Intra-articular bupivacaine hip injection in differentiation of coxarthrosis from referred thigh pain : A 10 year study

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The authors conducted a retrospective study to validate the specificity of intrarticular injection of local anaesthetic to identify the source of pain in patients with coxarthrosis but ill-defined clinical and radiological features. Forty-seven patients received intrarticular injection of the hip joint as a diagnostic procedure. Twenty-four patients showed a positive response with relief of pain. All of them underwent total hip replacement and remained pain free following surgery. In twenty-three patients intrarticular injection did not relieve the pain ; three of these underwent successful total hip replacement two years later. Other negative responders were further evaluated and appropriately managed.

This study confirms that intra-articular injection of local anaesthetic is a valuable tool in diagnostic dilemma. The calculated sensitivity of 88% and specificity of 100% is similar to other published series.

INTRODUCTION

The source of pain around the hip joint may be multifactorial. It is not uncommon for patients to be referred with combined low back and hip pain. The clinical signs and radiological features may sometimes be inconclusive. About 10-15% of patients may have combined spinal and hip pathology causing a diagnostic dilemma (1). It is essential to locate the source of pain to the hip joint before considering total hip replacement in these patients. Intrarticular injection of local anaesthetic with or without steroid is a valuable diagnostic tool to exclude or confirm the source of pain prior to further management. Diagnostic intrarticular injection in other anatomical sites like the acromioclavicular joint, the shoulder joint, the facet joints and trapezo-metacarpal joints have been reported (1-7).

Previous study with the use of intrarticular injection of the hip has shown 96% sensitivity for confirming the source of pain (2). Also studies have been done to assess the therapeutic effect of intrarticular injections with several different agents in patients with arthritis of the hip. The placebo effect associated with such injections limits widespread application as a therapeutic regime.

The aim of the current study was to evaluate the sensitivity and specificity of local anaesthetics with or without steroid in establishing the source of pain when the clinical and radiological features were inconclusive.

PATIENTS AND METHODS

Patients referred with pain around the hip joint with borderline clinical and radiological features with coexisting spine involvement were given intrarticular hip joint

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Table I

Total number of patients	47
Sex / M : F	20:27
Age	28 – 86 years
Right : Left	21:26
Bupivacain	24
Bupivacain + Lidospan	23
Radiographs : Pelvic film	47
Radiographs : Pelvis and L.Spine	17
Radiographs : Pelvis, L.Spine and Knee	4

Table II. — Response to injection

Grade	Number of patients
Pain relieved	24
No change	21
Worse	2

injection for a diagnostic purpose. Forty-seven patients were injected by a single surgeon between 1991 and 2000. All patients had pelvis and hip radiographs. Seventeen patients also had lumbosacral spine radiographs which revealed mild to moderate degenerative changes in 11 cases.

The mean age of the patients was 57 years (range 28-86). Male to female ratio was 20 : 27. The right hip was injected in 21 patients and the left in 26. Twenty four patients had intrarticular injection of 0.5% Bupivacaine only. The remaining 23 patients were injected with local anaesthetics (0.5% Bupivacaine hydrochloride) and local steroid (Triamcinolone acetate). The patients' data are given in table I.

The injections were all performed by a single surgeon under strict aseptic conditions in the operating theatre using image guidance. An eighteen-gauge spinal needle was used for injection. The patients were all placed in the supine position and the hip joint was entered through an anterolateral approach. All except one patient were discharged the same day. Patients continued with pre-injection analgesics and were reviewed at two weeks following injection. There were no infections or neurovascular complications following this procedure ; in two patients however, the hip pain deteriorated after the local injection.

RESULTS

Patients who had complete or significant relief of pain following injection were classified as positive responders. Among forty-seven patients who had intrarticular injection of the hip, twenty-four patients had adequate pain relief and improved activity (positive responders) (table I & II). Thirteen patients had received 0.5% Bupivacaine only and eleven patients had received 0.5% Bupivacaine and Triamcinolone acetate. For those who had injection with 0.5% bupivacaine alone, the duration of pain relief was between one day and one week. Patients who had both 0.5% bupivacaine and Triamcinolone acetate had more sustained pain relief, between one month and one year. All 24 patients underwent successful total hip replacement with complete relief of pain (table III).

Table III. — Outcome of Total Hip Replacement (THR)

	Positive response	Negative response
Response to local injection	24 patients	23 patients
Patients who underwent THR in each group	24 THRs	5 THRs
Pain relief following THR	All patients	3 patients

Table IV. — Negative Responders – Diagnosis

Diagnosis	Number of patients	Treatment
Osteoarthritis – knee joint	2	Knee replacement
Facet joint arthritis	6	Facet joint injection
Degenerative disc prolapse	1	Pain clinic
Lumbar spondylosis	3	Physiotherapy
Meralgia paraesthetica	1	Surgery
Inguinal hernia	1	Surgery
Trochanteric bursitis	1	Surgery

Twenty-one patients had no change in symptoms and in two patients the symptoms deteriorated (negative responders). In 15 patients further investigations identified different source of pain, these were treated accordingly (table IV).

