Use of Fluoroscopically Guided Intra-articular Hip Injection in Differentiating the Pain Source in Concomitant Hip and Lumbar Spine Arthritis

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Abstract

We retrospectively tested the effectiveness of fluoroscopically guided intra-articular hip injection in differentiating the pain generator in patients with atypical lower extremity pain and concomitant radiographic hip and spine arthritis. After the hip injection, 74 of 83 patients had pain relief (pain score improvement, 7.2 to 2.7) and functional improvement (Harris hip score [HHS] improvement, 54.3 to 80.4). Of those 74 patients, 50 (mean preoperative HHS, 60.3) went on to hip arthroplasty (for 48 of these 50, mean HHS increased to 84.4); the other 24 patients are being treated nonoperatively so far. The 11 patients who did not experience pain relief (9 after initial injection plus 2 after total hip arthroplasty) were found to have spinal pathology and were treated accordingly. Statistics: sensitivity, 100%; specificity, 81%; positive predictive value, 97%; negative predictive value, 100%.

One of the more challenging tasks for clinicians is determining where lower extremity pain originates—from the hip, the spine, or both. Diagnosis is further complicated by the fact that the presence of radiographic hip or spine arthritis does not always correlate with the presence of symptoms.[1,2] In a 2005 study of 1071 patients (age range, 45-84 years), Birrell and colleagues[1] found that mild to moderate radiographic hip arthritis was very common in this population and was usually asymptomatic. They also reported on cases of severe but painless hip osteoarthritis. Other investigators have found that radiographic lumbar spine arthritis can also be asymptomatic.[2]

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In 2004, Brown and colleagues[3] reported on their study of the signs and symptoms that help differentiate hip disease from spine disease in patients with concomitant radiographic hip and spine arthritis with groin, buttock, medial and lateral thigh, knee, and leg pain. They found that although a limp, groin pain, and limited internal rotation of the hips are more commonly associated with hip disorders, these conditions are also present in patients with spine pathology.

With multiple pain locations, plus radiographs showing concomitant hip and spine arthritis, it is often difficult to decipher the major source of pain and thus the appropriate treatment plan. The hypothesis is that patients with concomitant radiographic hip and spine arthritis whose pain originates from the hip will attain relief after steroid injection of the hip and will have successful results after total hip arthroplasty (THA). In this article, we describe the diagnostic and therapeutic use of fluoroscopically guided intra-articular bupivicaine and triamcinolone injections of the hip to differentiate the major pain generator in patients with concomitant hip and spine arthritis. Harris hip scores (HHSs) were used to quantitate the severity of the disease and evaluate the effectiveness of the hip injections.

Methods

Over a 3-year period, 83 (38 male, 45 female) consecutive patients (mean age, 63 years; range, 32-83 years) with concomitant hip and spine arthritis and an atypical pain pattern (pain around the hip joint and/or gluteal region with or without radicular symptoms) were included in this study. Minimum follow-up was 24 months, and mean follow-up was 32 months. Radiographs of the hip, lumbar spine, and knee were obtained for all patients during the evaluation process. Hip arthritis was graded as described by Birrell and colleagues[1] using the Croft modification of the Kellgren and Lawrence (K&L) grading system; a ruler was used to measure minimum joint space (MJS), as previously described. All patients in this study had arthritis of the hip and lumbar spine, either moderate (K&L score ≥2 or MJS <2.5 mm) or severe (K&L score, ≥4 or MJS <1.5 mm). To eliminate additional variables, we excluded from the study patients with symptomatic arthritis of the knee; patients with previous hip, knee, or spine surgery; and patients with arthritis in the setting of hip dysplasia.

Table. Use of Intra-articular Hip Injection in Detecting Lower Extremity Pain Caused by Hip Osteoarthritis (N = 83)

	True	False
Positive	72	2
Negative	9	0

Sensitivity: TP/TP+FN = 72/(72+0) = 100%.
Specificity: TN/TN+FP = 9/(9+2) = 81%.
Positive predictive value: TP/TP+FP = 72/(72+2) = 97%.
Negative predictive value: TN/TN+FN = 9/(9+0) = 100%.

