INTRAARTICULAR MORPHINE FOR POST OPERATIVE KNEE ARTHROSCOPY ANALGESIA

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ABSTRACT

The Arthroscopy has dramatically changed the orthopedic surgeon's approach to the diagnosis and treatment of variety of joint ailments. A degree of clinical accuracy, combined with low morbidity has encouraged the use of arthroscopy to assist in diagnosis to determine prognosis and often to provide treatment. Recent work has described peripheral opioid receptors in skin and synovium. The later may respond to the use of intra-articular morphine for analgesia following knee arthroscopy.

Two hundred and twenty five patients who had undergone different arthroscopic procedures for the last 3 and half years were prospectively evaluated. Of the total arthroscopic procedures evaluated, meniscal pathology was found in 154 patients, synovial pathology in 14 patients, Anterior CruciateLigament (ACL) and Posterior Cruciate Ligament (PCL) insufficiency in 18 patients, chondral lesions in 25 patients, tight lateral structures in 6 patients and loose bodies in 8 patients. All the patients were operated on outpatient basis. Routine intra-articular morphine (2 mg.) was used for postoperative pain relief. Drain was not put following the procedures. All the patients were seen on the 5th postoperative day. Most patients were satisfied with the pain relief modality and needed analgesics in few patients. Postoperative low dose intra-articular morphine injection has been found to be good alternative to other pain management modalities.

Key Words: Knee arthroscopy, Morphine, Opioid receptors, Post-operative pain.

INTRODUCTION

Arthroscopic knee surgery has progressed rapidly over the last 15 years. The arthroscopy has dramatically changed the orthopaedic surgeon's approach to the diagnosis and treatment of variety of joint ailments. A high degree of clinical accuracy, combined with low morbidity has encouraged the use of arthroscopy to assist in diagnosis, to determine prognosis and often to provide treatment. So this has now been accepted as diagnostic and therapeutic procedure. The procedure can be performed on out patients, but post- operative analgesia remains a problem. Intra-articular bupivacaine has been the most commonly used post-operative analgesia¹⁻⁴ in doses from 50-200 mg., which are compatible with safe serum concentrations.^{4,5}

Stein and his colleagues⁶ demonstrated that low doses of morphine sufficiently decreased post-operative pain following arthroscopic knee surgery and that the effect was blocked by intra-articular naloxone, confirming that low dose morphine blocked peripheral opioid receptors in the synovium.^{1,8} They did not observe any systemic side effects.

Previously patients operated on out patient basis had complaints of pain in the operated knee following use of intra-articular bupivacaine and oral analgesics. So in this prospective study, we tried to see the efficacy of low dose intra-articular morphine in terms of how often the patients had to take oral analgesics due to pain following knee arthroscopic surgery.

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MATERIALS AND METHODS

Intra-articular morphine analgesia following knee arthroscopy was observed in all study patients undergone diagnostic arthroscopies, synovial biopsies, meniscectomy, removal of loose bodies, or chondroplasty not requiring postoperative drainage. All patients were informed about the study and were requested for proper information.

EXCLUSION CRITERIAS

- 1. Epidural or spinal anaesthesia
- 2. Allergies to opioids
- 3. Severe cardiovascular, respiratory, metabolic or neurological disease
- 4. Post-operative intra-articular drainage requiring patients
- 5. Requiring post-operative splintage
- 6. Age less than 16 years or more than 70 years

A standard general anesthesia was given to all patients, induction with sodium thiopentone and maintenance with halothane, oxygen and Nitrous oxide and either spontaneous ventilation (laryngeal mask) or intubation and ventilator. At the completion of surgery, 2 mg. of morphine in 5 ml. of normal saline was injected into the knee. In most cases, portals were closed with dressing gauze and elastic compression crepe bandage. Sutures were inserted when portals were made larger to cause bleeding. Postoperatively, Diclofenac 50 mg. 3 times/ day was given as analgesics and patients were asked to record the number of doses of analgesics, they had to take for intolerable pain. All patients were seen on the 5th postoperative day.

RESULTS

Two hundred and twenty five patients were entered for this study.

Average age of the patients was 28 years, with the age ranging from 16 to 70 years of age. Majority (73.33%) patients were of age between 20-40 years, which is related to maximum sports and other activities.

Majority (68%) patients had meniscal pathology with predominant traumatic meniscal lesion (50%) in total patients.

