Academy of PHYSICAL MEDICINE

Research Paper Review

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Chiropractic Care and Risk for Acute Lumbar Disc Herniation

European Spine Journal 2017; Oct 16. doi: 10.1007/s00586-017-5325-y.

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ABSTRACT

INTRODUCTION: *Chiropractic care is popular for low back pain, but may increase the risk for acute lumbar disc herniation (LDH). Low back pain is a common early (prodromal) symptom of LDH and commonly precedes LDH diagnosis. The objective of this study was to investigate the association between chiropractic care and acute LDH with early surgical intervention, and contrast this with the association between primary care physician (PCP) care and acute LDH with early surgery.*

METHODS*: Using a self-controlled case series design and population-based healthcare databases in Ontario, Canada, we investigated all adults with acute LDH requiring emergency department (ED) visit and early surgical intervention from April 1994 to December 2004. The relative incidence of acute LDH with early surgery in exposed periods after chiropractic visits relative to unexposed periods was estimated within individuals, and compared with the relative incidence of acute LDH with early surgery following PCP visits.*

RESULTS: *195 cases of acute LDH with early surgery (within 8 weeks) were identified in a population of more than 100 million person-years. Strong positive associations were found between acute LDH and both chiropractic and PCP visits.*

DISCUSSION: *The risk for acute LDH with early surgery associated with chiropractic visits was no higher than the risk associated with PCP visits.*

CONCLUSION*: Both chiropractic and primary medical care were associated with an increased risk for acute LDH requiring ED visit and early surgery. Our analysis suggests that patients with prodromal back pain from a developing disc herniation likely seek healthcare from both chiropractors and PCPs before*

full clinical expression of acute LDH. We found no evidence of excess risk for acute LDH with early surgery associated with chiropractic compared with primary medical care..

ANALYSIS

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Background Information

Lumbar disc herniation (LDH) is considered one of the most recognizable and clinically challenging sources of low back pain (LBP). The diagnosis of LDH is usually based on a clinician observing a set of signs and symptoms that point to compression or irritation of a lumbar spinal nerve root, such as:

1. lumbosacral radiculopathy (radicular leg pain or 'sciatica'),
2. nerve root tension signs (e.g. positive straight leg raise or nerve tension tests),
3. neurologic deficits (e.g. muscle weakness, reflex changes, sensory deficits), and
4. advanced imaging (e.g. MRI or CT) findings that correlate with the clinical syndrome.

The clinical picture of LDH in the early stages (i.e. the prodromal phase), in which LBP progresses to radicular leg pain and possible neurologic signs, is often uncertain and can be a confusing time for both patients and clinicians. Thus, making a diagnosis of LDH during the early course of symptoms is often very difficult. People with LDH may consult a healthcare provider at different points in time along this course before radiculopathy or neurologic deficit has manifested, in which case the treatment itself might be mistakenly blamed for causing the LDH (which, in theory, was going to happen anyway). This type of error is called *protopathic bias*, wherein reverse-causality bias is present that is related to processes that occur before an outcome has been measured or diagnosed.

When LBP patients receive chiropractic care while in the prodromal phase of LDH and then later experience acute herniation, the observed association between the intervention

and outcome may *not* be causal. Also, many LBP patients seek care from primary care physicians (PCPs) whose interventions are not likely to cause LDH, so any observed association between intervention and outcome could be attributed to care seeking for the initial symptoms of LDH (i.e. protopathic bias).

Several randomized clinical trials have reported on the effectiveness of spinal manipulation in the management of LDH with radiculopathy (1-3); however, the safety of this treatment has not been adequately investigated. No valid epidemiologic studies have assessed the risk for acute disc herniation following chiropractic treatment; only case reports and small case series (lowest level of scientific evidence) have linked lumbar spine manipulation to LDH.

The objective of this study was to compare the associations between PCP and chiropractic care in relation to acute LDH with early surgery.

The study's hypothesis was that chiropractic care could only be thought to increase the risk for acute LDH if the measured association between chiropractic visits and acute LDH exceeded the association between PCP visits and acute LDH.

Pertinent Results:

The databases revealed 36,745 persons who had incident disc surgery during the study period. Many of them were excluded for the following reasons:

- 423 were under 18 years of age at the time of their surgery,
- 180 had a history of long-term care service in the 2 years prior to their surgery,
- 9576 had no LDH diagnosis linked to their disc surgery,
- 25323 had no emergency department (ED) LDH visit within 8 weeks prior to their LDH surgery, and
- 1048 with LDH or associated diagnoses and interventions within 21 months prior to the acute LDH event index date.

Following the exclusions process, 195 cases of acute LDH requiring an ED visit and early surgery met the case definition criteria and were included in the analysis.

Chiropractic & Primary Care Physician (PCP) Visits:

- Seventy-two (37%) of the 195 cases had visited a chiropractor during the 12 month period prior to their event index date, while 186 (95%) had visited a PCP within that same time period.