After informed consent was obtained, each patient was taken to the operating room. The anterior groin area was prepped with butadiene scrub and paint, and the area was draped in standard sterile fashion. The hip was instrumented with a 22-gauge spinal needle through a portal lateral to the femoral pulse aiming for the superolateral corner of the head using fluoroscopic guidance. Nine milliliters of 1% lidocaine and 40 mg of triamcinolone (suspended in 1 mL) were injected into the hip joint. Sedation was not administered during the injection, and all patients were discharged approximately 1 hour later. A fluoroscopically guided injection was given in the operating room, as a radiolucent table is necessary for the procedure; in addition, should a patient not be able to tolerate the pain associated with injection of local anesthetic, light sedation could be given in a controlled environment to allow prompt completion of the intra-articular injection.

All patients were seen in the office 2 weeks, 6 months, 12 months, and then annually after the injection. Patients who underwent THA were also seen 6 weeks after surgery. At each office visit, patients rated their pain on a 0-to-10 visual analog scale (VAS) ranging from 0 (no pain) to 10 (worst pain ever), and HHSs were obtained. Treatment was deemed effective if there was a substantial improvement in pain and HHS along with subjective symptomatic improvement. The HHS is a functional scoring system used to measure how well patients are performing their activities of daily living after undergoing THA. A score of 90 to 100 is excellent; 80 to 90, good; 70 to 79, fair; and 60 to 69, poor (a score of <60 indicates a failed intervention). Patients with significant or complete improvement in their pain (VAS score, <3) and HHS at the first visit after the injection were offered THA; those not experiencing symptomatic or functional improvement were thought to have pain due to spinal pathology and were referred to a spine surgeon.

Results

Eighty-three patients with concomitant radiographic spine and hip arthritis and a mean HHS of 54.3 underwent intra-articular hip injection (Table). At the office visit 2 weeks after the injection, 74 of these 83 patients had significant pain relief (improvement, 7.4 to 2.7), and their mean HHS (80.4) was an improvement; the other 9 patients did not have significant pain relief, and their mean HHS (51.5) was relatively unchanged.

Of the 74 patients who experienced pain relief, 50 went on to have uncomplicated THA. By time of surgery (approximately 3 months after initial hip injection), their mean HHS had deteriorated from 80.4 to 60.3, and their mean pain score had increased from 2.7 to 6.6. Forty-eight of the 50 patients who underwent THA obtained significant pain relief, and their HHS increased to 84.4; the other 2 patients did not experience significant pain relief, and their HHS 12 months after surgery was 61.3.

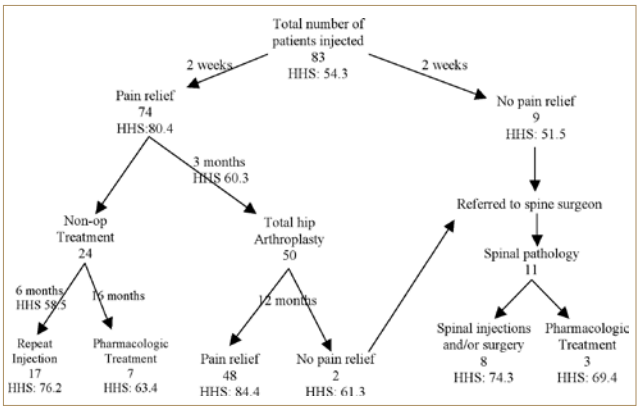

Figure. Treatment pathway for patients with atypical lower extremity pain and concomitant hip and spine arthritis (HHS, mean Harris hip score).

Seventeen of the 74 patients who had pain relief and HHS improvement after the initial injection elected to have another injection instead of THA when their pain returned. These patients had the second intra-articular hip injection approximately 6 months after the initial one. Before the second injection, their HHS had fallen to 58.5; after the second injection, it improved to 76.2. Seven of the 74 patients who had pain relief after the initial injection did not seek additional treatment up to 16 months after the initial injection, even though their HHS fell to 63.4.

