

### Description of This Summary

This is a summary of an original research article published in *The New England Journal of Medicine* in July 2014. The original article is available at [www.nejm.org/doi/full/10.1056/NEJMoa1313265](http://www.nejm.org/doi/full/10.1056/NEJMoa1313265). This summary of evidence is provided to assist in informed clinical decision-making and should not be construed to represent clinical recommendations or guidelines.

### STUDY DESIGN AND OUTCOME MEASURES

The study design was a double-blind, multisite, randomized controlled trial. Patients who were at least 50 years of age, had evidence of central lumbar spinal stenosis on magnetic resonance imaging or computed tomography, and had moderate-to-severe leg pain and disability were eligible for the study. Of 400 eligible patients, 200 were enrolled in the lidocaine-alone group and 200 in the glucocorticoids-plus-lidocaine group. Lumbar epidural injections were performed under fluoroscopic guidance; the choice of an interlaminar or a transforaminal approach was left to the discretion of the study physician. The primary outcomes were changes in pain-related disability (measured by the Roland-Morris Disability Questionnaire [RMDQ]) and leg pain from baseline to 6 weeks after injection. The secondary outcomes were improvement in function and leg pain at 3 weeks; the proportions of patients with at least minimal clinically meaningful improvement ( $\geq 30\%$ ) and with substantial clinically meaningful improvement ( $\geq 50\%$ ) in disability and leg pain at 6 weeks; and scores at 3 and 6 weeks on six other measures of symptoms, function, and satisfaction. This trial also sought to compare the adverse effects of epidural injections of glucocorticoids plus lidocaine versus lidocaine alone over the first 6 weeks after injection, including changes in morning serum cortisol levels that reflect adrenal suppression.

# A Randomized Trial of Epidural Glucocorticoid Injections for Spinal Stenosis: A Brief Summary of Findings for Clinicians

### KEY CLINICAL ISSUE

What are the relative effectiveness and adverse effects of epidural injections of glucocorticoids plus lidocaine (a local anesthetic) versus lidocaine alone in patients aged 50 years and older who have lumbar central spinal stenosis and associated moderate-to-severe leg pain and disability?

### BACKGROUND

Symptomatic lumbar spinal stenosis (LSS) is a common problem in older adults. It often presents insidiously, with patients reporting lower extremity discomfort and paresthesias while standing or walking and nocturnal “leg cramps.” These symptoms worsen with spine extension (lying supine, walking down stairs or downhill) and improve with flexion (sitting, leaning forward when walking, lying in a flexed position).<sup>1</sup> There is clear evidence that the risk for acquiring LSS and associated lower back and leg pain and other symptoms increases with age because of age-related degenerative changes in the spine.

Symptoms of LSS are commonly treated with epidural glucocorticoid injections. An estimated 25 percent of all epidural glucocorticoid injections administered in the Medicare population are for spinal stenosis. Data from rigorous randomized controlled trials are limited regarding the effectiveness and safety of epidural glucocorticoid injections for LSS symptoms.

### KEY FINDINGS

- » At 6 weeks after injection, patients in both the glucocorticoids-plus-lidocaine group and the lidocaine-alone group had improved pain-related functional disability and leg pain intensity when compared with baseline. The degree of improvement in both function and pain was similar between groups.
- » The percentage of patients with an improvement in RMDQ score of  $\geq 50$  percent at 6 weeks was similar in both groups (glucocorticoids-plus-lidocaine: 23.8%; lidocaine-alone: 20.2%;  $p=0.39$ ). The percentage of patients with an improvement in leg pain score of  $\geq 50$  percent at 6 weeks was identical in both treatment groups (38.3%;  $p=0.97$ ).
- » Patients who received glucocorticoids plus lidocaine also reported greater treatment satisfaction and greater reductions in depressive symptoms.
- » Transforaminal injections of glucocorticoids plus lidocaine showed no significant benefit over transforaminal injections of lidocaine alone at 3 or 6 weeks.
- » Interlaminar injections of glucocorticoids plus lidocaine were associated with statistically significant advantages over interlaminar injections of lidocaine alone with respect to function and pain at 3 weeks, but these differences were of minimal clinical significance (a 2.5-point difference in the RMDQ scores [0–24 points] and a 0.9-point difference in the pain scores [0–10 points]). There were no differences between injection approaches at 6 weeks.
- » There were more reported adverse events in the glucocorticoids-plus-lidocaine group than in the lidocaine-alone group (0.29 vs. 0.17 events per patient;  $p=0.02$ ). The most common adverse events were fever/infection and headache in the glucocorticoids-plus-lidocaine group and excessive pain in the lidocaine-alone group.
- » Among participants receiving glucocorticoids plus lidocaine, there were more adverse events with a transforaminal injection than with an interlaminar injection (0.46 vs. 0.22 events per patient). Serious adverse events (hospitalization or surgery) were rare among all patients.
- » There were higher rates of cortisol suppression at 3 and 6 weeks among patients who received injections that included glucocorticoids. These findings are consistent with systemic absorption of glucocorticoids.

