Effect of 8-Week Exercise-Based Rehabilitation on Immune Cell Counts in Post-COVID Syndrome Following Hospitalisation: An RCT

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BACKGROUND AND AIMS

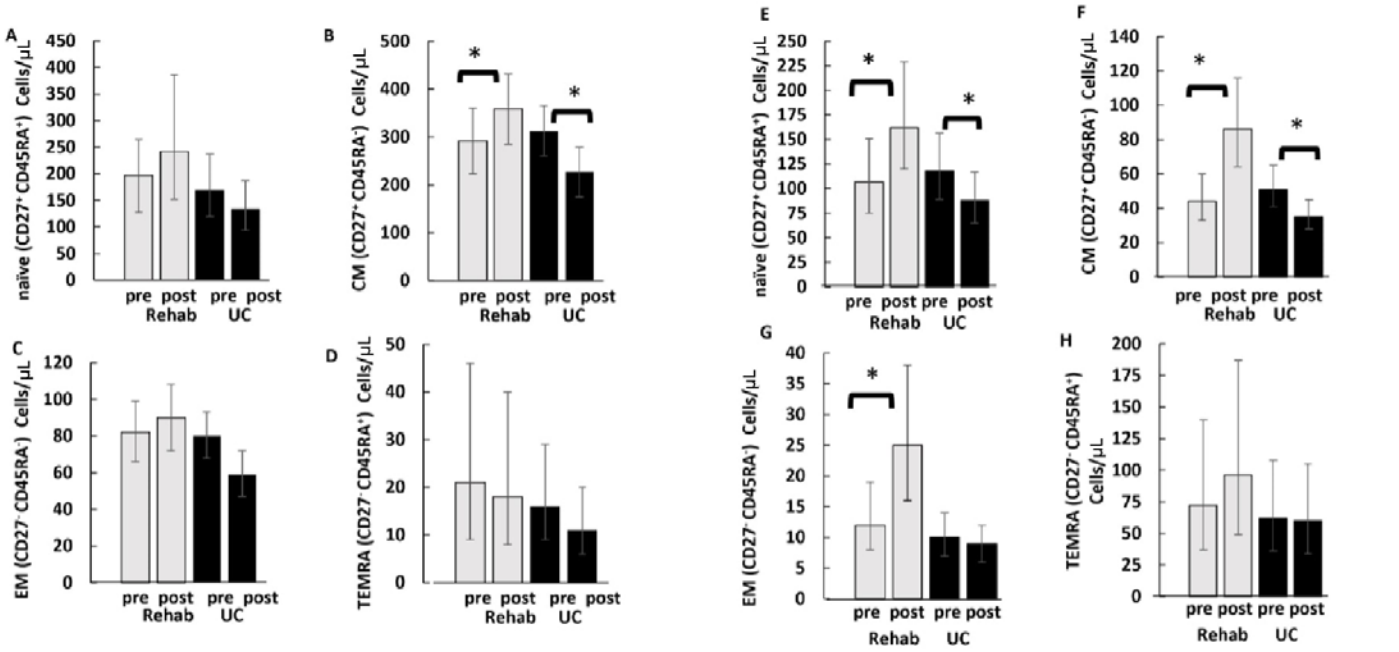
Survivors of severe COVID-19 may exhibit immune dysregulation, characterised by reduced naïve and increased senescent and exhausted T cell populations.[1] Regular exercise is associated with increased naïve and reduced exhausted and senescent T cell populations, and may therefore help resolve post-COVID-19 immune dysregulation.

The aim of this study was to explore the effect of an 8-week exercise-based rehabilitation intervention on cluster of differentiation (CD)4 and CD8 T cells and subsets in participants with post-COVID syndrome following hospitalisation, compared with usual care.[2]

MATERIALS AND METHODS

This was a sub-study in a single-blind RCT comparing an 8-week supervised rehabilitation programme to usual care alone. The rehabilitation programme consisted of twice weekly, individually prescribed and progressed aerobic and strength training, and a programme of education/self-management techniques, supplemented by a home exercise programme. Venous blood samples were collected pre- and post- intervention, and T cell immunophenotyping via flow cytometry was performed and analysed using linear mixed models.

Figure 1: Effect of exercise versus usual care on cluster of differentiation 4+ (A–D) and cluster of differentiation 8+ (E–H) subset changes from pre- to post-trial.



*Significant difference from pre and within trial.

Data are mean (95% CI) and are adjusted for sex and baseline value of the dependent variable.

CD: cluster of differentiation; CM: central memory; EM: effector memory; TEMRA: terminally differentiated effector memory; UC: usual care.

RESULTS

Thirty-one participants (n=13 male; 42%) completed blood samples pre- and post-intervention: 13 in the rehabilitation group and 18 in usual care alone. At 8 weeks, there were statistically significant differences in the number of central memory and naive CD8+ T cells, with an increase observed in rehabilitation and a decrease observed in usual care (all $p<0.05$; Figure 1). The number of CD8+ effector memory T cells increased in rehabilitation only ($p<0.05$), with no change in usual care alone (Figure 1). There were statistically significant differences in natural killer cells in the rehabilitation group compared to usual care alone (mean [CI]; rehabilitation pre: 271 [198–345] cells/µL; rehabilitation post: 378 [298–459] cells/µL; usual care pre: 302 [236–367] cells/µL; usual care post: 265 [200–331] cells/µL; $p<0.05$). There were no statistically significant differences in inflammatory and cardiometabolic biomarkers, including C-reactive protein, IL-6, cholesterol, triglycerides, and glucose.

CONCLUSION

Exercise-based rehabilitation could be a potential therapy for restoring post-COVID-19 immune dysregulation.

References

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