Intraarticular Corticosteroid Injection: Pain Relief in Osteoarthritis of the Hip?

BJÖRN KULLENBERG, RONNY RUNESSON, RICHARD TUVHAG, CHRISTER OLSSON, and SYLVIA RESCH

ABSTRACT. ***Objective***. Osteoarthritis (OA) is one of the most common causes of morbidity in the elderly population, and surgery is often preceded by years of pain and disability. Intraarticular corticosteroid injections in osteoarthritic joints may play a role in the therapeutic plan and can afford quick pain relief but do not alter the underlying disease. There is a paucity of well controlled studies that provide recommendations for the use of corticosteroids in OA of the hip.

Methods. A prospective analysis of 80 patients with OA of the hip and pain at rest and on bearing weight for more than 4 weeks was performed. Patients were randomized into 2 groups; group 1 (n = 40) received corticosteroid (80 mg triamcinolone acetonide) and group 2 (n = 40) local anesthetic (1% mepivacaine), injected into the hip joint under fluoroscopy. Pain, functional ability, range of motion of the joint, and analgesics consumed were registered 3 weeks postinjection. The treatment was blind for the patients and the investigators performing the followup.

Results. Pain for all modalities decreased after corticosteroid injection, but pain at rest decreased the most. There was significant pain reduction at the 3 (and 12) week followup. Joint range of motion increased significantly for all directions. Functional ability improved significantly after injection. We found no significant pain relief or improvement of functional ability in patients treated with local anesthetics.

Conclusion. This study suggests that intraarticular corticosteroids might improve pain and range of motion of the affected joint in patients with hip OA. (J Rheumatol 2004;31:2265–8)

Key Indexing Terms:
CORTICOSTEROIDS INJECTION OSTEOARTHRITIS HIP

Osteoarthritis (OA) of the hip is a significant cause of morbidity in the elderly population and affects 4% of people over the age of 65 years[1]. Total hip replacement provides a successful intervention in endstage hip arthritis, but is often preceded by years of pain and disability. Rapid symptom relief, longterm symptom relief, and chondroprotection are the basis of medical treatment of degenerative joint disease. Nonsteroidal antiinflammatory agents, analgesics, and intraarticular administration of corticosteroids may provide pain relief. Chondroprotective agents are currently the focus of research but to date there is no pharmacological treatment to alter the pathology of OA.

Intraarticular injections into osteoarthritic joints may play a role in the therapeutic plan, affecting primarily the inflammatory response of OA. The extent of resulting pain and functional impairment of OA in the mostly elderly patients often demands efficient therapeutic action. Injections of corticosteroids can afford quick pain relief, but do not alter the underlying disease[2].

OA is characterized by progressive erosion of the articular cartilage. Intraarticular corticosteroids remain widely used for symptomatic treatment of OA, and clinical experience suggests an amelioriation of acute exacerbations of knee OA[3]. There are currently few studies describing the effects of corticosteroid injections in hip OA[4-7].

Judicious use of intraarticular injections seldom produces significant adverse effects. Iatrogenic infectious arthritis follows one in 14,000–50,000 injections[3]. Rapid acceleration of cartilage attrition is rarely observed. Investigation of primate models has shown no significant longterm deleterious effect on cartilage[3].

There is a paucity of well controlled studies that provide recommendations for nonrheumatologic use of corticosteroids. We focused on the evidence of these treatments in hip OA.

MATERIALS AND METHODS

In order to design this prospective study we conducted a retrospective evaluation of all patients in the clinic between 1999 and 2000 who received intraarticular corticosteroids (total 61). The focus of interest was pain measured by visual analog scale (VAS) before and after intraarticular injection. The patient also recorded the duration of the effect and whether the treatment was worth repeating in the future. Time to pain relief and changes in function were noted. The response frequency was 90% (n = 54/61). Patients had a relatively high baseline score of pain, mean 8.4, but with much variation. Intraarticular injection with corticosteroid produced a significant decrease in the value to 3.2. Almost all patients preferred a further injection if it became necessary. The duration of pain relief was from 3 to 6 months after injection. In 8 patients the intraarticular injection had no effect.

A prospective study was then started. Criteria for inclusion were hip pain for more than 4 weeks requiring regular analgesia and pain on weight-bearing and at rest (VAS > 3). The patients were recruited from the orthopedic

From the Department of Orthopedics and Department of Rehabilitation, Blekinge Hospital, Karlshamn, Sweden.

B. Kullenberg, MD, Department of Orthopedics; R. Runesson, PT, Department of Rehabilitation; R. Tuvhag, RN; C. Olsson, MD; S. Resch, MD, PhD, Department of Orthopedics.

Address reprint requests to Dr. B. Kullenberg, Ort Klin, Blekingesjukhuset, Lansmansv 1, 374 80 Karlshamn, Sweden. E-mail: bjorn.kullenberg@ltblekinge.se

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waiting list for hip replacement and their hip OA was radiologically graded according to the Ahlbäck criteria[8] as 2 or worse and joint space narrowing with cartilage destruction of 50% or worse. The included patients were randomized into 2 groups using the closed envelope method. Group 1 (n = 40) received corticosteroids and group 2 (n = 40) local anesthetic. The injections were blind for the patient and the investigator, who performed the 3 week and 12 week followup. Pain, functional ability, and analgesics consumed were recorded. Blood chemistries were analyzed to detect a systemic inflammatory process. The range of motion of the hip joint was tested.

