Changes in Quality of Life Assessments and MRI Measured Intracranial Compliance of Migraine Subjects Receiving a National Upper Cervical Chiropractic Association (NUCCA) Atlas Correction

H. Charles Woodfield, III, BS Pharmacy,DC, Werner Becker, MD, D. Gordon Hasick, DC, Sarah Rose, PhD, Clive Beggs, PhD

Abbreviations:
PC-MRI: Phase Contrast Magnetic Resonance Imaging
NUCCA: National Upper Cervical Chiropractic Association
ICCI: Intracranial Compliance Index
QOL: Quality of Life
mTBI: mild traumatic brain injury
Keywords: migraine headache, quality of life, magnetic resonance imaging, cerebrospinal fluid, venous

Background: Using PC-MRI imaging, craniospinal flow changes were measured before, then after subjects that received a National Upper Cervical Chiropractic Association (NUCCA) atlas vertebrae correction. Previous study revealed an increased intracranial compliance (ICCI) with decreased venous pulsatility, following an atlas correction procedure.

Objective: This observational case series monitored eleven neurologist diagnosed migraine subjects in determining the consistency and sustainability of previously observed changes.

Methods: After screening by a neurologist, potential subjects signed consent, completed baseline migraine-specific quality of life (QOL) measures, returning in 30-days with a completed headache diary. Determination of need for NUCCA care confirmed study inclusion, allowing subjects to obtain baseline PC-MRI measures. Using a 1.5-Tesla GE 360 Optima MRI scanner, MRI acquired flow data analyses were completed using the software MRICP version 1.4.35 (Alperin Noninvasive Diagnostics, Chicago, IL). Subjects received care following the NUCCA protocol for eight weeks. Follow-up PC-MRI occurred at week four and eight following the intervention. Adverse reactions were surveyed one week after intervention. Headache diaries were maintained throughout the study. Neurologist end-of-study exit interviews allowed for final QOL outcomes collection.

Results: Of eighteen initially screened candidates, eight females, and three males, average age 41 years, met inclusion criteria. Four subjects with substantial secondary paravertebral venous drainage, showed an increase in ICCI. Seven subjects exhibiting primary jugular outflow, show ICCI unchanged from baseline. All subjects reported a clinically relevant improvement in at least one or more QOL assessments. Ten subjects reported mild neck discomfort occurring 24 hours after intervention, not requiring medication or treatment.

Conclusion: QOL measures seemed to indicate resolution of many migraine symptoms. The literature reports Mild traumatic brain injury (mTBI) patients show a predominant secondary venous drainage when compared to normal controls. Subjects reporting a remote history of concussion demonstrated a secondary venous drainage. Perhaps this study's ICCI changes were influenced by concussion and aforementioned secondary venous outflow indicating further investigation. The significance of consistent or increase in ICCI following intervention observed in the secondary venous drainage cohort compared to the jugular cohort remains unknown.