Accuracy of Diagnostic Injection in Differentiating Source of Atypical Hip Pain

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Abstract: It is not uncommon to encounter patients with atypical hip or lower extremity pain, ill-defined clinicoradiological features, and concomitant hip and lumbar spine arthritis. The purpose of this study is to present our experience using the response resulting from a combined anesthetic-steroid hip injection for treatment selection in these patients. A retrospective analysis of 204 consecutive diagnostic hip injections was undertaken. Patient charts were scrutinized for outcomes of injection and treatment. Our findings suggest that the relief of symptoms following injection of local anesthetic and steroid into the hip joint has a sensitivity of 91.5%, specificity and positive predictive value of 100%, and negative predictive value of 84.6% for response to total hip arthroplasty. We thereby believe that this is a reliable test with low morbidity and can predict the potential benefit of total hip arthroplasty in this diagnostically challenging group of patients.
Keywords: diagnostic, anesthetic, steroid, hip injection.

The "hip region" constitutes the groin, buttock, upper lateral thigh, greater trochanteric area, and the iliac crest. Pain originating from various sources may be perceived here and includes the hip joint, lumbosacral spine, sacroiliac joints, pubis, and soft tissue sources such as trochanteric bursitis, hip abductor dysfunction, and inguinal hernia. The prevalence of hip osteoarthritis is known to increase with age, affecting approximately 4% of the population older than 65 years [1]. Ten percent to 15% of patients may exhibit simultaneous involvement of the lumbar spine and hip(s) [2]. Careful history taking, physical examination, and plain radiographs are believed to provide crucial information in the assessment of individuals with hip disease. However, a diagnostic dilemma can arise in patients with atypical symptoms and signs. Even the presence of radiographic hip or spine arthritis does not always correlate with the presence of symptoms [3,4].

It is a challenging clinical situation when history, clinical examination, and plain radiography fail to locate the exact origin of hip pain. The quantification of symptoms in concomitant hip and spine disease is also vital and particularly relevant if the management includes a major reconstructive surgery such as hip arthroplasty. Additional diagnostic workup includes an anesthetic hip injection that helps differentiate the source of pain [4-8]. Most literature reports use of local anesthetic injections [4-7]. However, it has been our practice to use a combination of local anesthetic and steroid. The aim of this study was to assess the accuracy of anesthetic-steroid hip injection when applied as a diagnostic tool for hip arthritis in this clinically challenging group of patients.

Patients and Methods

After obtaining Institutional Review Board approval, we reviewed the clinical and radiographic records of all patients under care of the Arthroplasty service who underwent a hip injection between October 2005 and October 2008 at our institution. Of the total 267 patients, 204 individuals were included into the study because they satisfied at least one of the following conditions.

1. Pain in the hip region of uncertain etiology with/without radiating knee pain of minimum 6 months' duration
2. Subtle degenerative changes in the hip joint on plain radiographs
3. Concurrent hip and lumbar spine arthritis and
4. Absence of localizing physical signs with clinical examination such as Stinchfield test (resisted hip flexion test).

Patients were excluded if they had isolated labral tears of the hip or were undergoing therapeutic hip injection such as those awaiting hip arthroplasty.

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All patients were first assessed with detailed history, clinical examination, and anteroposterior and lateral radiographs of the hips and lumbar spine. If the diagnosis was in doubt or if relative quantification of pain was difficult, patients were offered a diagnostic hip injection.

Hip Arthrogram Technique

All hip injections were performed in a dedicated radiology suite under strict sterile conditions by the same musculoskeletal radiologist with several years of experience and more than 2000 injections. Skin preparation was undertaken using povidone iodine solution, and the area was draped. The skin was infiltrated with 1% lidocaine. Under fluoroscopic guidance, a 20-gauge spinal needle was advanced into the hip joint from anterolateral side targeting the anterior surface of lateral femoral neck. Once the loss of resistance was felt, intraarticular position of the needle was confirmed by injecting 3 mL Omnipaque 240 (GE Healthcare Inc, Princeton, NJ); and a spot image was taken to document location (Fig. 1). In one patient, because of previous allergy to radioopaque dye, room air was injected to confirm needle placement. A mixture of 5 mL 0.5% bupivacaine/Sensorcaine (AstraZeneca, Wilmington, DE) and 1 mL (80 mg) of methylprednisolone (either Depo-Medrol [Pfizer Inc, New York, NY] or generic) was then injected into the hip joint.

