

Cholesterol, Chiropractic and Cardiovascular Health

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Chiropractors are developing an interest in cholesterol levels, medications, and vascular issues since in the past there have been implications of a relationship between cervical manipulations and cerebrovascular arterial (CVA) events¹. Apparently current research has found that the purported relationship to be so rare that any factors associated with chiropractic manipulation and CVA events are more coincidental than causal²⁻⁴. Therefore the chiropractic profession has been focusing on how to be aware of a CVA event in progress and how to prevent such an occurrence, leads to the need to understand the importance of the current relationship between cholesterol levels and vascular events.

In one study that analyzed 61 prospective observational studies they failed to find any association of total cholesterol (TC) with stroke mortality. Ultimately the total cholesterol (TC)/HDL cholesterol ratio was found to be more predictive of ischemic heart disease (IHD) mortality than total or non-HDL cholesterol. They also found a positive relation between cholesterol and stroke only in middle age and only in those with below-average blood pressure (BP); at older ages (70-89), and particularly for those with systolic BP greater than 145 mm Hg, total cholesterol was negatively related to hemorrhagic and total stroke mortality^{5,6}.

In the Ezetimibe (Zetia) and Simvastatin (Zocor) in Hypercholesterolemia Enhances Atherosclerosis Regression (ENHANCE) study they found in their trial that patients who had an LDL cholesterol level of 178 mg per deciliter (4.60 mmol per liter) while receiving combination therapy with simvastatin plus ezetimibe, the carotid intima-media thickness progressed by 0.0111 mm. With a similar level of LDL cholesterol (167 mg per deciliter [4.32 mmol per liter]) during therapy with 80 mg of atorvastatin

(Lipitor) in the ASAP study, intima-media thickness regressed substantially, by 0.031 mm⁷.

However it has been questioned, "Does the ENHANCE study prove that ezetimibe provides no benefit when added to statin therapy or, for that matter, as monotherapy? For now, the study's findings are a red flag but not a black box⁸."

"The results of ongoing trials, such as the Improved Reduction of Outcomes: Vytorin Efficacy International Trial [IMPROVE-IT]), which will not be available until at least 2011, are expected not only to help define the role of ezetimibe in the treatment of hypercholesterolemia but also to provide insight into the biology of LDL cholesterol lowering and the use of carotid intima-media thickness as a surrogate indicator of coronary events⁹.

"Until such data are available, it seems prudent to encourage patients whose LDL cholesterol levels remain elevated despite treatment with an optimal dose of a statin to redouble their efforts at dietary control and regular exercise. Niacin, fibrates, and resins should be considered when diet, exercise, and a statin have failed to achieve the target, with ezetimibe reserved for patients who cannot tolerate these agents⁹."

The direction of vascular health and prevention seems to be towards issues of vascular inflammation and TC/HDL ratios⁶ and not so much on lowering total cholesterol levels. Therefore some markers such as homocysteine¹⁰⁻¹², c-reactive protein^{13,14} and clinical indicators of precursors of vascular inflammatory processes¹⁵ may offer a window into a patient's potential cardiovascular health. There is even some suggestion that the positive affects of statin medications are associated

with their ability to reduce vascular inflammation processes¹⁶ and not related to their affect on cholesterol. So far that leaves us best with interventions that offer low risk such as exercise^{17,18}, low inflammatory diets¹⁹, and increasing omega three supplementation²⁰ all of which would seem to be the recommended first line in treatment and prevention of possible vascular events.

