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Impact of Surgical Status, Loneliness and Disability on Biomarkers in Chiari Malformation Type I Adult Females

Monica A. Garcia, Xuan Li, Philip A. Allen, Douglas L. Delahanty, Maggie S. Eppelheimer, James R. Houston, Dawn M. Johnson, Frank Loth, Jahangir Maleki, Sarel Vorster, and Mark G. Luciano

Purpose

Many CM patients experience both acute and chronic stress from pain and disability related to CM. Allostatic load is the body's ability to secrete stress hormones to cope with acute stress. However, with chronic stress due to psychosocial and physical stressors, allostatic load may overwhelm the capability of biological mechanisms to cope with this stress. We tested this in CM by assessing biomarkers.

Methods

We collected biomarker data (measures of biological stress) on estrogen, interleukin-6, IL-6, c-reactive protein, or CRP (serum assays) , and cortisol (saliva assays) on 62 female adult CM patients (43 decompressed and 19 non-decompressed). For these same individuals, we also tested for levels of loneliness (UCLA Loneliness Scale—psychosocial function) and disability (Oswestry Head and Neck Disability Scale—psychological and physical function).

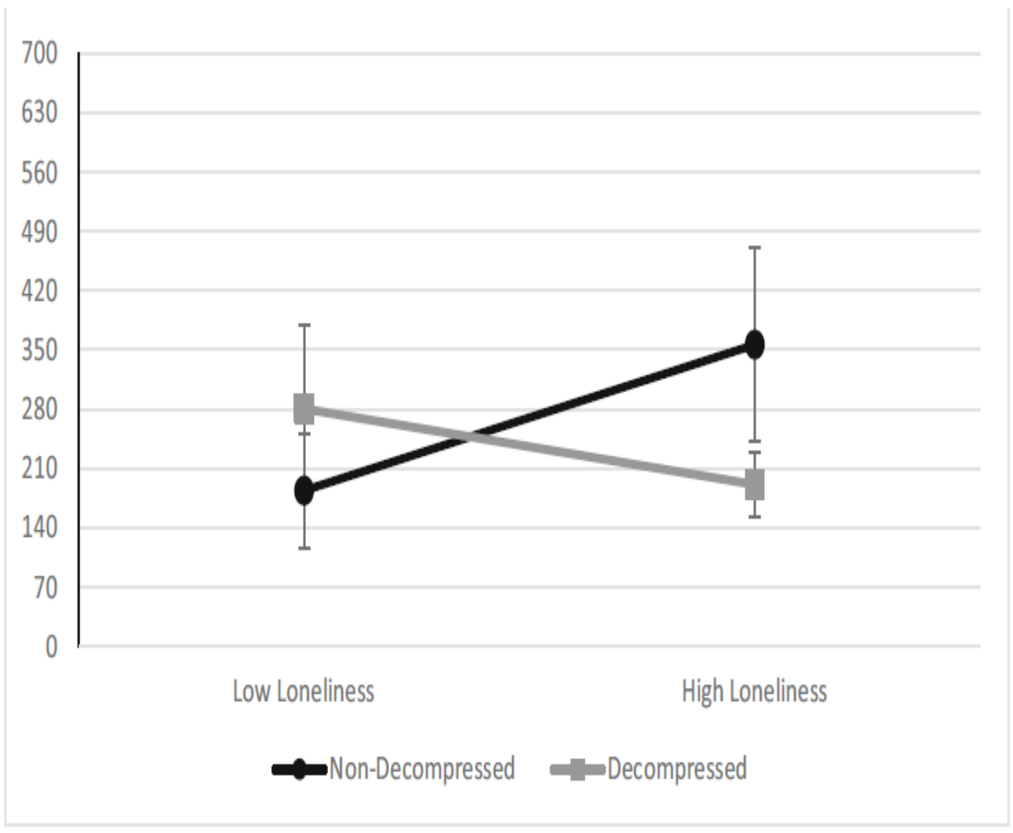
Results

The key results were that non-decompressed patients showed increases in estrogen levels with increasing levels of loneliness, but decreased levels of estrogen with increasing levels of loneliness for decompressed patients. The opposite pattern of results occurred for cortisol levels as measured by AUCG—decompressed patients showed increases in estrogen levels with increasing levels of loneliness, but decreased levels of estrogen with increasing levels of loneliness for non-decompressed patients. .

