

### How Safe Is Chiropractic Manipulation?

**Cassidy JD, Boyle E, Côté P, He Y, Hogg-Johnson S, Silver FL, Bondy SJ. Risk of vertebrobasilar stroke and chiropractic care: results of a population-based case-control and case-crossover study. *Spine* 2008;33:S176-83.**

**SYNOPSIS:** This was a population-based, case-control, and case-crossover study that measured the associations between chiropractic visits and vertebrobasilar artery (VBA) stroke, and contrasted these with primary care physician (PCP) visits and VBA stroke. Cases included eligible incident VBA strokes admitted to Ontario hospitals from 1993 to 2002. Controls were age- and gender-matched to each case. Case and control exposures to doctors of chiropractic and PCPs were determined from health billing records in the year before the stroke date. In the case-crossover analysis, cases acted as their own controls.

There were 818 VBA strokes hospitalized in a population of more than 100 million person-years. In those younger than 45 years, cases were about 3 times more likely to see a DC or a PCP before a stroke than controls. Results were similar in the case-control and case-crossover analyses. There was no increased association between chiropractic visits and VBA stroke in those older than

45 years. Positive associations were found between PCP visits and VBA stroke in all age groups. Practitioner visits billed for headache and neck complaints were highly associated with subsequent VBA stroke.

#### **RESEARCH QUALITY:**

Overall, this study had good methodological rigor.

*Quality Details:* This study used the following: 1) the research design was appropriate for the question; 2) inclusion and exclusion criteria were well described, and the population was representative of the target; 3) appropriate controls were included; 4) statistical methods and analysis were appropriate; 5) the sample had adequate power; 6) the methods section provided a clear, step-by-step description; 7) exposures measured independently; and 8) the conclusion flowed logically from the evidence.

**CONCLUSION:** VBA stroke is a very rare event in the population. There is no evidence of increased risk for VBA stroke associated with chiropractic care compared to PCP care.

**COMMENTS:** *This study provides the best data to date on the relationship between neck manipulation and vertebral artery stroke. It is reasonable to conclude that patients are no more likely to suffer a stroke following a visit to a doctor of*

*chiropractic than they would be after stepping into their family doctor's office. The increased risks of vertebrobasilar artery stroke associated with chiropractic and PCP visits is most likely explained by patients with vertebrobasilar dissection-related neck pain and headache consulting both chiropractors and primary care physicians before a VBA stroke. Researchers have not ruled out that in rare circumstances, however, neck manipulation could be a potential cause of some strokes.*

*Several studies support these findings. Boyle found in an ecological study that VBA stroke does not seem to be associated with an increase in the rate of chiropractic utilization.<sup>1</sup> Thiel found no serious adverse events in the investigation of more than 19,000 patients after chiropractic manipulation of the cervical spine.<sup>2</sup> Rubinstein documented that even though adverse events are not uncommon, they are transient and mostly mild to moderate in severity.<sup>3</sup> Moreover, the benefits of chiropractic care for neck pain appear to outweigh the potential risks. There is evidence from a quality systematic review of clinical trials that patients with chronic neck pain show clinically important short- and long-term improvements from a course of spinal manipulation or mobilization.<sup>4</sup>*

### Wellness Factors That Make a Difference

**Khaw KT, Wareham N, Bingham S, Welch A, Luben R, Day N. Combined impact of health behaviours and mortality in men and women: the EPIC-Norfolk prospective population study. *PLoS Med* 2008;5:e12.**

**SYNOPSIS:** This was a prospective cohort study that examined the potential impact of 4 health behaviors on mortality in men and women. The study included over 20,000 men and women aged 45-79 years with no known cardiovascular disease or cancer at baseline survey in 1993-1997, living in the general community in the United Kingdom, and followed up to 2006. Participants scored 1 point for each of the following health behaviors: currently nonsmoking, physically active, moderate alcohol intake (1-14 units a week), and plasma vitamin C >50 mmol/l indicating fruit and vegetable intake of at least five servings a day, for a total score ranging from 0 to 4.

The adjusted relative risks for all-cause mortality for men and women who had 3, 2, 1, and 0 compared to all 4 health behaviors were respectively, 1.39, 1.95, 2.52, and 4.04. The trends were strongest for cardiovascular causes.

#### **RESEARCH QUALITY:**

Overall, this study had good methodological rigor.

*Quality Details:* This study used the following: 1) the research design was appropriate for the question; 2) inclusion and exclusion criteria were well described, and the population was representative of the target; 3) the sample had adequate power; 4) it

included collection of appropriate baseline data; 5) outcome measures were valid and relevant; 6) the follow-up period was suitable; 7) subjects started at "zero" point; 8) statistical methods were appropriate; 9) analysis was adjusted for confounding; and 10) the conclusion flowed logically from the evidence.

**CONCLUSION:** Four combined health behaviors predict a 4-fold difference in total mortality in men and women, with an estimated impact equivalent to 14 years in chronological age.

**COMMENTS:** *Previous research supports these findings. A recent study indicated that adherence to a Mediterranean diet, nonsmoking, moderate alcohol use, and moderate physical activity were associated with a more than 50% lower rate of all-cause and cause-specific mortality.*<sup>5</sup>

*There is evidence that behavioral factors influence health. These results provide further support for the idea that even small differences in lifestyle may make a big difference to health in the population and should encourage behavior change.*

**Warning.** Practitioners should not automatically use information from research studies to make decisions about patient care, because health care literature suffers from inconsistent quality and frequently distorts research findings. Before relying on the findings of a research study, a practitioner should perform a critical appraisal to determine whether the conclusion is supported by the study's data. He or she should also locate and ex-

amine previous relevant research in order to integrate the current findings and form a conclusion based upon the preponderance of quality evidence. Even conclusions from multiple studies do not provide a definitive answer. Rather, they indicate the *direction* of the evidence. ■

*These reviews are excerpts from Direction of the Evidence, published by the Institute of Evidence-Based Chiropractic, whose aim is the integration of science into chiropractic practice in order to improve patient outcomes. Dr. Feise can be reached at [rjf@chiroevidence.com](mailto:rjf@chiroevidence.com)*

#### **References**

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