References

1. Haneline MT, Rosner AL. **The etiology of cervical artery dissection.** *Journal of Chiropractic Medicine.* Sep 2007; 6(3): 110-120.
2. Thiel HW, Bolton JE, Docherty S, Portlock JC. **Safety of Chiropractic Manipulation of the Cervical Spine: A Prospective National Survey.** *Spine.* 32(21):2375-2378, October 1, 2007.
3. Rubinstein SM, Leboeuf-Yde C, Knol DL, de Koekkoek TE, Pfeifle CE, van Tulder MW. **The Benefits Outweigh the Risks for Patients Undergoing Chiropractic Care for Neck Pain: A Prospective, Multicenter, Cohort Study.** *J Manip Physiological Therapeutics.* Jul 2007;30(6): 408-18.
4. 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 Feb 15;33(4 Suppl):S176-83.
5. **Prospective Studies Collaboration. Blood cholesterol and vascular mortality by age, sex and blood pressure: a meta-analysis of individual data from 61 prospective studies with 55 000 vascular deaths.** *Lancet.* 2007;370:1829-1839.
6. Amarenco P, Steg PG. **The paradox of cholesterol and stroke.** *Lancet.* 2007;370:1803-1804.
7. Kastelein JJ, Akdim F, Stroes ES, Zwinderman AH, Bots ML, Stalenhoef AF, Visseren FL, Sijbrands EJ, Trip MD, Stein EA, Gaudet D, Duivenvoorden R, Veltri EP, Marais AD, de Groot E; the ENHANCE Investigators. **Simvastatin with or without Ezetimibe in Familial Hypercholesterolemia.** *N Engl J Med* 2008;358:1431-a-1443.
8. Brown BG, Taylor AJ. **Does ENHANCE Diminish Confidence in Lowering LDL or in Ezetimibe?** *N Engl J Med.* 2008 Mar 30.
9. Drazen JM, Jarcho JA, Morrissey S, Curfman GD, **Cholesterol Lowering and Ezetimibe.** *N Engl J Med;* March 30, 2008.
10. Cui R, Moriyama Y, Koike KA, Date C, Kikuchi S, Tamakoshi A, Iso H; JACC Study group. **Serum total homocysteine concentrations and risk of mortality from stroke and coronary heart disease in Japanese: The JACC study.** *Atherosclerosis.* 2007 Dec 27;
11. Vanuzzo D, Pilotto L, Lombardi R, Lazzarini G, Carluccio M, Diviacco S, Quadrifoglio F, Danek G, Gregori D, Fioretti P, Cattaneo M, De Caterina R. **Both vitamin B6 and total homocysteine plasma levels predict long-term atherothrombotic events in healthy subjects.** *Eur Heart J.* 2007 Feb;28(4):484-91.
12. Tanne D, Haim M, Goldbourt U, Boyko V, Doolman R, Adler Y, Brunner D, Behar S, Sela BA.. **Prospective study of serum homocysteine and risk of ischemic stroke among patients with preexisting coronary heart disease.** *Stroke.* 2003 Mar;34(3):632- 6.
13. Tanne D, Benderly M, Goldbourt U, Haim M, Tenenbaum A, Fisman EZ, Matas Z, Adler Y, Zimlichman R, Behar S, C- **Reactive Protein as a Predictor of Incident Ischemic Stroke Among Patients With Preexisting Cardiovascular Disease.** *Stroke.* 2006 Jul;37(7):1720-4.

14. Cao JJ, Thach C, Manolio TA, Psaty BM, Kuller LH, Chaves PH, Polak JF, Sutton-Tyrrell K, Herrington DM, Price TR, Cushman M. **C-reactive protein, carotid intima-media thickness, and incidence of ischemic stroke in the elderly: the Cardiovascular Health Study.** *Circulation*. 2003 Jul 15;108(2):166-70.
15. O'Callaghan PA, Fitzgerald A, Fogarty J, Gaffney P, Hanbidge M, Boran G, Enright H, Murphy J, McCarthy B, Graham IM. **New and old cardiovascular risk factors: C-reactive protein, homocysteine, cysteine and von Willebrand factor increase risk, especially in smokers.** *Eur J Cardiovasc Prev Rehabil*. 2005 Dec;12(6):542-7.
16. Shishehbor MH, Brennan ML, Aviles RJ, Fu X, Penn MS, Sprecher DL, Hazen SL. **Statins promote potent systemic antioxidant effects through specific inflammatory pathways.** *Circulation*. 2003 Jul 29;108(4):426-31.
17. Kodama S, Tanaka S, Saito K, Shu M, Sone Y, Onitake F, Suzuki E, Shimano H, Yamamoto S, Kondo K, Ohashi Y, Yamada N, Sone H. **Effect of aerobic exercise training on serum levels of high-density lipoprotein cholesterol: a meta-analysis.** *Arch Intern Med*. 2007 May 28;167(10):999-1008.
18. Halverstadt A, Phares DA, Wilund KR, Goldberg AP, Hagberg JM. **Endurance exercise training raises high-density lipoprotein cholesterol and lowers small low-density lipoprotein and very low-density lipoprotein independent of body fat phenotypes in older men and women.** *Metabolism*. 2007 Apr;56(4):444-50.
19. Seaman DR. **The Diet-Induced Proinflammatory State: A Cause of Chronic Pain and Other Degenerative Diseases?** *J Manipulative Physiol Ther* 2002; 25:168-79.
20. Calabresi L, Villa B, Canavesi M, Sirtori CR, James RW, Bernini F, Franceschini G. **An omega-3 polyunsaturated fatty acid concentrate increases plasma high-density lipoprotein 2 cholesterol and paraoxonase levels in patients with familial combined hyperlipidemia.** *Metabolism*. 2004 Feb;53(2):153- 8.