Correlation of Prolactin, Alkaline Phosphatase, VDBP and Calcium in MS and Controls – An Extension of a CYP2J2 Genetic Study

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Introduction and Purpose

The current literature has a consistent link of gene, environment and autoimmune factors at play in the pathogenesis of MS. Vitamin D plays a role in the development and progression of MS. This study extends the association between the CYP2J2 (Vitamin D-7 hydroxylase) gene and a disease phenotype to explore if a complete vitamin D bioactivation pathway leads to the highest levels of vitamin D metabolites. This study also extends previous studies that indicated the potential for an association between the CYP2J2 gene and MS. The inhibition by CYP2J2 of 7α-hydroxycholesterol can be converted to 25-hydroxycholesterol (25OHD) via 25-hydroxycholesterol 1α-hydroxylase (CYP27A1) in the liver to form 1,25-dihydroxycholecalciferol (1,25[OH]2D3), a hormone that is important for regulation of calcium homeostasis and immune function.

Methods

Association analysis was performed using the multiple logistic regression model to explore if the levels of alkaline phosphatase, VDBP and prolactin demonstrate a relationship with sex of the subject. The tests of the effect of sex and the relationship between the variables of MS, age, sex and vitamin D were also determined.

Subsequent exploration was performed using analysis of variance to test the null hypothesis that the means are equal for the treatment groups. Post-hoc testing was used to explore the differences between groups.

Vitamin D Binding Protein

VDBP is a multifunctional serum protein belonging to the albumin gene family. It transports Vitamin D and its metabolites between the blood and extracellular tissues. Its effect on calcium levels is synergized by the presence of parathyroid hormone. In general, there is an inverse relationship between the level of VDBP and serum calcium. The information on this poster is data gleaned from the CYP2J2 study that CYP2J2 is the physiological relevant enzyme (dehydrocholesterol 7α-hydroxylase) for Vitamin D synthesis and activation.

Calcium

Calcium is the most abundant ion in the human body. It is essential for cell signaling and the propagation of nerve impulse. Calcium is a regulator of cell growth and differentiation. This study extends previous studies that indicated the potential for an association between the CYP2J2 gene and MS. The inhibition by CYP2J2 of 7α-hydroxycholesterol can be converted to 25-hydroxycholesterol (25OHD) via 25-hydroxycholesterol 1α-hydroxylase (CYP27A1) in the liver to form 1,25-dihydroxycholecalciferol (1,25[OH]2D3), a hormone that is important for regulation of calcium homeostasis and immune function.

Serum Statistics

Variable |
---|
N | Mean ± SD | Range |
---|
Vitamin D (ng/ml) | 457 | 35.90 ± 17.23 | 4.8 - 150.0 |
Alkaline Phosphatase (mcg/ml) | 457 | 11.95 ± 4.27 | 3.56 - 25.6 |
Calcium (mg/dl) | 457 | 10.07 ± 0.66 | 7.2 - 12.6 |
Vitamin D Binding Protein (mg/dl) | 457 | 32.71 ± 27.78 | 165.9 - 661.1 |
Prolactin (mcg/ml) | 454 | 10.04 ± 6.87 | 0.2 - 81.4 |

Vitamin D Binding Protein

VDBP plays an important role in serum levels and should be given regular consideration when evaluating patients with MS.

Association with Multiple Schizophrenia Status

<table>
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<th>N</th>
<th>P-value</th>
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<th>Affected</th>
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Effect of Age

Calcium levels in MS affected individuals may reflect an increase in release of calcium from bone to address the body’s need to maintain serum calcium levels. It is possible that the associations seen in this population would not be seen in other populations due to the homogeneity of this population. MS is an inflammatory autoimmune disease with traditionally lower Vitamin D levels than non-MS. The increase in oligodendrocytes promotes white matter repair in MS and may explain the race related levels of autoimmune disease. It is common for patients with sepsis to have a high calcium level (hypercalcemia). Sepsis is inflammation state due to an infection or septicemia, often accompanied by fever. The increase in oligodendrocytes promotes white matter repair in MS and may explain the race related levels of autoimmune disease. It is common for patients with sepsis to have a high calcium level (hypercalcemia). Sepsis is inflammation state due to an infection or septicemia, often accompanied by fever. MS is an inflammatory autoimmune disease with traditionally lower Vitamin D levels than non-MS. The increase in oligodendrocytes promotes white matter repair in MS and may explain the race related levels of autoimmune disease. It is common for patients with sepsis to have a high calcium level (hypercalcemia). Sepsis is inflammation state due to an infection or septicemia, often accompanied by fever.

Association with Age

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<tr>
<td>Calcium</td>
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<tr>
<td>VDBP</td>
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</tr>
</tbody>
</table>

Vitamin D is the most attractive environmental factor for consideration. There are 3 ways Vitamin D can be activated in the liver. It is possible that the associations seen in this population would not be seen in other populations due to the homogeneity of this population. MS is an inflammatory autoimmune disease with traditionally lower Vitamin D levels than non-MS. The increase in oligodendrocytes promotes white matter repair in MS and may explain the race related levels of autoimmune disease. It is common for patients with sepsis to have a high calcium level (hypercalcemia). Sepsis is inflammation state due to an infection or septicemia, often accompanied by fever.

Correlations among IGAL, Calcium, VDBP and prolactin that are independent from each other are significant. Calcium levels in MS affected individuals may reflect an increase in release of calcium from bone to address the body’s need to maintain serum calcium levels. It is possible that the associations seen in this population would not be seen in other populations due to the homogeneity of this population. MS is an inflammatory autoimmune disease with traditionally lower Vitamin D levels than non-MS. The increase in oligodendrocytes promotes white matter repair in MS and may explain the race related levels of autoimmune disease. It is common for patients with sepsis to have a high calcium level (hypercalcemia). Sepsis is inflammation state due to an infection or septicemia, often accompanied by fever.

Future Directions

Further research is needed to determine if changes in these trends apply for MS or are altered by other autoimmune diseases as well as if the subject exercises and whether that exercise is inside or outside. It is possible that the associations seen in this population would not be seen in other populations due to the homogeneity of this population. MS is an inflammatory autoimmune disease with traditionally lower Vitamin D levels than non-MS. The increase in oligodendrocytes promotes white matter repair in MS and may explain the race related levels of autoimmune disease. It is common for patients with sepsis to have a high calcium level (hypercalcemia). Sepsis is inflammation state due to an infection or septicemia, often accompanied by fever.

References