

Salivary CRP and Cortisol Analysis in Collegiate Female Lacrosse Athletes during a 2-Game Week

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ABSTRACT

Cortisol (CORT) and C-reactive protein (CRP) are two indicators of stress and are linked to tissue inflammation and illness. Increased stress and inflammation have been shown to decrease cognitive functioning, leading to diminished performance for athletes. Subjectively, athletes indicate fluctuations in stress, but few studies have assessed the physiological response of training and competition in elite female athletes. **PURPOSE:** The primary aim was to assess the acute response of CORT and CRP in Division I female lacrosse athletes during a high-stress week, including two games and three practices during the competitive season. The secondary aim was to assess the relationships between the evening measures of CORT and CRP with objective workload measures. **METHODS:** Saliva samples were collected from the 14 Division I female lacrosse players each morning and evening over the course of a week during competition season. Days 2, 4, and 5 consisted of afternoon/evening (PM) practices lasting approximately two hours, with days 3 and 6 consisting of PM games. Day 1 was a resistance training day and day 7 was a rest day. Workload was measured using wearable global positioning system (GPS) units. Variables included were total distance (m), high-intensity distance (m, >60% max sprint speed), sprints (count, >90% max sprint speed), accelerations (count, >3 m/s²), decelerations (count, >3 m/s²), and sprint distance (m, > 90% max sprint speed) **RESULTS:** CORT levels increased after the first game (0.36 ±0.54 µg/dl) and peaked on the morning of Day 5 (1.03 ±0.08 µg/dl). The two significantly low CORT readings were observed in the morning on Day 3 (0.051±0.068 µg/dl) and on Day 4 PM (0.36 ±0.48 µg/dl) (approximately 24 hours post-game collection, low workload day). Significantly higher salivary CORT concentrations were measured in the morning on Days 1 (0.61 ±0.46 µg/dl), 5 (1.03 ±0.08 µg/dl), and 6 (0.76 ±0.60 µg/dl). CRP levels fluctuated during the sampling period without a clear relationship to the game days. Significantly lower CRP salivary concentrations were seen in the morning on Day 5 (5.15 ± 4.03 pg/ml), and significantly higher CRP salivary concentrations on Days 2 (9.88 ±2.83 pg/ml) and 3 PM (9.37 ±3.72 pg/ml) (post-game, high workload). Repeated measures Pearson correlation analyses indicated trivial to low correlations between CORT and workload (r = 0.028 to 0.201, p = 0.167 to 0.847) and low correlations between CRP and workload (r = 0.182 to 0.274, p = .051 to 0.102). **CONCLUSION:** CRP and cortisol levels fluctuated greatly on a day-to-day basis. CRP tended to have a more direct response to load, with higher values directly after games. CORT values were less predictable in relation to workload and may therefore be affected by other factors such as academic load or the athlete's personal life. Future research should consider the role of travel and academic load and their effects on CORT and CRP in a student athlete.