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Original Research

Short-Term Efficacy of Sacroiliac Joint Corticosteroid Injection Based on Arthrographic Contrast Patterns

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Abstract

Objective: To determine the relationship between sacroiliac joint (SIJ) contrast dispersal patterns during SIJ corticosteroid injection and pain relief at 2 and 8 weeks after the procedure. The association between the number of positive provocative SIJ physical examination maneuvers (minimum of one in all patients undergoing SIJ injection) and the patient's response to the intervention was also assessed.
Design: Retrospective chart review.
Setting: Academic outpatient musculoskeletal practice.
Patients: Fifty-four subjects who underwent therapeutic SIJ corticosteroid injection were screened for inclusion; 49 subjects were included in the final analysis.
Methods: A retrospective review of electronic medical records identified patients who underwent SIJ corticosteroid injection. Fluoroscopic contrast flow patterns were categorized as type I (intra-articular injection with cephalad extension within the SIJ) or type II (intra-articular injection with poor cephalad extension). Self-reported numeric pain rating scale (NPRS) values at the time of injection and 2 and 8 weeks after the procedure were recorded. The number of positive provocative SIJ physical examination maneuvers at the time of the initial evaluation was also recorded.
Main Outcome Measures: The primary outcome measure was the effect of contrast patterns (type I or type II) on change in NPRS values at 2 weeks and 8 weeks after the injection. The secondary outcome measure was the association between the number of positive provocative SIJ physical examination maneuvers and decrease in the level of pain after the procedure.
Results: At 2 weeks after the procedure, type I subjects demonstrated a significantly lower mean NPRS value compared with type II subjects (2.8 ± 1.4 versus 3.8 ± 1.6, respectively, $P = .02$). No statistically significant difference was observed at 8 weeks after the procedure. NPRS values were significantly reduced both at 2 weeks and 8 weeks, compared with baseline, in both subjects identified as having type I flow and those with type II flow ($P < .0001$ for all within-group comparisons).
Conclusions: Fluoroscopically guided corticosteroid injections into the SIJ joint are effective in decreasing NPRS values in patients with SIJ-mediated pain. Delivery of corticosteroid to the superior portion of the SIJ leads to a greater reduction in pain at 2 weeks, but not at 8 weeks. Patients with at least one positive provocative maneuver should benefit from an intra-articular corticosteroid injection.

Introduction

In 1905 Goldthwaite and Osgood first reported that the sacroiliac joint (SIJ) can be a source of low back and leg pain [1]. Today, SIJ pain affects 15%-30% of patients with chronic nonradicular low back pain [2]. This condition can be a diagnostic and therapeutic challenge because of overlap in symptomatology with the hip joint and other causes of low back pain.

Clinically, patients with SIJ pain present with discomfort and tenderness at the sacral sulci. Often pain is referred to the posterolateral thigh, buttocks, low lumbar region, and/or groin [3-8], and in some cases it may mimic sciatica [9]. History is often notable for trauma such as a motor vehicle collision, fall onto the buttocks, or repetitive motion injury resulting from running, lifting, or altered gait [10,11]. Painful palpation of the ipsilateral sacral sulcus or provocative SIJ maneuvers such as FABER (flexion, abduction, and

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external rotation; Patrick's test), Gaenslen's test, thigh thrust, gapping, and sacral thrust are routinely performed during physical examination to help localize the source of pain. It has been shown that 3 or more positive provocative tests have a sensitivity of 82%-94% and a specificity of 57%-79% for SIJ pain [2,12-15]. Even when a thorough history and physical examination are performed, some investigators have proposed that a diagnostic injection of local anesthetic may be the only way to accurately diagnose pain originating from the sacroiliac joint [16].