Patient demographics. Eighty patients with hip OA entered the prospective study. All had a radiological abnormality of Ahlbäck grade 2 or worse. Mean age for group 1 was 67.3 ± 7.7 years and for group 2 it was 72.7 ± 6.4 years.

Hip injection. All patients received an injection of 2 ml fluid, either 80 mg corticosteroid triamcinolone acetonide or local analgesic mepivacaine 1%, into the hip joint. A 22 G needle was introduced under fluoroscopy by anterior approach, intraarticular position was confirmed. No attempt was made to aspirate the joint prior to injection. Patients were dishcharged after a short rest. They were instructed to rest for the remainder of the day and were allowed to resume normal activities the day after injection.

Assessment of outcome. Pain was assessed by VAS with reference to pain at rest and on bearing weight. Assessments were made prior to injection and after 3 (and 12) weeks. The values of VAS at rest and on bearing weight were added to achieve the total VAS score. The maximum value was then 20 (10 + 10).

Movement was measured by a goniometer for extension, flexion, and internal and external rotation. Patients were assessed by the same physiotherapist. Assessments were made prior to injection and after 3 weeks.

Assessment of functional ability was analyzed according to a 5 grade modified scale according to Katz and Akpom[9], with a focus on patients in relatively good medical condition.

The patients' total consumption of analgesia was registered prior to injection and at the followup at weeks 3 and 12. Their intake was classified into 3 groups: none, occasionally, and daily.

Statistics. Our analysis was conducted on an "intention to treat" basis: the last measurements of patients who withdrew before 12 weeks were carried forward. Pain and function data were analyzed using a nonparametric Mann-Whitney U test. Measurements of range of motion and functional ability were compared by paired t test.

RESULTS

There were no complications resulting from the intraarticular injections in our study. We found no clinical sign of systemic inflammatory response and no increase in blood chemistries.

For complete results see Table 1. In the corticosteroid group the VAS values for all modalities decreased, but VAS score at rest decreased the most (Figure 1). The largest differences were seen at the 3 week followup; thereafter the VAS scores increased slowly (Figure 1). There was significant pain reduction for both weight-bearing pain and pain at rest by the followup at 3 and 12 weeks postinjection. The range of joint motion increased significantly for all directions ($p < 0.001$ to < 0.01). The greatest improvement was seen for internal rotation. Functional ability improved significantly both 3 and 12 weeks after injection ($p < 0.001$). There was a decrease of the total analgesic intake during the study. Before corticosteroid injection 22/40 patients used analgesics occasionally and 16/40 daily. After corticosteroid injection 16/40 patients used analgesics occasionally and 3/40 daily. We found no significant pain relief or improvement in functional ability in patients treated with local anesthetics (control group) at 3 weeks. All patients withdrew from the study before 12 weeks due to lack of effect.

DISCUSSION

OA is one of the most common and economically important chronic diseases among adults of senior age. Most patients with OA seek medical attention because of pain. There now exists a range of analgesics, alone or in combination, that can alleviate the symptoms of disease and improve quality of life. These medications are not always sufficiently effective and must be discontinued due to side effects. The safest initial approach is to use oral analgesics, but if pain relief is inadequate intraarticular injections of corticosteroids may provide short term pain relief[9].

Local injections of corticosteroids are commonly used in orthopedic practice on the assumption that they will diminish the pain of inflammation. However, no clinical studies exist that can positively confirm prevention of cartilage defects in humans or a reversal of any progressively developing joint cartilage destruction. Corticosteroids are widely used for symptomatic treatment of peripheral joint disease, and several studies have indicated a significant benefit compared with placebo in knee OA[10,11]. Less is known of the effect of corticosteroids in hip OA. A prospective open study[7] of corticosteroid hip injection showed decreased pain score for up to 12 weeks after injection: greatest improvement was seen for night pain. The effects are, however, controversial. Flanagan and coworkers found a worsening of progression of hip OA

Table 1. Results of intraarticular injections of triamcinolone acetonide (TA) versus local anesthetic.

