攝取輔酶 Q_{10} 對超級馬拉松運動之心肌損傷指標的影響

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摘 要

本研究目的在探討超級馬拉松選手連續服用七天輔酶 Q_{10} 於跑後心肌損傷血液指標中 AST、LDH、CK、CK-MB 及 cTnI 之變化情形。受試者為國內有長跑習慣男性選手 9 名，其平均年齡 50.56 ± 10.47 歲、跑齡 8.5 ± 4.79 年、P 組及 Q_{10} 完成距離 55.78 ± 5.53 及 58.80 ± 10.58 km、P 組及 Q_{10} 完成時間皆為 7.11 ± 1.05 小時。研究方法為安排受試者進行二次的 6-8 小時練習賽，隨機分派成 2 組分別於賽前接受七天的輔酶 Q_{10}（劑量為 100 mg/day）及安慰劑（麥芽糊精），於練習賽前、賽後即刻抽血觀察其生化值之變化情形，第二次練習賽兩組增補劑互換，以相依樣本單因子變異數分析（one-way ANOVA）進行考驗，並以 LSD 進行事後比較，顯著差異水準 $\alpha = .05$。結果發現：（一）攝取安慰劑組及輔酶 Q_{10} 組的受試者在經過 6-8 小時的超級馬拉松練習賽後，賽前 30 分鐘及賽後即刻的心肌損傷血液指標值達顯著差異（$p < .05$）的包含 AST、LDH、CK，而 CK-MB 及 cTnI 則皆未達顯著差異。（二）連續七天攝取輔酶 Q_{10} 組與服用安慰劑組的受試者在經過 6-8 小時的超級馬拉松練習賽之後的賽後即刻心肌損傷血液指標值皆未達顯著差異（$p > .05$），但在賽後即刻 Q_{10} 組與安慰劑血液指標值上升趨勢百分比分別為：AST 206% & 254%、LDH 160% &172%、CK 555% & 1536%、CK-MB 174% & 347%、cTnI 121% & 239%，服用輔酶 Q_{10} 組的賽後血液指標值上升百分比皆低於安慰劑組。結論：（一）6-8 小時的超級馬拉松練習賽中，血液指標 AST、LDH、CK 在賽後顯著的增加，而引發酵素活性上升主要是來自於骨骼肌及肝臟功能損傷，而 cTnI 微高於實驗室標準值可能代表著心肌適應過程。（二）補充輔酶 Q_{10} 組心肌損傷血液指標呈現無顯著的差異，但是在於運動後引發 CK、CK-MB、cTnI 心肌損傷血液值上升的百分比與服用安慰劑組比較後有明顯下降的趨勢，值得更進一步探討。

關鍵詞：輔酶 Q_{10}、超級馬拉松、心肌損傷指標

Effect of Coenzyme Q_{10} Supplementation on Ultra Marathon of Cardiac Damage Markers

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Abstract

The purpose of this study was to investigate a different effect upon cardiac damage markers of AST, LDH, CK, CK-MB and cTnI in ultra marathon period after ultra marathon's runners took supplying Coenzyme Q_{10} last for 7 days. Subjects were nine males who used to run a long distance. They were ages of 50.56 ± 10.47 yr and had running experience about 8.5 ± 4.79 yr. Placebo group (taking maltodextrin) completed distance 55.78 ± 5.53 km while Q_{10} group completed distance 58.80 ± 10.58 km. These two different groups spent the same time about 7.11 ± 1.05 hr. Research was used random sampling to divide these nine male-runners into two groups. Each group had to exercise twice. For the first time, one of the divided group took supplying Coenzyme Q_{10} (100 mg) last for 7days before ultra marathon period and the other group took supplying placebo last for 7days before ultra marathon period. For the second time, these two groups were exchanged. Baseline data was analyzed by using one-way ANOVA and was compared by LSD. Statistical significance was accepted as $p<0.05$. The result indicated that both before and after 6-8 hr ultra marathon running period, AST, LDH, CK were different ($p < .05$) but CK-MB, cTnI were not different between Q group and P group. And the result also indicated the cardiac damage markers of both Q group and P group have no significant effects upon taking supplying Coenzyme Q_{10} last for 7 days. However, the activities-rise of cardiac damage markers of Q group was lower than P group after post-ex: (data percentages) AST 206% & 254%, LDH 160% & 172%, CK 555% & 1536%, CK-MB 174% & 347%, cTnI 121% & 239%. These data concluded that in 6-8hr's ultra marathon period, markers include AST, LDH, CK were significant high. The skeletal muscle and liver damage were the main causes of this situation. And the slight-rise cTnI might show an accommodative process of myocardium. Markers of Q group did not show a significant difference after males took supplying last for 7 days, but we found that post-ex induce CK, CK-MB and cTnI of Q group to rise lower than P group dose. This supplemental strategy is worth to be investigated in field with observation which includes Coenzyme Q_{10} concentration and extend recovery.

Key words: Coenzyme Q_{10}, Ultra Marathon, Cardiac Damage Markers