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ORIGINAL STUDY

Total hip arthroplasty after ipsilateral intra-articular steroid injection : 8 years follow up

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The purpose of the study was to assess the safety of Intra-articular steroid hip injections (IASHI), prior to ipsilateral total hip arthroplasty (THA). We investigated whether there was an excess of infection in such a group 7-10 years after total hip arthroplasty. A database of 49 patients who had undergone IASHI followed by ipsilateral THA was reviewed. The mean length of time between injection and arthroplasty was 12.1 months (5.1-19 months). We found 7 major complications. Ten patients died with no further hip surgery at a mean of 28 months from surgery ; 3 were lost to follow-up. The remaining group (36) were contacted by telephone at a mean of 97.8 (85-117) months from their surgery. No objective signs of joint infection were found. We believe our results show that ipsilateral steroid injection does not confer an increased risk of complications following subsequent THA, over an extended follow up.

Keywords : steroid ; hip ; injection ; replacement ; infection.

INTRODUCTION

Osteoarthritis (OA) of the hip is a common problem, with a total cost in the UK estimated to be 1% of the annual gross national product (*3*). In the current economic climate, effective and efficient management of OA has never been more important.

Management of OA of the hip is broadly divided into conservative and surgical treatment. The National Institute for Healthcare and Clinical Excellence (NICE) recommends a holistic approach to the management of OA (*12*). Conservative measures range from counselling, education and self-management programs to the use of analgesia, physiotherapy, TENS therapy and intra-articular steroid injection.

The definitive surgical management is total hip arthroplasty (THA). The decision of who should have THA is complicated. Despite no current consensus on strict indication criteria, pain with activity, rest pain and functional limitation were found to be the most important (*7*). It has been suggested that the number of THAs conducted in the UK could increase by as much as 40% between 1996 and 2026 (*1*).

A severe complication of THA is deep infection. This is catastrophic for the patient and extremely costly (*5*). To prevent this, peri-operative prophylactic antibiotics are administered and stringent aseptic technique is observed in theatre. Factors identified

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as increasing a patient's chance of developing a deep joint infection following THA should be reviewed because of the catastrophic nature of this outcome.

There has been some debate in the literature over the safety of ipsilateral intra-articular steroid injection prior to THA following Kaspar *et al*'s finding of a deep infection rate of 10% in these patients (*10*).

Intra-articular injection of steroid is commonly used as a method of relieving pain secondary to osteoarthritis in both the hip and knee. It can be combined with local anaesthetic and as a diagnostic tool to identify true hip pain over referred pain. The value of this is well proven (*15*). However the efficacy of intra-articular steroid injection as a method of pain relief and its safety have been questioned (*11*). It is known to be a challenging procedure, with up to 40% of injections being extra-articular when not performed under fluoroscopic guidance (*13*).

To date, there are four published studies (4,*10, 14,17*) that have investigated deep infection following ipsilateral IASHI. These have a mean follow-up range of 25.3 to 33.2 months (Table I).

It is well known that deep infection can present beyond this time frame, with approximately 82.7% infections having declared themselves by nine years (*18*). After this time it is felt that infections are likely to be due to haematogenous spread rather than to the surgery itself.

The previously published studies do not provide sufficient follow-up lengths to conclusively investigate whether there is an increased infection rate in patients who have undergone ipsilateral IASHI followed by THA by studying a cohort over a longer period of follow-up.

PATIENTS AND METHODS

We conducted a prospective study of a cohort of patients who had received a THA following an ipsilateral steroid injection, a database being founded to look at the efficacy of injection therapy. From this series we identified 49 patients receiving an intra-articular steroid injection followed by an ipsilateral THA.

The intra-articular steroid injections were conducted by members of the surgical team in a laminar flow theatre with fluoroscopy guidance in the day case unit of the hospital. Following preparation of the site with betadine solution, a 22-gauge needle was inserted, from an antero-lateral aspect, into the intra-articular space. Correct placement was ensured by injection of radio opaque contrast, and visualisation by fluoroscope ; 80 mg depomedrone and 5 ml of 0.5% bupivacaine were then injected into the joint space.

Table I. — Mean follow-up of published studies

Study	Mean follow-up (months)
Kaspar *et al* 2005 (*10*)	33.2
Chitre *et al*. 2007 (*4*)	25.8
McIntosh *et al*. 2006 (*14*)	32.4
Sreekumar *et al*. 2007 (*17*)	25.3

The total hip replacements were mainly conducted by the senior author in modern aseptic conditions and laminar flow operating theatres, 6 procedures being done elsewhere due to a waiting list initiative.