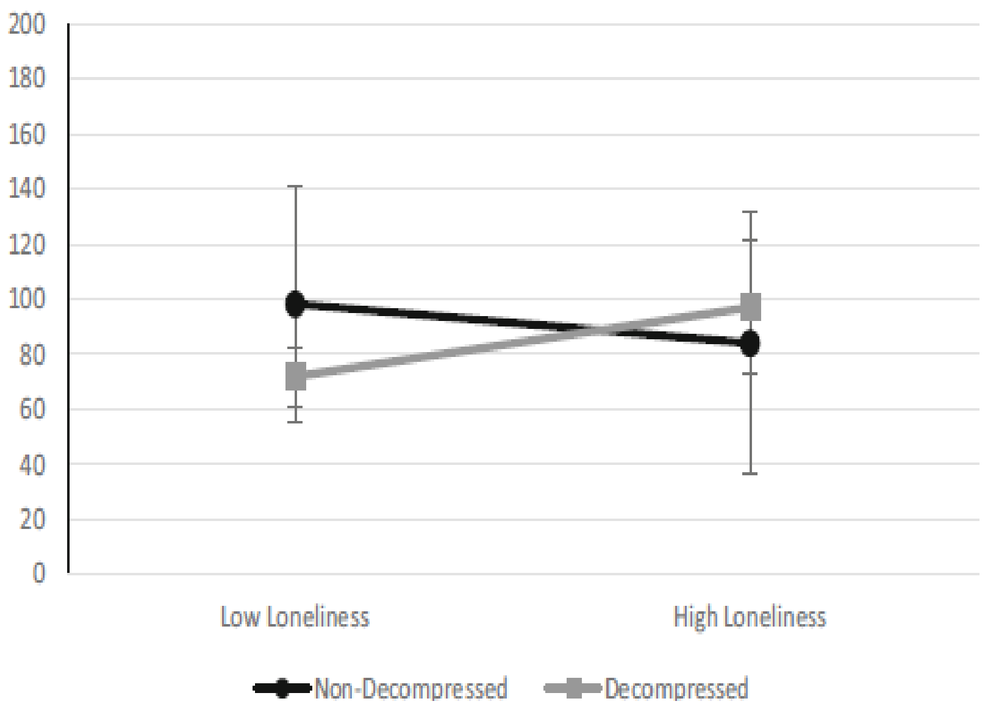
Conclusions

We assessed the inflammatory response in CM patients using cortisol, IL-6, and CRP, and we measured biological resilience using estrogen (McEwen & Seeman, 1999). We found that decompressed CM patients showed an increase in cortisol and a decrease in estrogen levels as loneliness increased, but the opposite pattern occurred for non-decompressed. This suggests that decompressed CM patients did not have the biological resources to upregulate neuro-protective hormones such as estrogen in the context of a stronger inflammatory response (as indicated by the cortisol response). On the other hand, non-decompressed CM patients were able to upregulate levels of neuro-protective estrogen.

Surgical Status x Loneliness Level Interaction on Estrogen



Surgical Status x Loneliness Level Interaction for Average AUCG



Reference:

Garcia, M.A., Li, X., Allen, P.A., Delahanty, D.L., Eppelheimer, M.S., Houston, J.R., Johnson, D.M., Loth, F., Maleki, J., Vorster, S., & Luciano, M.G. (2021). Impact of Surgical Status, Loneliness, and Disability on Interleukin 6, C-Reactive Protein, Cortisol, and Estrogen in Females with Symptomatic Type I Chiari Malformation. *The Cerebellum,* 20:872