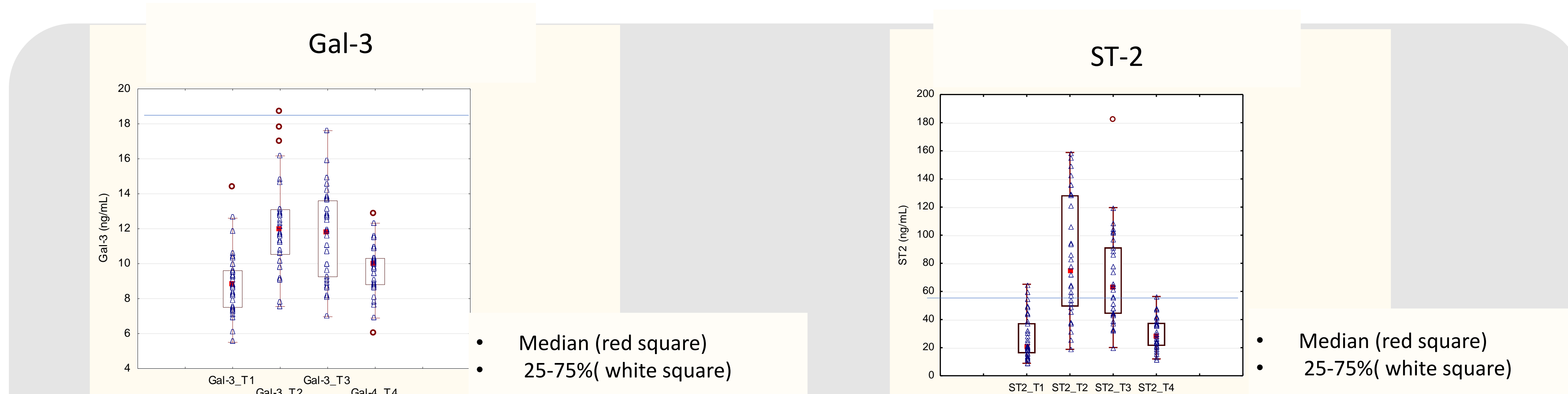
The famous “Tor des Géants” (TdG), one of the most challenging ultra-marathon in the world is considered as a supraphysiological effort. Previous studies have shown that taking part in intense and sustained exercise leads, in the long term, to the formation of cardiac fibroid deposits, which may be involved in cardiac arrhythmias. Some biomarkers could be used to quantify it. Galectin-3 (Gal-3) is a carbohydrate binding lectin produced by macrophages, upregulated in hypertrophied heart, emerging as a mediator for fibrosis development and cardiac remodeling. Suppression of tumorigenicity2 (ST2) is a family member of IL-1 receptors initially known for its role in immunological processes. It has a potential role in the cardiac pathogenesis. These receptors are led in cardiomyocytes and fibroblasts due to a mechanical stress.

- Objectives:** The aim of our study was to examine the evolution of Gal-3 and ST2 in trailers who ran the Tor des Géants (330 km with an altitude range of 24000m).
- Participants :** 51 participants have been followed and the study was conducted on 33 subjects having reached at least half of the race.
- Design:** Longitudinal, cohort study
- Setting:** The Tor des Géants, a 330 km long ultra-distance trail running, with +24,000m elevation changes in the Valley of Aosta (Italy), is considered as one of the most difficult mountain marathon race in the world. The maximum time allowed to complete the race is 150 h.
- Interventions :** Blood samples were collected at different timings → 4 days before starting (T0), after completing 148 km (T2), at finish line (T3) and 3 days after the end of the race (T4) .
- Main Outcome Measurements:**

Levels of plasma Gal-3 and ST2 were determined at 4 times: before the start, after 158km, at the end and 3 days after the end of the race in 33 trailers. Samples were directly centrifuged and frozen at -80°C. Gal-3 measurement was performed on the VIDAS (Biomerieux) and ST2 was analyzed with the Presage ST2 Assay (Critical Diagnostic). The reference values are <17.8ng/mL for Gal-3 and <35ng/mL for ST2. Statistica was used for the statistical analysis (ANOVA). We calculated the difference between the different time and expressed in delta: $\Delta 1 = (T2-T1)/T1 * 100$, $\Delta 2 = (T3-T2)/T2 * 100$, $\Delta 3 = (T4-T3)/T3 * 100$, $\Delta 4 = (T3-T1)/T1 * 100$, $\Delta 5 = (T4-T1)/T1 * 100$. After that, we tried to correlate the delta between them (results= R(p-value)). Results were considered as significant with $p < 0.05$.

Results

We observed an increase for Gal-3 and ST2, above the reference values only for ST2. We noted for both a decrease up to the normal values 3 days after the trail. For the correlation between deltas, we observed that Gal-3 and ST2 are correlated for each delta.



- Conclusions:** The results of this study demonstrate that this exercise was associated with biochemical abnormalities that may reflect adverse consequences on cardiac structure as fibrosis. ST2 values were higher, perhaps due to a mechanical stress more than a cardiac stress.