In 5 patients the symptoms of hip pain persisted with borderline features of hip osteoarthritis. After a mean period of 2 years, no further source of pain was identified and they underwent total hip replacement. In three patients the symptoms significantly improved following the hip replacement and these were accordingly considered as having had a false negative result to intrarticular hip injection.

Two patients however did not achieve any symptomatic relief following THR and were included in the true negative response group. Overall no organic cause was identified in 5 patients ; they were referred to the pain clinic for further management.

DISCUSSION

Intra-articular corticosteroid injection therapy is widely used for symptomatic peripheral and axial joint osteoarthritis (1-7). The placebo effect of these injections raises doubts about the specificity of these injections in identifying the source of pain. There is one double blind randomised trial comparing intra-articular saline and local anaesthetic injection in patients with a definite diagnosis of arthritis of the hip joint who were waiting for total hip replacement. The majority of patients, including those who had saline injection to the hip, reported good pain relief for an average period of one month (3).

About 10% of patients having hip pain may have a co-existing pathology of the hip and the spine with inconclusive clinical and radiological features as to the source of pain (1). Surgeons are faced with a diagnostic dilemma in these situations and they need to establish the source of pain before considering a replacement of the hip joint. The distinction may not be possible even with costly investigations like magnetic resonance imaging and computerised tomography scans.

Our study was meant to assess the specificity of local anaesthetic with or without steroid in relieving pain arising from hip arthritis. Crawford *et al* (1) have conducted a similar study for establishing the source of pain before primary and revision total hip replacement. In their series, 33 of 44 patients had significant pain relief from intra-articular injection and 32 subsequently had successful total hip arthroplasty. It was concluded that intra-articular injection of local anaesthetics is at least 96% sensitive and is a reliable test in identifying the source of pain in atypical cases. Odoom *et al* published similar results from their study on 23 patients (7). Both these studies supported the value of intra-articular local anaesthetic injection as a specific diagnostic tool and suggested that further studies were needed to confirm their findings.

Our study has also shown similar if not better results confirming that it is an inexpensive and reliable test for identifying the source of pain. The specificity and the positive predictive value in our series were 100%, indicating that there was no false positive response. The sensitivity was 88% and the negative predictive value 85% (73% with the worst case scenario), which is better than in the earlier reported series. When the cause of pain in arthritic joints is the increased intra-osseous venous pressure, local anaesthetic injection of the joint will not relieve this pain (3). This may explain why, despite a false negative response to the injection, some of our negative responders reported pain relief after total hip replacement. It is also vital to perform the injection under X-ray guidance in order to be certain that the needle is in the hip joint prior to injection.

In two of our patients (4%), the hip pain deteriorated following the injection ; this possibility has to be explained prior to the injection, and patients who have non-organic symptoms have to be identified and excluded.

In our series the effect of the combination of local anaesthetics and steroid lasted longer than local anaesthetics alone. We therefore recommend this combination in order to obtain a sustained pain relief whilst they are awaiting joint replacement once decided.

CONCLUSION

Our results support the earlier studies, that there is a role for local anaesthetic injection in identifying the source of pain in patients who have coxarthrosis with borderline clinical and radiological features and an associated low back spondylosis. The concern regarding the specificity of these injections has limited the widespread application of this technique as a diagnostic tool. Our study has shown an 88% sensitivity and 100% specificity in establishing the source of pain.

We do not, however, feel that it is practical to use local anaesthetic with or without steroid injection into the hip joint for mere pain relief. After all, this

is an invasive investigation and in 5% of our cases the hip pain did get worse.

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Statistical analysis

N = 47	TRUE	FALSE
POSITIVE	24	0
NEGATIVE	17	3 (6)

SENSITIVITY :

$$\frac{\text{true positive}}{\text{true positive + false negative}} = \frac{24}{27} = 88\%$$

SPECIFICITY :

$$\frac{\text{true negative}}{\text{true negative + false positive}} = \frac{17}{17} = 100\%$$

POSITIVE PREDICTIVE VALUE :

$$\frac{\text{true positive}}{\text{true positive + false positive}} = \frac{24}{24} = 100\%$$

NEGATIVE PREDICTIVE VALUE :

$$\frac{\text{true negative}}{\text{true negative + false negative}} = \frac{17}{20} = 85\%$$

or (worst case scenario) $\frac{17}{23} = 73\%$