

Factors Associated with Patient-Reported Postsurgical Symptom Improvement in Adult Females with CMI: A Report From the Chiari1000

Richard Labuda, Dorothy Loth, Philip A Allen, Francis Loth

Purpose

The goal of this study was to assess if a broad array of factors is predictive of patient-reported surgical impact on symptoms.

Methods

Sixty-five pre-surgical factors were selected from the self-report history questionnaires (12 variables, N=653), standardized scales (14 variables, N=494-581), and morphometric measurements from magnetic resonance imaging (39 variables, N=137) data of adult women in the Chiari1000 dataset. The factors were tested independently to identify those that were either significantly different in terms of, or significantly related to, patient reported surgical impact on symptoms ($p < 0.05$). These results were then used to build a forward selection regression model to identify which factors uniquely predicted symptom improvement, and to see how much of the variation (variance) in outcomes could be explained by these factors.

Results

Overall, 74.4% of the subjects reported either some level of improvement or complete resolution of symptoms. Independent testing identified 12 significant factors, including having a family member diagnosed with Chiari malformation (CMI), Ehlers-Danlos Syndrome, migraines, duration of symptoms > 2 years, multiple surgeries, symptom severity, depression, anxiety, stress, and loneliness. Depression exhibited the highest correlation ($r=0.36$, $p < 0.00001$) with a negative outcome. The regression model accounted for 34% of the outcome range, and identified 5 factors with significant, unique contributions to the outcome variability.

Conclusions

The regression model accounted for more than a third of the surgical impact variance. Having a family member diagnosed with CMI contributed the largest unique variance to the model, suggesting that hereditary CMI may represent a unique subset of patients with poorer outcomes. Independent testing showed that psychological factors, such as depression and anxiety, were significant negative predictors, indicating that presurgical screening and treatment for these psychological conditions may improve outcomes.

Chiari1000 Question & Scoring:

Overall, how did surgery impact your symptoms:

Completely Resolved = 5

Improved Significantly = 4

Improved Slightly = 3

No Change = 2

Got Worse = 1

Patient Reported Surgical Impact on Symptoms (653 subjects)

| | N | % |
|------------------------|-----|-------|
| <i>Surgical Impact</i> | | |
| Completely Resolved | 11 | 1.7% |
| Improved Significantly | 252 | 38.6% |
| Improved Slightly | 223 | 34.2% |
| No Change | 60 | 9.2% |
| Got Worse | 107 | 16.4% |

Comparison of Symptom Impact Average Scores for Significant Self-Report Factors

| Factor | Surgical Impact Average Score | |
|------------------------|-------------------------------|------|
| | Yes | No |
| Dx Family Member | 2.84 | 3.04 |
| Ehlers-Danlos Syndrome | 2.77 | 3.03 |
| Migraines | 2.94 | 3.12 |
| Symptoms > 2 Yrs | 2.91 | 3.24 |
| Multiple Surgeries | 2.84 | 3.05 |