Analysis of Response to Injection

After the injection, patients were observed for 30 minutes; and feedback about pain relief was documented in the radiology report. The response to injection was analyzed in terms of percentage relief of pain, with a "positive response" meaning more than 50% pain relief from the preinjection pain level and "negative response" meaning less than 50% pain relief. Patients were encouraged to ambulate and carry out all routine activities. All patients were followed up by the Arthroplasty service 2 weeks after injection. Negative responders were interviewed about pain relief subsequently (ie, after the 30-minute observation period in the radiology suite) and categorized as "delayed positives" if they had responded positively within 2 weeks. These patients were added to the "positive response" group. The "negative response" group was investigated further to diagnose the source of pain, and some were referred to the spine service. The outcome of total hip arthroplasty (THA) in terms of pain relief was determined at a minimum 6 months of follow-up. Harris Hip Score was used to document preoperative disability and improvement after surgery [9].

A standard 2 × 2 table was used to calculate sensitivity, specificity, and positive and negative predictive value of the test (Table 1).

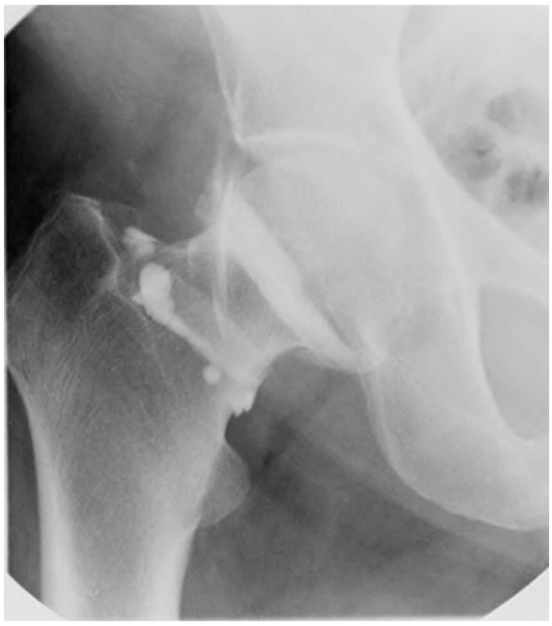

Fig. 1. Spot radiograph demonstrating intraarticular pooling of the dye, confirming needle placement into the hip joint.

Results

There were no complications of injection in any of the patients. Of 204 individuals, there were 128 women and 76 men, with a mean age of 65.40 years (range, 31-84 years). One hundred fifty-two patients (74.5%) had a positive response (127 immediate and 25 delayed), and 52 (25.5%) had a negative response to injection. In the positive response group (n = 152), there were 97 women and 55 men, with a mean age of 65.81 years. Eighty-six (56.6%) of 152 positive responders underwent primary uncemented THA, and all had good pain relief at minimum 6 months of follow-up (true positives [TPs]). Final diagnosis at surgery was osteoarthritis in all cases. The Harris Hip Score improved in this group from a mean of 56.69 preoperatively to 88.86 postoperatively at 6 months. Out of the remaining 66 patients in the positive response group; 28 were awaiting surgery, 21 deferred surgery and requested repeat intraarticular injections that were provided to them, 12 were being treated conservatively, and 5 were lost to follow-up.

The negative response group (n = 52) was composed of 32 women and 20 men, with an average age of

Table 1. Two × Two Table

	"Gold Standard" Result (Relief After THA for Hip/Interventions for Other Diagnoses)	
	Hip Disease +	Hip Disease −
Test result (hip injection)		
+	(TP) 86	(FP) 0
−	(FN) 8	(TN) 44