

Intra-Articular Hip Injection Using Anatomic Surface Landmarks

Mohammad A. Masoud, M.Sc., and Hatem G. Said, M.D.

Abstract: Intra-articular hip injection is a frequently used technique for diagnostic and therapeutic purposes and is gaining more importance for the early diagnosis of hip disease. It is commonly performed with imaging guidance such as ultrasonographic or fluoroscopic control. We describe our technique of injection of the hip using relative distances from anatomic surface landmarks, with the needle insertion point at the site of the proximal anterolateral portal for hip arthroscopy, with a posterior direction of 30° and targeted toward a junctional point between 2 perpendicular lines, 1 distal from the anterior superior iliac spine and the second anterior from the tip of the greater trochanter. This technique can be used without imaging guidance in the outpatient clinic. Moreover, it minimizes the need for radiographic exposure for more critical injections, such as the injection of contrast material before conducting magnetic resonance arthrography of the hip.

Intra-articular injection of the hip joint has been frequently used as a therapeutic and diagnostic tool.¹ Injections of corticosteroid or hyaluronic acid have been used in osteoarthritis of the hip to delay total hip replacement.^{2,3}

More recently, injections have been used as a diagnostic test to prove the presence of intra-articular hip pathology with a specificity and positive predictive value of up to 100%.⁴ This has proved very useful in establishing the diagnosis in a group of patients with vague complaints involving what is collectively called the “hip region,” which includes the groin, buttock, upper lateral thigh, greater trochanteric area, and the iliac crest, with minimal positive findings on physical examination and radiography.

Traditionally, intra-articular hip injections are performed under fluoroscopic or ultrasonographic guidance.^{2,4,5} The purpose of this article is to describe an injection technique that depends on relative distances from anatomic surface landmarks that can markedly reduce or abolish the need

for imaging guidance and is suitable for routine use in the outpatient clinic.

Injection Technique

The aim is to pierce the hip capsule at any point on the anterolateral surface of the femoral head or neck below the acetabular rim down to the intertrochanteric line. We followed the principle described by Wettstein and Dienst⁶ in hip arthroscopy to use the proximal anterolateral portal, which is used for accessing the peripheral compartment of the hip joint, while modifying the technique so that we could use relative distances from fixed anatomic surface landmarks.

The patient lies supine with the limb in neutral rotation (patella facing forward). The tip of the greater trochanter is identified and marked, the anterior superior iliac spine (ASIS) is marked, and a line is drawn between them, at the junction between the upper third and lower two-thirds, lying at the soft spot (one can feel the anterior border of the gluteus medius); this is marked as point A (needle entry point).

Two lines are then drawn: line 1 from the ASIS distally toward the upper pole of the patella and line 2 perpendicular to it from the tip of the greater trochanter anteriorly. The intersection point is point B (target point) (Fig 1, Video 1).

The groin area is sterilized and draped, and by use of aseptic techniques, 3 cc (cubic cm) of local anesthetic is injected at point A, to minimize the pain of inserting a spinal needle. Then, an 18- to 20-gauge spinal needle (Sanicomp SL, Barcelona, Spain) was used and inserted

From the Department of Orthopedics and Traumatology, Assiut University Hospital, Assiut, Egypt.

The authors report that they have no conflicts of interest in the authorship and publication of this article.

Received June 8, 2012; accepted January 9, 2013.

Address correspondence to Mohammad A. Masoud, M.Sc., Sanderstr 8, 97070 Wuerzburg, Germany. E-mail: mohammadmasoudortho@yahoo.com

© 2013 by the Arthroscopy Association of North America

2212-6287/12385/\$36.00

<http://dx.doi.org/10.1016/j.eats.2013.01.004>

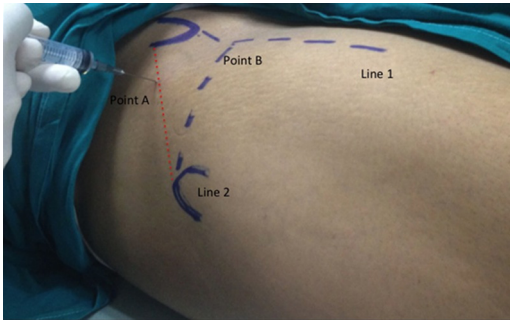


Fig 1. Right hip in supine position with anterolateral view. The ASIS and the greater trochanter are palpated and demarcated. Line 1 is drawn from the ASIS down to the center of the patella, line 2 is drawn from the tip of the greater trochanter anteriorly perpendicular to line 1, point B is the meeting of both lines and is the target point in the coronal plane, and point A is the soft-spot entry point at the junction of the upper third and lower two-thirds of the imaginary line between the ASIS and tip of the greater trochanter.

at point A, directed toward point B with a posterior tilt of 30° .