Table I : Age and Sex Distribution

Age	Male	Female	Total
< 20 years	28	8	36
20-30 years	86	34	120
30-40 years	29	16	45
>40 years	11	13	24
Total	154	71	225

Age	Male	Female	Total
Meniscal Pathology	111	43	154
Degenerative Tear	6	12	18
Traumatic Tear	92	21	113
Discoid Meniscus	13	10	23
Synovial Pathology	8	6	14
ACL & PCL Insufficiency	16	2	18
Chondral Lesion	12	13	25
Tight Lateral Structure	4	2	6
Loose Bodies	3	5	8
Total	154	71	225

Table II : Knee Pathology

Table III : Postoperative Analgesics Requirement

Age	Male	Female	Total
Analgesics Doses			
No Analgesics Needed	55	48	103
? 3 Doses	49	19	68
4-6 Doses	38	4	42
> 6 Doses	12	0	12
Total	154	71	225

One hundred three patients out of 225(45.77%) did not have to take any analgesics (Diclofenac), and 171(76%) patients had to take insignificant doses of analgesics (<3 doses) or no analgesics. This shows analgesic effect of intra-articular morphine following arthroscopic knee surgery is excellent which is statistical significance (P= .0000253). This result also shows that female can cope more pain than male, requiring less analgesic drugs.

DISCUSSION

The search for an ideal analgesic for use following knee arthroscopy has become important as more day care surgery is performed. Intra-articular bupivacaine has been commonly used to produce post-operative analgesia.¹⁻⁴ Intra-articular bupivacaine is an effective post-operative analgesic.^{2,9,10} However, this effect seems to be short lived with duration of only 2 hours.^{2,10} Henderson and his colleagues,¹¹ found no analgesic effects with 30 ml. of intra-articular 0.25% (75 mg.) bupivacaine. They suggested that this might be due to rapid clearance from the knee, too low a dose or perhaps ineffective relief of portal pain.

Opioid receptors have long been recognised in the brain and central nervous system, but have only recently been demonstrated in the periphery on nerve endings¹²⁻¹⁶ and in the synovium of cat knee.¹⁵ Stein and his colleagues⁶ provided the first clinical evidence of the peripheral action of opioids, showing that anti-nociceptive effect of intra-articular morphine was blocked by intra-articular naloxone.

The anti-nociceptive action of peripheral opioids has only been demonstrated in the presence of inflammation.^{7,16-18} When no inflammation exists or in the setting of immunosupression,¹⁶ this anti-nociceptive response is absent. Surgical procedures induce a local inflammatory response.

The peripheral opioid action involves a number of mechanisms, including inhibition of action potentials in Pain fibres^{7,16} and inhibition of the release of excitatory substance P.^{7,19} Action on Post-ganglionic nerve terminals blocks the release of several sensitising prostanoids, which may be important in sympathetically maintained pain syndrome.²⁰

A number of studies have now shown the clinical efficacy of intra-articular morphine and have demonstrated a prolonged effect with analgesia lasting at least 24 hrs.^{6,21-24,25-29} This has been explained by the low lipid solubility of morphine giving its hydrophilic qualities, thus slowing its clearance from the knee.^{10,23} The study presented here demonstrates this prolonged action of morphine so that substantial numbers of the patients in this study didn't have to take analgesics at all. Majority

(76%) patients had to take no analgesic or less than 3 doses of analgesics following surgery which is statistically significance (P=.0000253). This also shows the efficacy of intra articular morphine for post-operative pain in arthroscopic knee surgery.

A delay onset of action is documented by a number of authors.^{6,21,30} This delay onset may be related to a delay in development of an inflammatory reaction following the surgical procedures or residual effects of premedications and anaesthetic drugs. But this study could not demonstrate this delayed effect. The possibility that intra-articular morphine may be acting as a depot for the slow release of morphine into the systemic circulation needs to be considered. The data presented by Lawrence and colleagues²³ indicates that levels from 5 mg of intra-articular morphine are decreasing at 2 hours. Hence the systemic effects are likely to diminish with time, but levels may transiently approach effective analgesic levels in the first hours. So nausea is seen in 5mg intra-articular morphine but not in low dose (1mg) intra-articular morphine. Like that we also didn't notice any nausea following 2mg intra-articular morphine despite adequate analgesia.

Some workers^{23,24,26,31} leave the tourniquet inflated for 10 minutes following intra-articular injection, on the basis that it may aid tissue binding.²⁴ No study has addressed this issue scientifically, and we also deflated tourniquet immediately. Several authors have combined bupivacaine with 1mg morphine and claimed superior overall analgesia coverage for the 24 hours period using this mixture.^{18,21,32,33} Our study does not address this issue but efficacy of 2mg intra-articular morphine at early time points may compare favorably with the effect of combined analgesics. Further studies are required to resolve this issue.

It can be concluded that low dose (2mg) intra-articular morphine injection has been found to be good alternative to other pain management modalities especially for day care patients following arthroscopic knee surgery.

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