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Original Research Articles

Hip Joint Pain Referral Patterns: A Descriptive Study

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ABSTRACT

Objective. To determine hip joint pain referral patterns.

Design. Retrospective analysis.

Setting. Multicenter.

Patients. Fifty-one consecutive patients meeting clinical criteria of a symptomatic hip joint.

Interventions. Fluoroscopically guided intra-articular hip joint injection.

Outcome Measures. Anatomic pain map before hip injection and visual analog scale both before and after hip injection.

Results. The hip joint was shown to cause pain in traditionally accepted referral areas to the groin and thigh in 55% and 57% of patients, respectfully. However, pain referral was also seen in the buttock and lower extremity distal to the knee in 71% and 22%, respectively. Foot and knee pain were seen in only 6% and 2% of patients, respectively, while lower lumbar spine referral did not occur. Fourteen pain referral patterns were observed.

Conclusions. Buttock pain is the most common pain referral area from a symptomatic hip joint. Traditionally accepted groin and thigh referral areas were less common. Hip joint pain can occasionally refer distally to the foot. Lower lumbar spine referral did not occur.

Key Words. Hip Joint; Injection; Pain; Referral Pattern

Introduction

The hip joint is a known potential pain source due to its innervation from the obturator, femoral, and sciatic nerves [1,2]. Hip joint pain referral has been classically thought to occur most commonly in the groin and anterior thigh [3,4].

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Two studies exist regarding hip joint pain patterns in patients awaiting total hip replacements [5,6]. In these studies, fluoroscopically guided intra-articular (FGIA) hip injections were not utilized. However, FGIA anesthetic hip joint injections have been used diagnostically to identify those with hip pathology [7–10].

To the authors' knowledge, there have been no studies published that have assessed hip joint pain referral patterns based on a diagnostic FGIA hip injection.

The objective of this retrospective descriptive study was to characterize hip joint pain referral

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patterns based on preinjection pain diagrams completed by patients who had a positive response to a FGIA injection.

Methods

After approval by the Human Subjects Division at the University of Washington, patients who underwent diagnostic and potentially therapeutic FGIA hip injections between May 2000 and May 2005 were identified. These patients were selected from four different physiatry practices. Fifty-one consecutive patients meeting inclusion criteria were selected for the study. The study's inclusion criteria were evidence of hip pathology on plain radiographs or magnetic resonance imaging studies and ≥90% pain reduction 30 min after the FGIA hip injection. At 30 min after injection, patients were asked to assess their pain while performing typically painful functional activities.

Before injection, patients completed an anatomical pain drawing and preprocedure visual analog scale. After informed consent, patients were placed supine. Local anesthesia was used but no oral or intravenous sedation was provided. The antero-lateral hip region was sterilely prepped and draped. Under fluoroscopic guidance, a 22-, 25-, or 26-gauge needle was inserted from a skin position starting just lateral and superior to the mid-position of the intertrochanteric line. The needle was fluoroscopically guided medial and slightly inferior to the mid-portion of the femur's anatomical neck under the joint capsule. Intra-articular flow within the hip joint was verified by a nonionic contrast medium injection (Figure 1). Then 4 cc of 0.5% bupivicaine and 2 cc of triamcinoline

Figure 1 Fluoroscopically guided intra-articular hip joint injection.

Table 1 Frequency of pain referral to the buttock, thigh, groin, leg, knee, and foot

Anatomic Region	Percentage of Patients with Pain
Buttock	71
Thigh	57
Anterior	27
Lateral	27
Posterior	24
Medial	16
Groin	55
Leg	16
Lateral	8
Posterior	8
Anterior	4
Medial	2
Foot	6
Knee	2

40 mg/cc were injected. Injections were performed in similar fashion by four investigators (P.D., N.H., M.K., M.F.). At 30 min after injection, each patient completed a postprocedure visual analog scale.

Data analysis was performed by the one investigator (J.M.L.) who was not involved in the injection procedure. The pain diagram was analyzed to determine pain referral patterns. Referral patterns were delineated into buttock, groin, thigh, knee, leg, and foot. The buttock was defined as that area inferior to the iliac crests, lateral to the posterior superior iliac spines, and superior to the posterior thigh. The groin area was defined as that area superior to the greater trochanter and inferior to the lower abdomen. The thigh and leg were further anatomically divided into anterior, posterior, medial, and lateral divisions.

Results

From the 51 patients included in the study, 28 (55%) were female and 23 (45%) were male. The mean age of the study population was 60.6 years (range 19–93 years).

Pain referral frequency to the buttock, groin, and lower extremity is listed in decreasing order in Table 1.

Fourteen pain referral patterns were seen and listed in decreasing order in Table 2.

The composite preprocedural pain drawing from all patients is represented in Figure 2.