The clinical notes of all of the patients were available and were analysed. Any evidence of an adverse outcome was investigated. Blood markers of infection (White cell count, C-Reactive Protein, Erythrocyte Sedimentation Rate), microbiology (joint aspirations, blood cultures) and imaging investigations conducted were reviewed. Patients who had been discharged from official follow-up were contacted by telephone and answered questions regarding their hip. Those with any problems were invited for review.

RESULTS

The mean age of the patients at operation was 69.0 years (51 to 98). The mean interval between injection and operation was 12.1 months (5.1-19) and the mean length of follow-up was 97.8 months (85-117 months).

We recorded 7 complications in our series of 49 THAs. Three deep vein thromboses (DVT) were identified, 1 posterior dislocation, 1 superficial infection, 1 periprosthetic fracture 1 month after THA and 1 stroke and haematoma that became immediately infected.

The 3 DVTs were successfully managed with anticoagulation therapy. The posterior dislocation occurred 3 days post operatively. It was successfully reduced under general anaesthetic and the patient suffered no further complication. The superficial

infection was confirmed 2 weeks post operatively by wound swab and culture ; antibiotic therapy was successful with no ongoing problem. One patient suffered a peri-prosthetic fracture. She underwent a successful revision 12 weeks after the original operation. There has been no late infection.

At follow-up 10 patients had died with no further hip surgery at a mean of 28 months from surgery ; 3 were lost to follow-up (6.1%). The remaining group (36) were contacted by telephone at a mean of 97.8 months from their surgery, 26 were very happy with their joints, 4 had mild pain, 6 moderate pain. These 6 were reviewed, 2 had hips at risk, with femoral loosening, neither was keen to be revised, and none had abnormal infection markers (WCC, CRP and ESR).

The patient who suffered the stroke and deep wound infection also had a post-operative wound haematoma and pneumonia. The pneumonia prevented wound wash out, as the patient was unfit for general anaesthetic. This patient died at 4 months from surgery. Due to these confounding factors it is not possible to conclude that this infection was related to the previous steroid injection.

DISCUSSION

One patient in this series suffered a deep wound infection (2.0%), which is not thought to be because of the hip injection. After 12 years of consultant practice, the senior author is aware of a deep infection rate of 0.87% in all THAs. The proven deep infection in our series was complicated by the presence of co-morbid factors that did not allow aggressive management of the patient's haematoma, possibly the cause of the infection.

Expressing our results can therefore be 0% or 2%, which is in keeping with studies by Chitre *et al* (*4*), McIntosh *et al* (*14*) and Sreekumar *et al* (*17*), who quote infection rates of 0%, 1.3% and 0% respectively. It contradicts the findings of Kaspar *et al* (*10*) demonstrating a 10% deep infection rate in THAs following ipsilateral steroid injection.

It is interesting that 4 patients reported mild pain and 6 moderate pain at follow-up. The immediate benefits of THA for pain relief are clear. Britton *et al* (*2*) investigated the validity of pain as a predictor of revision following THA. They report that pain levels following THA show a small improvement up to two years. This is followed by a general deterioration in pain levels after 4 years. Our patients' complaints of pain can be accepted due to the length of follow-up in our study.

By studying a group of patients over a longer follow-up (mean 97.8 months) we have been able to provide stronger evidence that IASHI prior to THA does not confer increased infection risk. The one deep infection in our case series was identified early. Although 10 patients had experienced pain at some point during their follow-up, there were no objective signs of infection.

Two factors have been identified that may have contributed to the increased infection rate in Kaspar *et al's* study. The mean length of interval between IASHI and THA in the Kaspar *et al* study is 11.4 months. In our study it is 12.1 months (Chitre *et al* 18.0 months, McIntosh *et al* 3.7 months, Sreekumar *et al* 14 months). Chitre *et al* suggested a shorter interval between IASHI and THA might predispose to deep joint infection. This is contradicted by our study and does not appear to be the case.

It has also been noted that the Kaspar *et al* study describes the IASHI as being conducted in the 'radiology suite'. There is no mention of sterile conditions, and it may be that this procedure conducted in a non-sterile environment may have introduced pathogenic bacteria into the hip joint prior to the subsequent THA.

A similar debate has been conducted with regard to deep infection in knees following total knee arthroplasty preceded by IASHI. It was suggested in 2006 (*16*) that steroid injection prior to total knee replacement may increase the incidence of deep infection. This debate is ongoing, however several studies completed since refute this finding (*8,6,9*).

A statistical comparison to the literature is not valid. This is due to confounding factors (primarily differing surgeons and the different settings of the procedures) and the relatively small sizes of the studies.

We acknowledge the weaknesses of our study, namely its size and the variety of surgeons conducting both the IASHI and THA.

CONCLUSIONS

Our study provides good evidence that ipsilateral IASHI prior to THA does not confer increased deep infection risk over an 8 year period of follow-up. This supports the use of IASHI as a cost effective, and safe treatment of osteoarthritis of the hip.

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