- There were positive associations between chiropractic visits and acute LDH with early surgery regardless of the length of the risk period. For the risk period 0-7 days after a chiropractor visit, the adjusted incidence rate ratio (IRR) was 12.9 (95% CI 7.2-23.3).

- There were also strong positive associations between PCP visits and acute LDH with early surgery for all risk periods. The risk period 0-7 days after a PCP visit resulted in an IRR of 14.5 (95% CI 9.9-21.2).

- When the analyses were restricted to only include visits related to lumbar spine complaints, the associations for PCP visits increased, but not associations for chiropractic visits.

- Sensitivity analyses were performed, which essentially did not change the above results.

- A bootstrap analysis of the ratio of the incidence rate ratios (IRRs) for chiropractic care compared to PCP care was performed, which showed a positive safety profile for chiropractic care as compared to PCP care. *NOTE: Bootstrapping is a type of resampling where large numbers of smaller samples of the same size are repeatedly drawn, with replacement, from a single original sample. Bootstrapping is loosely based on the law of large numbers, which states that if you sample over and over again, your data should approximate the true population data.*

CLINICAL APPLICATION & CONCLUSIONS

The authors concluded that patients with prodromal back pain caused by a developing lumbar disc herniation seek healthcare from both chiropractors and PCPs prior to full clinical expression of acute LDH that is eventually managed with early surgery. The positive associations between PCP visits and acute LDH with early surgery were stronger than for chiropractic care.

Even though a positive association between chiropractic care and acute LDH with early surgery was found in this study, the fact that there was a stronger positive association between PCP visits (which would not plausibly cause LDH) and acute LDH with early surgery suggests that the associations are explained by protopathic bias. In other words, patients with LDH-related LBP may have sought healthcare for this prodromal symptom before the LDH was diagnosed. Therefore, the associations that were observed represent the background risk of patients seeking healthcare for early prodromal symptoms of LDH.

On the other hand, it is possible that spinal manipulation or even physical examination maneuvers could exacerbate a developing or latent disc herniation, leading to full clinical expression of an already-existing condition.

The authors pointed out that there are no clinical screening tests available that can accurately identify LBP patients who are at increased risk of developing acute LDH. They also pointed out that most physical tests used to identify LDH are not very accurate.

Clinicians should therefore continue to be vigilant when caring for patients with LBP, observing for signs and symptoms of neurological involvement and take appropriate actions if they occur.

STUDY METHODS

The data in this study were derived from four population-based healthcare databases in Ontario, Canada that included information on patients' hospitalizations and surgeries, emergency department (ED) visits, and practitioner (chiropractor and physician) as well as other healthcare utilization as documented by fee-for-service billings.

This was a self-controlled case series, which is considered a type of cohort study. Self-controlled means that within-person comparisons were used to determine relative risk. In other words, each individual was compared with themselves during both the exposed and unexposed observation times. This research design controls for variables, like gender and BMI, that are unchanged during the study.

The source population was comprised of all Ontario residents, aged 18 years or older, who were covered by the provincial universal healthcare system between April 1, 1992 and November 30, 2004.

Cases were selected from the above-mentioned databases and included persons with acute LDH that resulted in early surgery. Cases also had to have presented to a hospital ED for LDH within 8 weeks prior to their LDH surgery.

Persons who had a diagnosis of LDH 21 months prior to their event index date were excluded from the study. Also excluded were those who had visited neurosurgeons, orthopaedic surgeons, neurologists, physiatrists, or rheumatologists, or if they had advanced spine imaging or diagnostic testing related to LDH during the same time period.

Exposures were healthcare visits to chiropractors and PCPs that occurred in the 1-year period before date of the event (i.e. early LDH surgery).

STUDY STRENGTHS/WEAKNESSES

The self-controlled case series design that was used strengthens the results of this study because persons were compared with themselves. This controls for confounding factors that do not change over time (e.g. obesity, smoking, certain occupations), which could have an impact on the risk for acute LDH.

One of the weaknesses of this type of study, where the risk for a certain condition following a healthcare visit is examined, is the added potential for confounding. This is because persons who seek healthcare may be different from those who do not.

There is always a potential for misclassification bias in studies that use administrative healthcare data (e.g., intervention and diagnosis codes), as was done in this study. However, the authors tested the impact of this bias using sensitivity analyses, which yielded results similar to their primary analysis and did not change their conclusions.

Other study limitations include:

- The possibility that some chiropractic visits did not involve spinal manipulation and that other modalities may have been used in addition to manipulation (e.g. exercise, modified activities, and nonprescription medication). Simply visiting a chiropractor cannot be used as a proxy for receiving SMT.

- PCP visits could have involved a variety of treatments (e.g. medication, bed rest, physical therapy, and exercise).

The authors appropriately acknowledged these potential biases, but did not feel they would alter their conclusions.

Additional References:

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