EVOLUCIÓN DE LOS PARÁMETROS FISIOLÓGICOS DESPUÉS DE UN EJERCICIO AGUDO DE VÍA METABÓLICA PREDOMINANTE DIFERENTE

PHYSIOLOGICAL PARAMETERS EVOLUTION AFTER A PREDOMINANT METABOLIC PATHWAY-DEPENDENT ACUTE EXERCISE

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RESUMEN

Nuestro objetivo fue medir tres variables (frecuencias cardiaca y respiratoria, y lactatemia), y observar su evolución antes y durante 15’ post-ejercicio. 25 hombres/mujeres, distribuidos en tres grupos, realizaron una carrera con una vía metabólica predominante diferente: 100m (anaeróbica aláctica), 400m (anaeróbica láctica), 5’ intensidad submáxima (aeróbica). Las variables se midieron en reposo y en intervalos de 5’ post-ejercicio. Tras ejercicio anaeróbico láctico, se observó un mayor cambio en todas las variables, un retorno más lento a valores basales, y un pico de lactatemia a los 5’; además, la lactatemia fue superior a 4 mmol/L (indicador OBLA) al acabar todos los test. Conclusión: la liberación del lactato intramuscular a sangre continúa tras estos ejercicios, y los aumentos en frecuencias cardiaca y respiratoria son mayores cuando predomina el metabolismo anaeróbico láctico, quizás por aumento del gasto cardiaco (por la disminución de energía disponible mediante glucólisis) y las ventilaciones (para atenuar la acidosis).

PALABRAS CLAVE: fisiología del ejercicio, vías metabólicas, lactato, post-ejercicio.

ABSTRACT

Our aim was to measure three physiological variables (heart and respiratory rates, and lactatemia) before and immediately after an exercise test, and to observe their evolution over 15 minutes post-exercise. 25 males/females, 19-25 years old, were distributed into three groups, which performed a race test with a different predominant-metabolic-pathway: 100m (alactic anaerobic), 400m (lactic anaerobic), submaximal-intensity 5’ (aerobic). Variables were measured at rest-state and for 5’ intervals (0’-15’) post-exercise. Results: after a lactic anaerobic exercise, a higher change in all variables, a slower return to basal values, and a 5’-lactatemia peak were observed; in addition, at 0’ post-exercise lactatemia was more than 4 mmol/L (OBLA marker) in all tests. In conclusion: intramuscular lactate releasing to blood goes on after exercise, and heart and respiratory rates increases are higher when lactic anaerobic metabolism predominates, maybe for a higher cardiac output (to attend glycolysis-mediated available-energy decrease) and ventilations (to attenuate acidosis).

KEYWORDS: exercise physiology; metabolic pathways; lactate; post exercise.
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1. INTRODUCTION & AIM

Many physiological variables have been considered to be measured to explain how exercise affects organism¹. Our aim was to measure and to observe what effects exercise have on lactatemia, heart rate and respiratory rate after exercise performance, for 0’, 5’, 10’ and 15’ post-exercise, considering three different acute tests, based on the predominant metabolic pathway: alactic anaerobic, lactic anaerobic and aerobic.

2. MATERIAL & METHODS

25 males and females, 19-25 years-old, distributed randomly into three groups: alactic anaerobic (‘Ala’), lactic anaerobic (‘Lac’) and aerobic (‘Aer’). ‘Ala’ ran 100 m; ‘Lac’ ran 400 m; ‘Aer’ ran for 5’ at a moderate intensity (60-70% theoretical maximal heart rate²). Measurement periods: pre-exercise and 0’-15’ post-exercise (at 5’ intervals).

Heart rate was controlled by a Polar® sensor. Respiratory rate was observed counting torax breathing cycles. Lactatemia (mmol/L) was determined by a Lactate Scout+ lactate analyser.

3. RESULTS

After exercise with lactic anaerobic prevalence, lactatemia was significantly higher in relation to ‘Ala’ and ‘Aer’ at every post-exercise intervals; besides, ‘Lac’ blood clearance was slower than the other two groups, and its peak was reached at 5’ post-exercise. At all post-exercise intervals, ‘Lac’ heart rate was higher than ‘Ala’ and ‘Aer’, showing significant difference at 5’ and at 10’. Respiratory rate was just significantly higher in ‘Lac’ vs. ‘Aer’ at exercise end.

4. DISCUSSION & CONCLUSIONS

Immediately at the end of this kind of exercises, blood lactate is more than 4 mmol/L, typically considered as an OBLA marker³,⁴, regardless of prevalent metabolism. When

³ CHMURA, J., NAZA, K. Parallel changes in the onset of blood lactate accumulation (OBLA) and threshold of psychomotor performance deterioration during incremental exercise after training in athletes.
lactic anaerobic metabolism predominates, lactatemia peak is reached at 5’ post-exercise, maybe for an intramuscular lactate continuous releasing to blood, and proving 5’ is the time required to buffer lactic acid; also heart and respiratory rates increases are higher, maybe for a higher cardiac output (to attend glycolysis-mediated available-energy decrease) and ventilations (to attenuate acidosis)

REFERENCES