Without image control, the needle is inserted until it touches bone; if it does not touch bone, the needle is reinserted with a lesser angle to the floor along the same craniocaudal direction until bone is encountered (Fig 2). The beveled needle is rotated while in place to allow more free flow of the injected fluid or slightly withdrawn if resistance continues. As a diagnostic test, 10 cc of lidocaine (1%) mixed with 5 to 10 cc of normal saline solution was injected.



Fig 2. Right hip with anterior-to-superior fluoroscopic view, showing the position of the needle under the C-arm. The needle is touching bone of the neck, which ensures that it has passed through the capsule of the hip joint. Although fluoroscopy is performed for research and education purposes, the purpose of this article is to show that the technique can be performed without imaging support.

In 40 patients undergoing injection of local anesthetic (14 patients) or magnetic resonance arthrography (26 patients) for diagnosis of intra-articular hip disease, a fluoroscopic check was used after final setting of the needle and touching bone, which required blind redirections in 4 patients to lessen or increase the angle of posterior tilt. Results have shown that the needle was inside the peripheral compartment of the hip in 38 of 40 hips (95%), with a 95% confidence interval of 0.84 to 0.99. In 2 cases it was at the intertrochanteric line, which was considered outside the capsule, and this was possibly because of anatomic variation or inaccurate identification of the surface landmarks.

Discussion

The reliability of intra-articular injection of the hip as a diagnostic test has been well investigated. Deshmukh et al.⁴ have found that relief of symptoms after injection of local anesthetic and steroid into the hip joint has a sensitivity of 91.5% and specificity and positive predictive value of 100% for response to total hip arthroplasty.

In our opinion, what is new in our technique is its relativity and that it is patient specific. It does not use fixed distances in centimeters from anatomic landmarks because this obviously ignores the fact that variations among patient sizes and anatomic differences exist.

However, this technique requires adequate palpation and precise outlining of both the ASIS and greater trochanter tip, which makes it inapplicable in obese patients (relatively) in whom one cannot perform accurate palpation of these structures. In addition, this technique will be unreliable in the presence of femoral head-neck deformities such as coxa vara or a high-riding greater trochanter, making the surface anatomy undependable.

The increasing indications for intra-articular hip injections have led us to develop this bedside injection technique that does not require imaging modalities, making it a routine step at the end of a suspicious or positive hip examination in the outpatient clinic. On the basis of the fact that intra-articular hip injection for diagnostic local anesthetic testing is a good positive test with some false-negative results,⁷ we can recommend the use of this technique with no imaging control as a fast test in the outpatient clinic. However, for more critical injections such as contrast material, we still recommend the use of image guidance. Moreover, this technique of accessing the hip joint has minimized the necessary radiographic exposure for such critical injections and even for accessing the peripheral hip compartment as a first portal in hip arthroscopy.

Acknowledgment

The authors acknowledge Dr. Khaled Mohamed for his effort in reviewing this article.

References

1. Kivlan BR, Martin RL, Sekiya JK. Response to diagnostic injection in patients with femoroacetabular impingement, labral tears, chondral lesions, and extra-articular pathology. *Arthroscopy* 2011;27:619-627.
2. Lovell NH. Intra-articular corticosteroid hip injections: A review of 63 consecutive patients. *Eur J Orthop Surg Traumatol* 2006;16:20-23.
3. Kon E, Mandelbaum B, Buda R, et al. Platelet-rich plasma intra-articular injection versus hyaluronic acid viscosupplementation as treatments for cartilage pathology: From early degeneration to osteoarthritis. *Arthroscopy* 2011;27:1490-1501.
4. Deshmukh AJ, Thakur RR, Goyal A, Klein DA, Ranawat AS, Rodriguez JA. Accuracy of diagnostic injection in differentiating source of atypical hip pain. *J Arthroplasty* 2010;25(suppl):129-133.
5. Crawford RW, Gie GA, Ling RS, Murray DW. Diagnostic value of intra-articular anaesthetic in primary osteoarthritis of the hip. *J Bone Joint Surg Br* 1998;80:279-281.
6. Wettstein M, Dienst M. Arthroscopy of the peripheral compartment of the hip. *Oper Tech Orthop* 2005;15:225-230.
7. Byrd JWT, Jones KS. Diagnostic accuracy of clinical assessment, magnetic resonance imaging, magnetic resonance arthrography, and intra-articular injection in hip arthroscopy patients. *Am J Sports Med* 2004;32:1668-1674.