

## Acylcarnitine profile in survivors of a prolonged versus a short stay in ICU.

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**Topic:** 9: Intensive Care Medicine

**Abstract text: Background and Goal of Study:** In a previously published study [1], we described an abnormal acylcarnitine (AC) profile in survivors of a prolonged stay in intensive care unit (ICU). However, it is unknown if ICU survivors have a different AC profile after less severe disease and shorter ICU stay. This observational study aimed to compare AC profile of ICU survivors of a prolonged versus a short stay.

**Materials and Methods:** Consecutive adults who survived an ICU stay < 7days after an elective cardiac surgery between November 2021 and March 2022 were recruited (short stayers, SS). For each SS, 1 to 2 long stayers (LS), matched for gender and age, were recruited among patients enrolled in our post-ICU follow-up program targeting survivors of an ICU stay ≥ 7days. Exclusion criteria were treated HIV infection and ongoing treatment with valproate, cyclosporine or cisplatin. In both groups, AC profile was determined during the week following ICU discharge by liquid chromatography with tandem mass spectrometry.

**Results and Discussion:** 50 SS (80% men, age 70.9 (65-77.6) years, SAPS II 23 (18-26.7)) survived an ICU stay of 2 (2-3) days and were evaluated 4 (2-5) days after ICU discharge. They were matched to 85 LS (21.2% men, age 68 (63-73) years, SAPS II 40.5 (29-54.5)) who survived an ICU stay of 11 (8-15.5) days. In ICU, 2/85 (2.3%) LS benefited from renal replacement therapy, while 58/85 (68.2%) received propofol. AC profile was assessed 6 (4-8) days after ICU discharge in LS. Their AC profile was significantly different. The sum of C3, C4 and C5 derivatives was higher in LS: 1.520 (1.178-1.974) vs 1.185 (0.932-1.895) μmol/l (p<0.001). The long-chain ACs were lower in LS: 0.830 (0.660-1.105) vs 1.090 (0.935-1.293) μmol/l (p<0.001). Carnitine (C0) concentration was similar in LS and SS: respectively 50.79 (38.22-62.93) vs 45.58 (39.2-55.75) μmol/l (p=0.072). No carnitine deficiency was observed in either group. Their total AC/C0 ratio was also similar: respectively 0.355 (0.268-0.415) and 0.358 (0.289-0.417) (p=0.391). A ratio > 0.4 (representing, by definition, a disturbed mitochondrial metabolism) was observed in 26/85 (30.6%) LS and in 15/50 (30%) SS (p<0.999).

**Conclusion(s):** Survivors of a prolonged ICU stay differed from SS after a scheduled cardiac surgery in terms of short-chain and long-chain ACs. Short-chain ACs concentrations were higher in LS, suggesting a higher protein catabolic rate, while long-chain ACs concentrations were lower, suggesting an altered mitochondrial beta-oxidation. Whether these findings correlate with the impaired exercise tolerance and the related mitochondrial dysfunction observed in ICU survivors should be further explored.

**References:** (1) Rousseau AF, Schmitz S, Cavalier E, Misset B, Boemer F. Altered Serum Acylcarnitines Profile after a Prolonged Stay in Intensive Care. *Nutrients*. 2022;14.

**1st Keyword:** Intensive care

**2nd Keyword:** Recovery

**Abstract type: none case report** 1. Prospective observational only

**Ethical Research:** I hereby confirm that an Institutional Review Board (IRB), Independent Ethics Committee (IEC), Ethical Review Board approved the study.

**Institution:** Comité d'Ethique Hospitalo-Facultaire Universitaire de Liège

**Name of the Ethical Committee Chair:** Vincent Seutin

**Approval reference:** 2021/255

**Date of approval:** 14 September 2021

**I hereby confirm that the written consent has been received from the patient:** No

**I hereby confirm that the institutional standards for animals have been reached.:** No

**I hereby confirm that I have been informed and agree with that ESAIC contacting the above mentioned IRB/IEC/ERB in order to inspect this review.:** Yes

**I hereby confirm that the Ethical Declaration is not required.:** No

**Conflict of interest to declare?:** No

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