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Exploring serum and CSF Calcitonin Gene Related Peptide levels: A promising biomarker in multiple sclerosis?

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Introduction:

Calcitonin Gene Related Peptide (CGRP) is a neuropeptide ubiquitous in the peripheral and central nervous system, mostly known for the role in vasodilation and pain signal transmission during migraine attacks. Recent studies have been unraveling its immunomodulatory properties, including its possible role in multiple sclerosis (MS) pathophysiology, however there is no conclusive evidence on whether it plays a pro or anti-inflammatory role.

Objectives/Aims:

To evaluate soluble CGRP levels at MS diagnosis, in cerebrospinal fluid (CSF) and serum, and evaluate associations with progression and short-term disease severity.

Methods:

We enrolled for a retrospective cohort study 59 patients (39 females, mean age at diagnosis 38.79 years ± standard deviation or SD 9.89) with Radiological Isolated Syndrome (RIS), Clinical Isolated Syndrome (CIS) and Relapsing-Remitting (RR) MS. During the diagnostic work-up were collected clinic-demographic data, serum and CSF. Patients were followed with clinical visits in which clinical data were collected.*** CGRP levels were determined through an ELISA commercial kit (MyBioSource Inc, MBS267126, San Diego, CA, USA). None had a history of migraine attack at diagnosis. Statistical analyses were conducted with STATA software to determine Mann–Whitney, Kruskal-Wallis test and Spearman's rank correlation coefficient significance.

Results:

CGRP levels were significantly higher in MS patients if compared to healthy controls published by Papiri et Al. (PMID: 37013432) and Han et Al. (PMID: 35204700). Mean values resulted 73.10 pg/ml in serum (±9.42 vs 29.50 ± 8.91, $p<0.05$ t-test) and 64.01 in CSF (± 10.39 vs 52.05 ± 5.70, $p<0.05$ t-test). CGRP levels did not relate to clinical variables at diagnosis: age, gender, Expanded Disability Status Scale (EDSS), number of T2, gadolinium enhancing and spinal cord lesions. However, there was a positive correlation between serum CGRP and the Multiple Sclerosis Severity Score (MSSS) at the last follow up ($r2 = 0.27$, $p<0.05$ Spearman's rank correlation).

Conclusion:

We observed an increased CGRP level in the CSF and serum of MS patients at diagnosis. Our findings suggest its potential use as a biomarker to identify cases with poor prognosis, indicating a pro-inflammatory effect of this neuropeptide.

Disclosures:

Angelo Bianchi: nothing to disclose