Discussion

Common orthopedic belief is that hip joint pain typically refers to the groin, anterior thigh, and

Table 2 Twelve observed patterns of hip pain referral in order of decreasing frequency

Pain Referral Areas	Percent of Patients
Buttock and thigh	20
Buttock and groin	18
Buttock alone	12
Groin alone	12
Groin and thigh	10
Thigh alone	6
Buttock, groin, and thigh	6
Buttock, groin, thigh, and leg	4
Buttock, thigh, and leg	4
Buttock, groin, thigh, leg, and foot	2
Buttock, groin, thigh, and knee	2
Buttock, groin, leg, and foot	2
Buttock, thigh, leg, and foot	2
Thigh and leg	2

knee [11,12]. This belief stems largely from anatomical studies, regional hip blockade, and analysis of pain patterns in patients awaiting primary or revision total hip arthroplasty (THA) [5,6,13,14].

Pain referral areas for hip osteoarthritis based on body image maps were studied in 60 patients awaiting THA [5]. Pain was seen most commonly in the anterior groin and buttock at an incidence of approximately 80%, respectively.

In a separate study, hip referral patterns were evaluated in patients undergoing primary and revision total hip replacements [6]. The referral patterns were based on interviews and recorded prospectively for 323 patients awaiting THA. If the patients' pain was relieved at the 3-month follow-up examination after THA, it was concluded that the hip joint had been the pain generator.

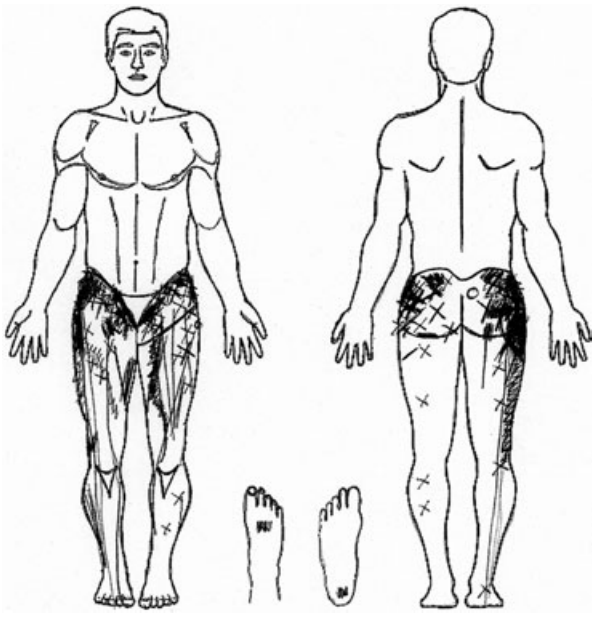

Figure 2 Composite preprocedural pain drawing from all patients.

In the primary THA group, groin and thigh pain were most common at 73% and 21%, respectively. The most common referral pattern combination was groin pain with referral to the knee (27%).

Accurate diagnosis of pain originating from the hip joint can be clinically challenging. Radiographic evidence of joint space narrowing has been used as a clinical indicator of a potentially symptomatic hip joint. Bierma-Zeinstra et al. [15] showed that clinical symptoms and signs can predict the degree of hip osteoarthritis seen on radiographic imaging. Brown et al. [16] found that a limp, groin pain, or limited hip internal rotation with radiographic hip disease can predict pain originating from the hip.

However, commonly relying on historical features and physical examination, tests for hip joint pain have not been validated as judged against controlled intra-articular hip blocks. FGIA injections have been the gold standard for diagnosing sacroiliac (SI) and lumbar zygapophyseal joint pain and can be used in analogous fashion in hip joint investigations.

Unlike previous hip joint referral studies, the present study describes pain referral patterns based on pain diagrams that were completed before a positive response to a FGIA hip injection. Neither oral nor intravenous sedation was used. Patients had to report ≥90% relief after the diagnostic block based on pre/postprocedure visual analog scales. False-positive responses were minimized by avoidance of preprocedural sedation and the requirement of high-grade pain relief.

In the present study, referred pain to the buttock was most common at an incidence of 71%. Thigh and groin referral were almost equal in frequency at 57% and 55%, respectively. Only 16% of patients described lower leg pain. The most common referral combination was buttock pain with thigh referral (20%).

The referral areas share similarities to previously reported patterns observed from the SI and lumbar zygapophyseal joints [17–19]. Slipman et al. [19] reported that 94% of 50 patients with SI joint pain relieved by a single intra-articular SI joint injection experienced buttock pain. Schwarzer et al. [18] found that in 26 patients with lumbar zygapophyseal joint pain based on dual controlled blocks, 76%, 57%, and 18% experienced thigh, buttock, and groin pain, respectively.

This study's referral patterns can be a useful tool in the diagnosis of hip joint related pain. The hip joint can cause pain outside of the immediate hip region and must be considered in the differential of buttock, groin, thigh, and even more distal lower extremity pain. Pain maps can be used as an adjunct to a thorough history and physical examination when evaluating a patient with potential hip pathology. Further prospective studies are needed using both controlled blocks and a control group in order to determine the true validity of this study's referral patterns.

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