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The Spine Journal 11 (2011) 100–106

THE SPINE JOURNAL

Clinical Study

Intradiscal injection therapy for degenerative chronic discogenic low back pain with end plate Modic changes

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Received 5 July 2009; revised 26 January 2010; accepted 1 July 2010

Abstract

BACKGROUND CONTEXT: The effect of intradiscal steroid therapy for patients with degenerative chronic discogenic low back pain remains an issue of debate.

PURPOSE: To evaluate the effect of various intradiscal injection regimens for patients with degenerative chronic discogenic low back pain and end plate Modic changes.

STUDY DESIGN: Double-blind, randomized, controlled, prospective clinical study.

PATIENT SAMPLE: One hundred twenty patients with discogenic low back pain and end plate Modic changes on magnetic resonance imaging (MRI) who received discography but were unwilling to accept surgical operation.

OUTCOME MEASURES: Pain and function were determined by the visual analog scale (VAS) and the Oswestry Disability Index (ODI) assessment.

METHODS: Patients who received diagnostic discography for suspected degenerative discogenic low back pain were recruited. A total of 120 patients with positive discography and end plate Modic changes at a single level were enrolled in the study and allocated into Groups A and B according to the type of Modic changes on MRI. Then, the patients in Groups A and B were randomized into three subgroups, respectively. Intradiscal injection of normal saline was performed in Subgroups A1 and B1, intradiscal injection of diprospan was performed in Subgroups A2 and B2, and intradiscal injection of a mixed solution of diprospan+songmeile (cervus and cucumis polypeptide) was performed in Subgroups A3 and B3. The clinical outcome of each patient was evaluated and recorded by using the VAS and ODI at 3 and 6 months after the procedure.

RESULTS: The subgroups were comparable with respect to gender, age, pain, and percentage disability. Neither VAS pain scores nor Oswestry function scores of the patients within Group A had any improvement at 3 or 6 months after saline injection, but both of them improved significantly at the two time points after diprospan and diprospan+songmeile injection, respectively. Meanwhile, the latter two injection protocols led to no significant difference in pain relief and functional recovery. Similar results were obtained in patients within Group B. Furthermore, no difference of the improvement of VAS pain scores or Oswestry function scores was found between the patients within Group A and within Group B at different time points after various interventions.

CONCLUSION: Intradiscal injection of corticosteroids could be a short-term efficient alternative for discogenic low back pain patients with end plate Modic changes on MRI who were still unwilling to accept surgical operation when conservative treatment failed.

Keywords: Discogenic low back pain; Modic changes; Discography; Intradiscal injection

FDA device/drug status: not applicable.

Author disclosures: none.

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doi:10.1016/j.spinee.2010.07.001

Introduction

A discogenic etiology of low back pain exists in a subgroup of patients suffering with chronic low back pain [1–3]. Crock [4] reported a condition that is characterized by internal disruption of the disc, discogenic lumbar pain in the absence of disc abnormality, absence of nerve root compression, and no abnormality seen with computed tomography (CT) or myelography. Approximately at the same time, signal changes of degenerative lumbar end plates and adjacent bone marrow appeared on magnetic resonance imaging (MRI) were reported by de Roos et al. [5] and then were named as end plate Modic changes [6,7]. Later, there were studies that demonstrated a strong linkage between end plate Modic changes and discogenic low back pain [8–11]. Nonoperative measures frequently are unable to reduce discogenic low back pain and improve the functional status [2,3,12,13]. In addition, surgical treatment of these patients, including interbody fusion techniques, has yielded only mixed results [14–21]. Although it is only a palliative therapy, owing to its merit of minimal invasion and simplicity, spinal or intradiscal corticosteroid injection is still adopted by patients who are unwilling to accept surgery. Only two prospective, double-blind, randomized, placebo-controlled studies about intradiscal corticosteroid injections for discogenic pain have been reported. Simmons et al. [22] compared intradiscal corticosteroid injection and intradiscal bupivacaine injection in 25 patients with one-level "intervertebral disc disruption" with or without sciatica and a one-level "positive pain response on discography." At 2 weeks, there were no significant differences between the two groups. Ten more years later, Khot et al. [23] performed an intradiscal corticosteroid injection versus an intradiscal saline injection in 120 patients with chronic low back pain and concordant pain on discography and found no improvement of clinical outcomes in the steroid treatment group at 1 year. Here, we report our prospective, double-blind, randomized, placebo-controlled study on intradiscal injection therapy for patients with degenerative chronic discogenic low back pain. We hypothesized that intradiscal injection of corticosteroids should be tried for those patients with discogenic low back pain with end plate Modic changes who were still unwilling to accept surgical operation when conservative treatment failed.

EVIDENCE & METHODS

Context
Several previous controlled trials have failed to demonstrate improved clinical outcomes with intradiscal steroid injections. This article presents the results of a randomized controlled trial testing the effect of intradiscal steroid injections for degenerative disc disease with evidence of possible inflammatory end plate findings (ie, Modic changes).

Contribution
The authors report that patients receiving intradiscal steroid injections had significantly better clinical outcomes compared to those receiving only saline injection. The magnitude of this effect is reportedly high.

Implication
Despite the positive results in the current investigation, other studies have found conflicting results. Furthermore, the process of injecting a disc space, as performed in this study, has been shown previously to be a risk factor for accelerated degeneration or herniation, which may negate the proposed beneficial effects over the long term. Independent corroboration of the current findings and the magnitude of the effect size appreciated are needed before strong conclusions can be made about the benefits of therapeutic intradiscal steroid injections.
—The Editors

Methods

The protocol for the human procedures used in this study was approved by the ethics committee of our university hospitals, and the study was performed based on the Consolidated Standards of Reporting Trials guidelines [24,25].

Patients

Patients were recruited from February 2005 to March 2009, who received diagnostic discography in the first author's hospital for suspected degenerative discogenic low back pain. Clinical characteristics included chronic low back pain, which subsided in supine position and aggravated after long-time sitting or standing, without apparent radicular pain or apparent nerve root compression physical signs of the lower extremity. All failed to conservative treatment for at least 6 weeks, and no one had any medical conditions requiring systemic steroid therapy. Magnetic resonance imaging showed lumbar disc degeneration, predominantly at L3–L4, L4–L5, and L5–S1 levels. Decrease of disc water content ("black disc") and mild annulus fibrosus bulge were the main manifestations. No apparent nerve root compression or dural sac compression was found. In some patients, end plate Modic changes Type I (low signal on T1-weighted spin-echo images and high intensity on T2-weighted spin-echo images), Modic changes Type II (high signal on T1-weighted spin-echo images and high or isointense signal on T2-weighted spin-echo images), or high-intensity zone of posterior annulus fibrosus could be seen on MRI. Informed consent was obtained from each patient to enter the trial.

Discography

We performed discography specifically under CT guidance to place the discographic needle in the center of the