

Conditionally Essential Amino Acid Supplementation Reduces Postoperative Muscle Wasting in Orthopedic Trauma Patients

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Objectives: Increased metabolic demand and inadequate oral intake after musculoskeletal trauma results in catabolic skeletal muscle wasting, which limits potential for functional recovery after injury. This study compared standard perioperative nutrition and oral supplementation with conditionally essential amino acids (CEAA) on changes in lean body mass after operative fixation of acute fractures.

Methods: Patients sustaining operative pelvis and extremity fractures presenting to a Level 1 trauma center were prospectively enrolled in a single blinded-randomized clinical trial. Demographics, injury classification, and comorbidities were collected at baseline. Fat Free Mass (FFM) was measured within 72 hours of surgery using A-Mode Ultrasound. Patients were randomly chosen to receive standard nutrition (Control) or standard nutrition plus an oral supplement (CEAA) containing 14 g of amino acids to be taken 2x daily for 2 weeks. FFM was re-assessed at 6 weeks and 3 months post-surgery. Statistical analysis was performed comparing Least Squared Mean FFM ($P < .05$).

Results: 222 subjects (Control: 112, CEAA: 120) were included in this analysis. There were no differences in age, gender, BMI, or baseline FFM between Control and CEAA subjects (all $P > .05$). Median supplement compliance was 22/28 servings (78.6%, $sd \pm 36.9\%$). At 6 weeks, average change in FFM among Controls was -1.28 kg ($P = .004$) and $-.56$ kg among CEAA ($P = .19$). Changes were not significant between groups ($P = .23$). At 12 weeks, there were non-significant changes in FFM from baseline in both groups (Controls: $-.02$ kg $P = .96$, CEAA: $+.36$ kg $P = .44$). From 6–12 weeks, FFM changes were $+ 1.26$ kg ($P = .012$) and $+.91$ kg ($P = .06$) respectively.

Conclusions: Patients randomized to standard nutrition had significant FFM loss compared to those receiving additional CEAA supplementation 6 weeks after surgery. At 12 weeks, the control group decreased FFM further from baseline while the CEAA group mostly recovered their loss. Although 12-week FFM changes were not significant, results indicate CEAA supplementation prevents FFM loss in the acute post-operative phase. Further investigation is needed to compare FFM changes, clinical outcomes, complication rates, and the impact of baseline nutrition status.

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