

Meeting abstract

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Re-establishment of normal blood flow is mandatory to restore intramuscular high energy phosphate levels after transient ischemia

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Background

Normalization of blood flow is required to salvage ischemic tissues, but might paradoxically cause reperfusion injury. The aim of this study was to determine whether restoration of skeletal muscle high energy phosphates after ischemia is affected by post-ischemic vessel stenosis.

Methods

Leg ischemia was induced by a cuff on one thigh for 20 minutes and muscle high energy phosphates depleted by lower leg exercise (n = 5 healthy male subjects). After calf ischemia, the cuff was either deflated or air pressure maintained at 20 mmHg below systolic pressure for 5 min (stenosis). Measurements of high-energy phosphates in gastrocnemius muscle were performed with a 3 T spectrometer. ³¹P and ¹H spectra were acquired as an estimate of myocellular concentrations of phosphocreatine (PCr) and inorganic phosphate (iP).

Results

PCr concentrations decreased to 31% ± 16% during ischemic exercise (p < 0.001) and iP levels increased in parallel. While PCr re-established within 2 min after cuff deflation, no recovery was detectable when blood flow was impaired in the reperfusion phase.

Discussion

Muscle phosphate recovery depends on normalization of blood flow. These data indicate that intensified strategies to re-establish flow conditions are required for residual myocellular function after transient ischemia.