Initial treatment of SIJ pain consists of ice, nonsteroidal anti-inflammatory drugs, and physical therapy. Patients who fail to improve with these conservative measures often undergo SIJ intra-articular (IA) corticosteroid injections for diagnosis and pain relief [17]. Evidence for the therapeutic effectiveness of SIJ corticosteroid injections is mixed: individual studies have shown some benefit [18,19], whereas systematic reviews have found limited [20,21] to moderate [22] evidence to support their use.

A lack of strong evidence for the efficacy of SIJ corticosteroid injections may be due to inaccurate placement of the medication. Recently, patterns of contrast dispersal demonstrated on fluoroscopy have been shown to predict immediate, short-term (2 weeks), and intermediate-term (2 months) pain reduction in patients receiving transforaminal epidural steroid injections [23]. To our knowledge, no similar investigations have been published regarding the SIJ.

The purpose of this study is to (1) determine the relationship between contrast dispersal pattern during SIJ arthrography and pain relief at 2 and 8 weeks after the procedure and (2) determine if an association exists between the number of positive provocative SIJ maneuvers and the patient's response to the corticosteroid injection.

Materials and Methods

Patients

After Institutional Review Board approval was obtained, a retrospective chart review was performed. Patients who underwent SIJ injections between September 2012 and October 2013 were identified, and data were extracted from the electronic medical record.

These patients initially presented with pain in the buttock or posterior thigh that was believed to be somatically derived from the SIJ. Patients were scheduled for SIJ injection if they had pain over the posterior superior iliac spine and one or more positive provocative SIJ maneuvers. Based on investigators' preference and clinical practice, all patients had results for FABER (Patrick's test) [24], sacral thrust [25], and Gaenslen's test [25] recorded in the chart. Patients without any positive provocative tests were not scheduled for a procedure and thus not included in the study, given that when all provocation SIJ tests are negative, symptomatic SIJ disease is less likely and therefore may be ruled out [12]. Patients also were excluded from the study if they had findings suggestive of another source of axial back pain, as well as radiation of symptoms past the knee, less than 5/5 strength in the lower extremity, diminished reflexes, signs of myelopathy, and positive neural tension signs including straight leg raise and/or slump test. Patients undergoing any additional injection for painful symptoms within 3 months of the initial injection and those with a self-reported history of peripheral neuropathy or other neuromuscular disorders were also excluded. Patients younger than 18 years, prisoners, and those with worker's compensation or legal claims pending because of injury were also excluded from the final analysis.

Chart Review

A retrospective chart review was performed to identify all patients undergoing SIJ injection between September 2012 and October 2013 who met the aforementioned criteria. Baseline demographic data collected included age, gender, duration of symptoms, history of prior SIJ injection, and history of lumbar spinal fusion. In addition, response (either positive or negative) to 3 SIJ provocative maneuvers (sacral thrust, FABER, and Gaenslen's test) and preinjection numeric pain rating scale (NPRS) scores ranging from 0 (no pain) to 10 (severe pain) were obtained. NPRS values at 2 and 8 weeks after the injection were also recorded.

Injection

All SIJ corticosteroid injections were performed by a single physician trained via fellowship in pain medicine (JRS) using a posterior approach with a standard single-beam C-arm fluoroscope. Anterior-posterior, contralateral oblique, and lateral views were used to guide needle placement. Once the needle tip was believed to be in the IA position, 0.5 mL of iohexol (Omnipaque 180, GE Healthcare, Princeton, NJ) was injected. Anterior-posterior images with live fluoroscopy were saved to the picture archiving and communication system. A uniform dose of 1 mL of 2% preservative-free lidocaine hydrochloride (AAP Pharmaceuticals, Schaumburg, IL) combined with 1 mL of triamcinolone acetonide 40 mg/mL (Bristol-Meyers Squibb Co, New Brunswick, NJ) was injected. The needle was removed, a sterile dressing was applied, and the patient was transferred to the recovery area for 15 minutes of monitoring.

Arthrogram Classification

De-identified fluoroscopic images of contrast injection for each subject were analyzed in random order