	Baseline TA	Local Anesthetic	3-week TA	Local Anesthetic	12-week TA
VAS					
Total (0–20)	12.2 ± 2.2	12.0 ± 1.0	3.8 ± 2.6	12.4 ± 1.8	7.9 ± 3.9
Activity (0–10)	6.9 ± 1.3	7.0 ± 1.0	2.5 ± 1.4	7.3 ± 1.5	4.7 ± 2.1
Rest (0–10)	5.3 ± 1.2	5.0 ± 1.7	1.3 ± 1.3	5.1 ± 1.2	3.1 ± 1.9
Functional ability (0–5)	2.0 ± 0.3	2.2 ± 0.2	3.6 ± 0.6***	2.0 ± 0.4	2.9 ± 0.8
Joint motion					
Flexion	94 ± 9.8	97 ± 5.8	102 ± 9.8**	95 ± 4.9	
Internal rot	3 ± 4.1	6 ± 3.1	13 ± 5.6***	5 ± 4.2	
External rot	10 ± 5.1	11 ± 4.2	21 ± 5.7***	11 ± 6.4	

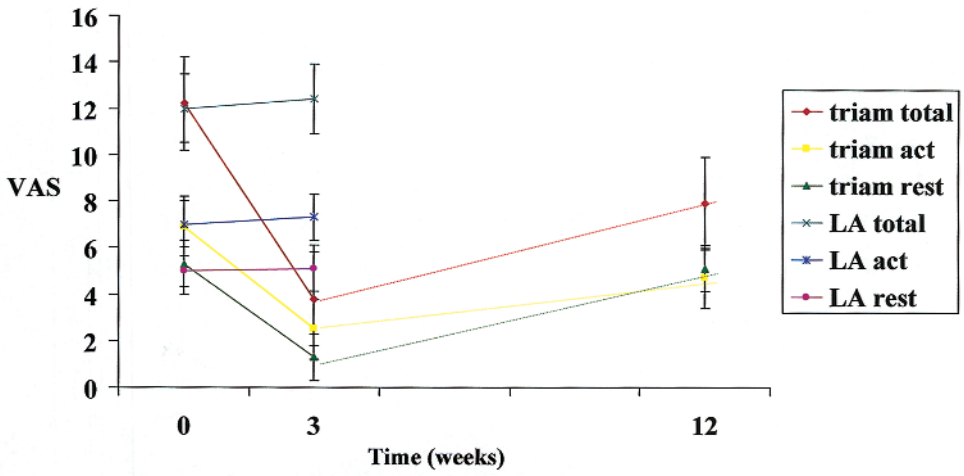

Figure 1. Differences in visual analog scale (VAS) scores after intraarticular injections of triamcinolone (triam) and local anesthetic (LA).

when corticosteroids are injected[4]. Results from our study of corticosteroid injection of the hip joint indicate that pain decreased significantly for about 12 weeks. Various aspects of pain improved but pain at rest improved the most. This is probably due to the inflammatory response of OA in the joint, where non-weight-bearing pain correlates well with effusions in diseased hips[12].

The effects of joint lavage together with intraarticular injection of corticosteroids remain controversial. Ravaud, *et al* showed additive effects of both treatments[13]; however, another study shows no relation between joint effusion and corticosteroid response[14]. Aspiration of synovial fluid was not associated with greater reduction of pain in a placebo group[15].

Twenty percent of the patients in the study underwent surgery during the study, with no differences between the groups. Predictive factors for response to intraarticular corticosteroid injections are not well investigated. Gaffney, *et al* found benefits in patients with evidence of joint effusion in the osteoarthritic knee[11]. The corticosteroid response was not influenced by the radiographic severity of the disease[7,11]. The criteria of inclusion in our study was hip OA with Ahlbäck score[8] of 2 or higher.

Our patients were treated as outpatients, and were discharged after the intraarticular injection. Recent data have suggested that immobilization for 24 hours after injection of weight-bearing joints confers longer lasting effect of corticosteoid injections, at least in the knee[16].

There are endogenous factors that can suppress pain stimuli, such as the placebo effect. The placebo effect is known to be especially important in mechanisms of pain control in moderate pain situations, where the effect reaches values of 30% — one-third of the patients feel pain relief when treated with an inactive drug[17]. Our study shows a decrease in VAS pain score of 50–60%. Injection was associated with an increase in degree of rotation. Internal rotation is one of the earliest signs of hip disease[7]. Therefore, this finding suggests an effect on the hip joint and not a placebo response. The improved range of motion might, however, be an effect of the reduction of pain following injection.

Hip arthritis has been separated into radiological subsets. The pattern of bone response comprises atrophic, hypertrophic, and mixed subtypes, which are based on the presence or absence of osteophytes[18]. All subtypes occur in OA[7], but atrophic hip arthritis tends to progress more rapidly[19,20] and did not gain any significant benefit after corticosteroid injections in a previous study[7]. Attention is increasingly focused on a possible disease-modifying role for steroids in OA[21], where the disease is viewed as a phasic condition in which organ damage occurs intermittently. If these phases can be detected, this could perhaps lead us to a more rational approach to the use of intraarticular steroids in OA.

Intraarticular hip injections require radiographic monitoring as surface landmarks are unreliable[7]. This procedure is well tolerated by the patients, and the radiological exposure is minimal. We estimate an average screening time of 60 seconds.

Relief of pain and improvement of function can be achieved in patients with moderate OA waiting for definitive surgery, especially if an integrated approach is used. The intraarticular corticosteroid injection may also be useful when surgery is contraindicated due to medical conditions. These patients may get temporary amelioration of symptoms and also reduction of potentially toxic analgesics.

Our study suggests that intraarticular corticosteroids can decrease pain and improve range of motion in patients with hip osteoarthritis. Injections offer a further therapeutic option in these patients.

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