

## **Investigation of a Combined Antibiotic Protocol to treat chronic chlamydia pneumoniae and its effect on extracranial blood flow in patients with MS and CCSVI**

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### **Abstract**

**Objective:** Chronic cerebrospinal venous insufficiency (CCSVI) is a condition associated with multiple sclerosis (MS) and manifested by stenoses and obstructions in the extracranial venous circulation. One mechanism that has been proposed for the association between MS and CCSVI is that the venous obstructions found in MS are due to a chronic persistent venulitis caused by the intra-cellular bacterial parasite, *chlamydia pneumoniae* (*Cpn*). The objective of the current study is to determine the effect of a combined antibiotic protocol (CAP) on the manifestation of venous obstruction seen in MS as measured by a quantitative duplex ultrasound examination.

**Method:** A non-randomised before-after cohort study was conducted to investigate differences in blood flow volumes pre and 6-months post antibiotic treatment for *Cpn* infection. Flow volume data was measured by Quantitative Extra-cranial Duplex Ultrasound (QECDU) across affected and unaffected sides from multiple veins segments, IJV J2, IJV J3 and vertebral vein (VV) and global arterial blood flow was also measured. The advantage of this study is that it incorporates a within subject control (un-affected side) and a between subjects control (no *Cpn* infection determined by serology IgG and/or IgA). The ultrasonographer was blinded as to the status of *Cpn* infection in each patient.

**Results:** A total of 57 patients were included in the study which is ongoing. 46 (80%) were found to have positive *Cpn* serology. Overall there was a difference in segmental flow volumes where J2 is higher than J3 which is higher than VV. There was a statistically significant post-treatment difference seen for the affected side of *Cpn* infected patients (mean difference= 47mls/min (95%CI: 18, 76) ( $p=0.0001$ ). There was a very slight increase seen for affected side of uninfected patients (mean difference = 5 mls/min, 95%CI:16, 26; $p=0.642$ ) and not statistically significant. The difference in these effects was statistically significant ( $p=0.022$ ). The largest effect was in the J3 segment (mean change 73ml/min,  $p=0.004$ ) and an effect in consistent direction was observed for J2 and VVs but neither of these was statistically significant.

There was a statistically significant post-treatment increase in mean global arterial flow for the infected patients (mean difference=87.7ml/min, 95%CI:0.22, 175,  $p=0.049$ ) and a difference of 46ml/min for non-infected patients that was not statistically significant ( $p=0.188$ ).

Interestingly, the mean venous volume flow decreased in the unaffected side for both infected and uninfected patients.

**Conclusion:** A CAP appears to improve the extra-cranial circulation in patients diagnosed with MS as assessed by QECDU. This effect is statistically significant in patients with positive *Cpn* serology. This study supports the theory that chronic infection with *Cpn* may be a significant contributor to the presence of CCSVI in MS patients.