



Exercise Biochemistry Review

Proceedings of IBEC 2018, Beijing, China, October 23-25
PO-151

The change characteristics of precompetition biochemical indexes of excellent male gymnasts

xiaoling he
Hubei Institute of Sports Science

Objective In order to ensure that Chinese gymnasts in Hubei province can adapt to the pattern of large intensity and large training volume before the national games in good condition, the training monitoring and regulation of athletes' physical function and fatigue recovery are carried out by monitoring blood, urine and other biochemical indicators. On this basis, the characteristics of the physical and biochemical functions of the gymnasts in Hubei province are summarized, hoping to provide the accumulated data of the physical function evaluation of the gymnasts in the future, and to strengthen the scientific degree of the gymnastics training in Hubei province.

Methods To prepare for the national games in 2017, 12 men gymnastics athletes of Hubei province as the research object, and in the precompetition training period, every Monday morning test hemoglobin(Hb), white blood cells(WBC), blood urea(BUN), creatine kinase(CK), every two weeks on Monday morning test testosterone, cortisol, and body composition, test every two weeks training on the second day of urine 10 items such as indexes. Blood samples and urine samples were sent to the laboratory of the laboratory of Tongji Hospital in Wuhan city and Hubei institute of sports science, respectively.

Results 1. The WBC of male gymnasts in Hubei province was between $3.6\sim 11.7\times 10^9/L$, with an average value of $5.7 \pm 1.4 \times 10^9/L$, and the WBC level was within the normal range with a small range of variation, with no significant difference in each test. In the experiment, we found that there were large individual differences in the low WBC. Individual athletes' WBC was high for a long time, indicating weak resistance and easy to have inflammatory infection. In addition, the WBC of some athletes is low for a long time, and it is difficult to recover. Although the targeted treatment is improved, it is easy to relapse. Therefore, in sports practice, attention should be paid to WBC detection and long-term monitoring of susceptible athletes.

2. The Hb level of male gymnasts in Hubei province is between 131~175 g/L, with an average of 156.3 ± 8.1 g/L, and that of Chinese excellent male gymnasts is 156.9 ± 8.83 g/L, indicating that the Hb level of male gymnasts in Hubei province is relatively high compared with the project itself. In the early stage of large amount of exercise, Hb concentration will decrease. With the adaptation to the training amount, Hb concentration gradually rises, which is reflected in the improvement of functional state and the improvement of sports ability.

3. The change range of serum CK was between 118~594 U/L, with an average of 282.4 ± 105.2 U/L, which was relatively high. CK changes obviously with the training intensity, and the period of high-intensity training is significantly higher than the adjustment period, and there is a trend of accumulation with the extension of training time.

4. The change range of BUN was between 3.19~7.23 mmol/L, with an average value of 5.15 ± 1.04 mmol/L, and the average value of each stage of precompetition training was between 4.5-5.5 mmol/L, with no significant change and no statistical difference.

5. The change range of serum testosterone was between 3.03~9.69ng/mL, with an average of 5.45 ± 1.29 ng/mL, and the overall level of testosterone was low. Serum cortisol changes ranged from 7.5 to 24.9 ug/dL, with an average of 14.5 ± 3.3 ug/dL, and the overall level was stable. After a long period of intensive training, testosterone levels declined and cortisol did not change significantly.

6. In the test of ten urine items, there were 10 cases of urinogen positive, 2 cases of bilirubin, and 1 case of urinary protein.

Conclusions 1. The WBC level of gymnasts in Hubei province is within the normal range and the variation range is small. Studies have shown that adaptive exercise can improve disease resistance, but in fact the athletes are less resistant at late periods of heavy duty training, before or during competition, and the risk of various diseases increases. In sports practice, WBC testing should be emphasized, and athletes with low immunity should be monitored for a long time.

2. Athlete's Hb level is at a higher level relative to the project itself and combined with training. Starting from the end of winter training in February, athlete's Hb level is significantly decreased, reflecting the decrease of Hb when the intensity is on the upper level. At the same time, the individual difference of athletes' Hb level is large. Hb level will produce a great impact on the aerobic capacity of athletes, although aerobic capacity is not gymnastics technology projects focus on the development of special technical ability, but high aerobic capacity of athletes than aerobic athletes are more able to withstand the great physiological load of exercise, poor ability of aerobic capacity of athletes in training is usually poor second half for a longer time, prone to pay enough concentration, movement quality decreased obviously, can't do difficult moves.

3. The CK level of gymnasts in Hubei province is at a relatively high level, which is related to the characteristics of gymnastics. The precompetition training of gymnastics mainly highlights the intensity load, the intensity of strength training is relatively high, and the muscle cell membrane is damaged more. The differences of serum CK in the period of high-intensity training and adjustment are significant, which can reflect the intensity of precompetition training, as well as the fatigue and recovery of athletes. The changes of blood urea were not obvious at each training stage before the competition, and there was no significant reaction of blood urea accumulation. There was no significant difference between the intensity training stage and the adjustment period, indicating that blood urea was not a sensitive fatigue index in the strength training. In addition, when athletes lose weight before the competition, it is easy to see increased blood urea.

4. The overall level of serum testosterone of gymnasts in Hubei province is relatively low, indicating that the muscle strength and explosive power of gymnasts in Hubei province are relatively weak. Cortisol is relatively stable, suggesting that the body's resilience is modest.

5. After the intensive training, the positive rate of urobigen is much higher than that of urinary protein and bilirubin, indicating that urobigen is more sensitive to the evaluation of the intensity of training in gymnastics.