Nine patients who did not have pain relief after the initial hip joint injection (their mean pain score of 6.9 was essentially unchanged from 7.4) and 2 patients who responded positively to the initial injection but still had pain after the THA were referred to spine surgeons for evaluation (Figure). These 2 patients had concomitant spinal stenosis and underwent spinal decompression (laminectomy and foramenotomy without fusion); however, even though they reported subjective improvement in symptoms, they were essentially lost to follow-up (for this study) and were unable to complete HHS evaluations after the spinal decompression.

Of the 11 patients with spinal pathology, 8 underwent either spinal injections and/or surgery, and 3 opted for pharmacologic treatment. There were no infections or complications in any patients.

In this series, sensitivity and negative predictive value were 100% (there were no false-negatives) (Table). In comparisons with other series, however, specificity (81%) and positive predictive value (97%) were slightly lower (because of 2 false-positives) (Table).

Discussion

The prevalence of hip and spinal arthritis increases with age, and hip arthritis and spinal arthritis often present with similar signs and symptoms.[1,3-7] Studying a group of patients with lower extremity pain, Brown and colleagues[3] found that those with a limp were 7 times more likely, and those with groin pain or limited internal rotation of the hips were 14 times more likely, to have pain generated from the hip alone, or from the spine and hip, rather than from the spine alone. Although these results may help rule out the spine as the sole pain generator, they leave a clinician in a dilemma regarding which disorder to treat first (ie, which condition is the underlying pain generator).

Results from several studies have shown that, in the presence of concomitant disease, treatment of the spine does not alleviate pain in patients with hip arthritis, and vice versa.[3,8,9] Whereas McNamara and colleagues,[5] reporting on patients with concomitant hip and spinal disease, found that most who underwent THA followed by spinal decompression had excellent results, other investigators have suggested that it is more prudent in the presence of spinal stenosis to treat the spinal condition first, as there is a risk for neurologic sequelae.[3] However, although spinal stenosis can have neurologic sequelae, numerous researchers have found that patients with symptomatic and radiographic spinal stenosis can function for years without any neurologic compromise.[10-12] Such conflicting data make it difficult for clinicians to determine which of the 2 conditions should be treated first in the presence of concomitant disease.

Previous study results have shown that the sensitivity of intra-articular hip injections ranges from 88% to 96% and specificity from 90% to 100%.[4,13,14] Our results show 100% sensitivity and 88% specificity, with specificity reduced by 2 patients (of 50) who had pain relief and HHS improvement after injection but HHS deterioration after THA. These 2 patients were included in the false-positive group because both were diagnosed with spinal stenosis and degenerative disc disease and underwent decompression and fusion, after which they had complete pain relief plus HHS improvement (to 83.4 and 80.1). It is possible that, for each of these 2 patients, pain was generated equally from the hip and spine pathology, and the initial HHS improvement after the injection resulted from the elimination of hip pain. It is also possible that each patient's spine pathology worsened in the time between the hip injection and the THA—thus accounting for the lowered HHS after THA.

Previous studies of the diagnostic use of intra-articular hip injections were done with small groups of patients and did not use any functional measures to assess the effectiveness of the injections.[4,13] Furthermore, all but one of these studies did not radiographically confirm entry into the hip joint, and in other studies entrance into the hip joint with the anterior approach using anatomic landmarks was successful in only 60% of hip injections.[13,15] One shortcoming of our study is that there was a selection bias toward patients with hip pathology, as our practice specializes in hip arthroplasty and cares for patients referred by primary care physicians and other orthopedic surgeons. This situation is actually helpful in studying this cohort of patients, as many are referred to us for management by outside practitioners because of these patients' atypical pain patterns and complex arthritic patterns.

Our study results show that, in the presence of concomitant hip and spine arthritis, the use of fluoroscopically guided intra-articular injection is an excellent technique for differentiating the pain generator. It is also unique in that improvement in both pain and HHS scores was used to evaluate the effectiveness of the injections. Fluoroscopically guided intra-articular hip injection is a valuable adjunct to history taking, physical examination, and plain radiography in determining the best treatment method for patients with both hip and spine pathology. However, we do not advocate using this technique for all patients, as it can be expensive when done in the operating room. A cheaper alternative is to give these injections to select patients in radiology suites.

Authors' Disclosure Statement and Acknowledgments

The authors report no actual or potential conflict of interest in relation to this article.

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