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# Non-contrast computed tomography-guided intra-articular corticosteroid injections of severe bilateral hip arthritis in a patient with ankylosing spondylitis

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**ABSTRACT**

*Progressively destructive hip arthritis is a common complication of patients with ankylosing spondylitis. Palliative intra-articular corticosteroid hip injections are helpful in younger patients who wish to delay joint replacement surgery. Non-contrast computed tomography (CT)-guided intra-articular procedures can potentially minimize radiation exposure compared to fluoroscopy-guided techniques. We describe a CT-guided technique for intra-articular corticosteroid hip injections for severe bilateral hip arthritis which avoids the use of radiologic contrast by documenting the presence of a pre-injection air bubble underneath the fibrous capsule. Significant reduction in symptoms within 48 hours and at 6 weeks post-injection confirmed the successful outcome of this technique.*

## Introduction

Progressively destructive hip arthritis is a common complication of ankylosing spondylitis (AS) and leads to considerable physical disability (1, 2). Intra-articular corticosteroid hip injections are usually performed under fluoroscopic guidance and may reduce pain and improve internal rotation in rheumatoid arthritis, osteoarthritis, and ankylosing spondylitis for up to 12 weeks (3). Computed tomography (CT) exposes patients and operators to less radiation compared to conventional fluoroscopy (4). Depending on the complexity of the situation and operator skill, interventional CT or fluoroscopy-guided procedures can cause variable degrees of radiation exposure. Non-contrast CT-guided interventional techniques could theoretically minimize radiation exposure in procedures that utilize CT with contrast or fluoroscopy. We describe a technique for non-contrast CT-guided corticosteroid hip injections in a patient with severe bilateral hip arthritis from AS.

## Case report

A 31-year old man with a 12-year history of inflammatory back pain and a 5-year history of ankylosing spondylitis presented to our medical center with a 3-year history of progressive bilateral hip pain. When he was diagnosed with AS 5 years years ago, he was advised to try sulfasalazine, but compliance was erratic. He reported an episode of "uveitis" several years ago which resolved with topical ophthalmic treatment. Within the last year the patient had noted a marked deterioration in hip mobility accompanied by persistence of hip joint pain despite the periodic usage of non-steroidal anti-inflammatory drugs (NSAIDs).

Examination revealed an otherwise healthy appearing adult male with marked thoracic kyphosis and loss of cervical and lumbar lordosis. Rotational spine movements were essentially absent. In both hips abduction was markedly limited to 20 degrees and flexion was limited to 100 degrees. Internal rotation was limited to 15 degrees bilaterally. Pain was more pronounced in the left hip compared to the right hip on passive range of motion. Based on a 100 mm Visual Analog Scale (VAS), the left hip had a baseline VAS pain score at rest of 84 mm and the right hip had a baseline VAS of 73 mm. There were no other significant musculoskeletal findings.

Maintenance celecoxib 100 mg twice daily and a physical therapy program were initiated. Improvement in hip mobility and pain relief after 4 weeks of treatment was minimal. On follow-up corticosteroid injections into both hips were considered and the patient was referred for interventional radiology. A CT-guided procedure was suggested. Plain CT films (Siemens Somatom Plus 4) of both hips showed loss of joint space and subchondral cyst formation, confirming the advanced nature of the bilateral hip arthritis (Fig. 1).

With the patient supine, and after the administration of a local anesthetic, gauge 22 spinal needles were placed into both hip joints using an aseptic technique and an anterior approach. A plain CT study shows the tips of both needles between the joint capsule and bone cortex (solid arrows, Fig. 2). A bubble of air was injected to confirm the placement of the needle tip beneath the fibrous capsule (dashed arrows, Figs. 2 and 3). Twenty milligrams of triamcinolone acetonide (Kenocort)

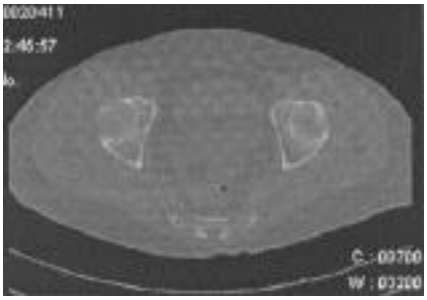

**Fig. 1.** Plain CT image of both hips showing bilateral concentric joint space narrowing and subchondral cyst formation which is more pronounced on the left side.

**Fig. 2.** The gauge 22 needles can be seen being directed perpendicularly into both hips (**solid arrows**). A small radiolucent air bubble is visible adjacent to the needle tip on the right side of the patient (**dashed arrow**), corresponding to the space between the bony cortex of the femur and the fibrous capsule.

**Fig. 3.** Radiolucent air bubbles are visible at the tips of both needles (**dashed arrows**). Corticosteroids were then injected through both needles following visualization of the air bubbles.

and 2 ml of Lidocaine 2% were then injected. Since this was a novel injection technique, the patient was encouraged to walk after the procedure to improve the immediate distribution of the drug within the joint, and was referred to a physiotherapist for passive range of motion exercises.

On examination 2 days after the procedure, the VAS pain scores had improved to 31 mm and 21 mm for the left and right hips, respectively, confirming the successful placement of the corticosteroid preparation into both hip joints. Another follow-up exam 16 days later confirmed this improvement, with both hips maintaining a VAS pain score of 24 mm at rest. Internal rotation was 25 degrees for both hips. Abduction had improved to 30 degrees, and flexion had increased to 120 degrees bilaterally. Sulfasalazine 1000 mg per day and glucosamine 1500 mg per day were added, and physical therapy was continued 3 times a week. Six weeks later hip joint pain reduction and mobility were maintained.

## Discussion

The presence of hip disease in AS has been reported in as many as 35-38% of patients, with bilateral involvement in up to 91% (1,2). Recently published articles suggest that 20-year survival rates of implants in patients with total hip arthroplasties (THA) can be as high as 64% to 73% (2, 5). While THA may be the only long-term treatment for severe hip arthritis in AS, this is not an attractive option for younger patients since revisions may be still be required. Consequently, palliative measures to delay hip replacement need to be explored.

Intra-articular corticosteroid injections are useful for relieving pain and improving range of motion in patients with hip arthritis and sacroiliitis from spondyloarthropathies (3,6). Advances in radiologic imaging techniques now allow the more precise placement of intra-articular medication into the hip joints. Injection of air into the joint can provide sharp echoic contrast to localize the placement of intra-articular hip injections using ultrasound guidance (7). For our patient we opted for a CT-guided technique to obtain detailed baseline images of both hips for future management purposes.

The creation of an air bubble underneath the fibrous capsule of the hip joint helped to localize needle placement and avoid the use of radiologic contrast dye. The successful placement of corticosteroids was verified by the immediate and prolonged relief of pain and improvement in functioning experienced by this patient. Given the novelty of this procedure, he was asked to walk just after the injection in order to improve drug delivery, but knees injected with triamcinolone and allowed 24 hours of rest had significantly better outcomes 6 months later compared with knees that were not rested (8).

This technique is especially useful in younger AS patients with advanced hip disease who may wish to delay surgery, and in whom repeat injections using radiologic contrast could increase the risks associated with radiation exposure. Similarly to ultrasound-guided joint injection techniques, this procedure avoids exposure to contrast material, offers precise localization, and could be useful in treating other chronic degenerative and inflammatory hip arthropathies.

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