## LIMITATIONS OF THE STUDY

- » Patients in both treatment groups had decreased pain and improved function. Potential explanations for the similar improvements in the two groups include placebo effects, regression to the mean, the natural history of spinal stenosis, washout of inflammatory mediators from the epidural space, and other factors present in both study groups, including contact with study personnel and receipt of lidocaine.
- » The study did not include a sham injection; thus, the effects of lumbar glucocorticoid injections in comparison with no treatment were not determined.
- » The lidocaine-alone group included a higher proportion of patients with acute pain. Post-hoc adjustment for pain duration revealed similar pain improvement in both treatment groups but greater functional improvement with glucocorticoids plus lidocaine, which was statistically but not clinically significant (1.2-point difference in RMDQ score between groups).
- » The small benefit observed at 3 weeks was due solely to the interlaminar epidural approach and not to the transforaminal epidural approach to injection. However, the results of the trial cannot be used to directly compare interlaminar and transforaminal injections, as the choice of injection approach was left to the discretion of the physician.
- » The study did not present data for the two treatment groups regarding certain factors that might affect the outcome of epidural injections, including the volume, type, and dosage of the specific types of glucocorticoids. For those seeking additional information, the proportion of patients receiving each steroid and the range of doses allowed were published in the appendix to the original research article. A link to the article is provided on page 1 of this summary.
- » The results of the trial cannot be used to determine the effect of specific glucocorticoids (triamcinolone, dexamethasone, betamethasone, or methylprednisolone), as the choice was left to the discretion of the physician.
- » The results of the trial cannot be generalized to other diagnoses for which lumbar epidural glucocorticoid injections may be used.

## CONCLUSIONS

This double-blind, randomized controlled trial demonstrated that in treating patients with lumbar central spinal stenosis and moderate-to-severe leg pain and disability:

- » Lumbar epidural injection both of glucocorticoids plus lidocaine and lidocaine alone improved leg pain and pain-related functional disability 6 weeks after injection.
- » Injection of glucocorticoids plus lidocaine produced minimal or no short-term (6 weeks) benefit when compared with lumbar epidural injection of lidocaine alone.
- » Injection of glucocorticoids increased the rate of adverse events and the risk of adrenal cortisol suppression.

## POSSIBLE KEY POINTS FOR CLINICIAN AND PATIENT OR CAREGIVER DISCUSSIONS

- » Lumbar spinal stenosis exhibits a nonprogressive or slowly progressive course, which allows initial trials of less complicated and less invasive treatment strategies.
- » The possible treatment strategies for LSS symptoms include medications, supervised exercise or physical therapy, cognitive behavioral therapy, epidural injections (local anesthetic alone or glucocorticoids plus a local anesthetic), and surgery.
- » Epidural glucocorticoids can be absorbed systemically, which may be particularly relevant for patients receiving more than one epidural injection or concomitant glucocorticoids by other routes. Furthermore, the potential adverse effects of systemic glucocorticoids (e.g., elevated blood glucose, increased risk of infection or osteoporosis) may be especially important in older patients, the population that typically develops LSS.

## SOURCE

This summary is based on the research article “A Randomized Trial of Epidural Glucocorticoid Injections for Spinal Stenosis” (Friedly JL, Comstock BA, Turner JA, et al. *N Engl J Med*. 2014 Jul;371(1):11-21. PMID: 24988555). An electronic copy of this summary is available at [www.effectivehealthcare.ahrq.gov/spinal-stenosis/](http://www.effectivehealthcare.ahrq.gov/spinal-stenosis/). This summary was prepared by the John M. Eisenberg Center for Clinical Decisions and Communications Science at Baylor College of Medicine, Houston, TX.