

**Chiropractic Care and the Risk of Vertebrobasilar Stroke:  
Results of a Case-control Study in U.S. Commercial and Medicare  
Advantage Populations**

**Chiropractic & Manual Therapies  
2015; 23:19; pp. 1-10**

Thomas M Kosloff, David Elton, Jiang Tao and Wade M Bannister

- 1) "The burden of neck pain and headache or migraine among adults in the United States is significant." "In any given year, neck pain affects 30% to 50% of adults in the general population." Also, the prevalence of headache is substantial.
- 2) "In the United States, chiropractic care is frequently utilized by individuals with neck and/or headache complaints."
- 3) "Chiropractors routinely employ spinal manipulative treatment (SMT) in the management of patients presenting with neck and/or headache."
- 4) The main purpose of this study was to replicate the case-control epidemiological design published by Cassidy, et al. to investigate the association between chiropractic care and VBA stroke; and compare it to the association between recent PCP care and VBA stroke. **[Article Review #06-09: Risk of Vertebrobasilar Stroke and Chiropractic Care: Results of a Population-Based Case-Control and Case-Crossover Study].**
- 5) The objective of this study was to compare:
  - A)) The associations with chiropractic care and vertebrobasilar artery (VBA) stroke, and
  - B)) The associations between with recent primary care physician (PCP) care and VBA stroke.
- 6) The authors assessed commercially insured and Medicare Advantage (MA) health plan members in the U.S. The data set included health plan members located in 49 of 50 states (excluded North Dakota) and encompassed national health plan data for 35,726,224 commercial and 3,188,825 MA members. **[This study looked at approximately 39 million people.]** "A total of 1,829 cases were identified, making this the largest case-control study to investigate the association between chiropractic manipulation and VBA stroke." **[Important]**
- 7) A total of 1,829 VBA stroke cases occurred over the 3-year period:
  - 1,159 – commercial group
  - 670 – Medicare Advantage (MA) group
 For each stroke case, four age and gender matched controls were randomly selected from sampled qualified members (4633 controls). The designated hazard period in this study was zero to 30 days prior to the index date.

8) “In both commercial and MA populations, there was a significant association between PCP visits and VBA stroke incidence.” **[Interesting]** This “positive association between PCP visits and VBA stroke is most likely due to patient decisions to seek care for the symptoms (headache and neck pain) of arterial dissection.” “Patients are more likely to see a PCP for symptoms related to vertebral artery dissection closer to the index date of their actual stroke. Since it is unlikely that the services provided by PCPs cause VBA strokes, the association between recent PCP visits and VBA stroke is more likely attributable to the background risk related to the natural history of the condition.”

9) “There was no association between chiropractic visits and VBA stroke found for the overall sample, or for samples stratified by age.” **[KEY]**

10) “We found no significant association between exposure to chiropractic care and the risk of VBA stroke. We conclude that manipulation is an unlikely cause of VBA stroke.” **[Important]**

11) “Our results increase confidence in the findings of a previous study, which concluded there was no excess risk of VBA stroke associated chiropractic care compared to primary care.”

12) “Our results add weight to the view that chiropractic care is an unlikely cause of VBA strokes.”

13) Previous research has indicated that most patients who experience a vertebral artery dissection are under the age of 45. “Our results did lend credence to previous reports that VBA stroke occurs more frequently in patients under the age of 45 years.”

14) “There were no significant differences in pure hypercholesterolemia for either the commercial or MA populations.” **[Important, indicating that high cholesterol levels did not appear to be a factor in stroke]**

15) With the exception of hypertension, there are reasons to question the clinical significance of the following conditions as risk factors in the occurrence of stroke due to vertebral artery dissection:

- ischemic heart disease
- disease of pulmonary circulation
- other forms of heart disease
- hypercholesterolemia
- diseases of other endocrine glands
- hypertension
- smoking
- diabetes mellitus
- obesity/overweight

“Only hypertension had a positive association with cervical artery dissection.”  
**[increased relative risk by 67%] [Important: this would argue that we should take blood pressure on all of our patients]**

16) A secondary analysis was conducted to determine the relevance of using chiropractic visits as a proxy for exposure to manipulative treatment.

17) This “analysis clearly showed that manipulation may or may not have been reported at every chiropractic visit. Therefore, the use of chiropractic visits as a proxy for manipulation may not be reliable.”

18) Using chiropractic visits as a measure of exposure to manipulation is unreliable because this study shows that at least 30% of chiropractic patients are not manipulated. This highlights the potential “flaws in using a surrogate variable (chiropractic visits) to estimate the risk of VBA stroke in association with a specific intervention (manipulation).”

19) “The current study does not exclude cervical manipulation as a possible cause or contributory factor in the occurrence of VBA stroke.”  
[Every clinician should use caution and sound clinical judgment]