

ORIGINAL

140 adult knee arthroscopies under intra-articular local anaesthetic

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ABSTRACT

Aim: To analyse the use of intra-articular local anaesthetic (IALA) for therapeutic knee arthroscopy in the day case unit of a UK district general hospital.

Methods: Investigation of 140 consecutive adult therapeutic knee arthroscopies. Visual analogue pain scores, patient satisfaction, operative details and difficulties were recorded. Costs were estimated.

Results: Surgical pain scores varied between 0 and 6 with 87% experiencing no pain. Only 6 patients required intraoperative sedation. 95.5% of patients were satisfied with IALA and 93% would choose IALA during future knee arthroscopies. Employing IALA reduced costs from £59.33 to £17.06.

Conclusion: IALA for ambulatory day case arthroscopic knee surgery is highly reliable, safe, and cost effective. It also provides an acceptable experience for patients.

Keywords: Local anaesthetic, knee, arthroscopy, awake procedure.

INTRODUCTION

Arthroscopic examination and treatment of the knee is a frequently performed day surgery procedure. There are two commonly used modalities of anaesthesia: general (GA) or regional. Regional anaesthesia often causes motor as well as sensory blockade (1). This delays mobilisation in the post-operative period and can lead to the procedure becoming less suitable for the ambulatory day case environment (2), thus GA is usually employed.

This study uses an intra-articular local anaesthetic (IALA) technique as the sole anaesthetic modality during day case therapeutic knee arthroscopy.

In the National Health Service, approximately 150,000 knee arthroscopies are performed annually with more than half involving meniscal procedures (3).

Since the late 1970s, IALA has been studied, used and described, but these studies largely involved diagnostic arthroscopy. Despite these widespread descriptions it is not commonly employed in the United Kingdom.

A single surgeon offers an IALA service for knee arthroscopy from one department in Kent, United Kingdom. Prospective data pertaining to this service has been collected. We present the results and our experiences relating to this service.

HYPOTHESIS

IALA is acceptable to patients, allows all routine intra-articular arthroscopic therapies to be performed and is a safe alternative to general anaesthesia in day case ambulatory therapeutic knee arthroscopy. IALA is also a particularly

useful technique in patients not fit for general anaesthesia in the ambulatory or day surgery setting. Furthermore, it avoids the potential complications of spinal or regional local anaesthetic techniques.

METHODS

Prior to starting this study the senior authors applied for and were granted permission for the trial through the hospital Research and Development unit.

PATIENT SELECTION

All adult patients listed for knee arthroscopy (usually after diagnostic magnetic resonance imaging) from the lead surgeon's clinic were offered an anaesthetic choice of GA or IALA. The exclusion criteria for IALA were ipsilateral hip arthritis, allergy to local anaesthetic agents or patient refusal of IALA. These patients went on to have their procedures under GA.

ANAESTHETIC TECHNIQUE

All the procedures were performed on designated day case local anaesthetic knee arthroscopy lists.

All patients received verbal and written information during routine preoperative assessment.

Initially all patients were kept nil by mouth for 6 hours prior to surgery in case conversion to GA became necessary. This precaution was later removed as it was felt to be unnecessary.

Deep vein thrombosis (DVT) prophylaxis consisted of early mobilisation and compression stockings for all patients. Low molecular weight heparin was prescribed for high-risk patients in accordance with hospital policy.

The anaesthetic protocol was a multimodal analgesic approach. In addition to the intra-articular injection, Paracetamol 1g and Diclofenac 75 mg were given intravenously. If the use of NSAID was contraindicated, Co-Codamol 30/500 was given orally 2 hours prior to the IALA.

In accordance with strict asepsis the skin of the knee was prepared with alcoholic 10 % povidone-iodine solution (Videne Alcoholic Tincture). 2 % Chlorhexidine gluconate (Ecolab) was used if the patient was iodine sensitive. An anaesthetist performed the IALA injection. It was inserted into the retro-patella pouch, accessed through a lateral approach using a 23G hypodermic needle. During advancement of the needle a negative pressure was applied to aspirate synovial fluid prior to injection.

The IALA consisted of 20 mls 2 % lidocaine with 1:200,000 epinephrine. The patient was then encouraged to move the knee through 2-3 flexion and extension cycles to move the local anaesthetic through the whole joint. The surgery was commenced 15-20 minutes after the IALA injection.

Rescue analgesia was available in the form of aliquots of fentanyl. An anaesthetist assigned to the operating list administered the anaesthetic protocol.

To use the time efficiently the IALA for the next patient on the arthroscopy list was infiltrated during the preceding patient's surgery. This allowed for zero "anaesthetic time" once the first patient's surgery had begun.

SURGICAL TECHNIQUE

The lead surgeon performed all the arthroscopies.

The theatre was prepared for the arthroscopy in a standard fashion. The satellite screen was positioned for the benefit of the patient. A fluid management system was employed. The patient was placed supine on the operating table. No tourniquet was applied. A padded lateral support was used. Standard skin preparation was used.

Prior to skin incision the 2 standard antero-lateral and antero-medial port sites were infiltrated with 5 mls of 1 % lidocaine.

The arthroscopy was performed as per the surgeon's normal protocol.

1. Initial sequential diagnostic arthroscopy through each compartment.
2. Therapeutic procedures performed.

The operating surgeon conducted constant commentary explaining the procedure. Patients were encouraged to view the arthroscopic images in real time (if they wished).

Closure of the wounds was performed with a single 3-0 polyglactin 910 (Vicryl) subcuticular suture to each wound. The joint was infiltrated with 20-30 ml of 0.5 % levobupivacaine (Chirocaine) according to patient mass.

The patient was then sent directly to the day-case ward. This bypassed the Post Anaesthetic Recovery Unit, unless patient had received sedation. Discharge was allowed once patient was deemed safe to leave by the ward nursing staff.

Take home post operative pain relief was provided for all patients in the form of simple multimodal analgesia. A choice was given of Paracetamol 1 g PO QDS or Co-coda-

mol 30/500 two tablets PO QDS plus optional Ibuprofen 400 mg POTDS PRN.

Patients were seen in the routine orthopaedic outpatient follow up clinic.

The clinic review protocol was:

- **2 weeks:** patient education on operative findings, wound review and arrangement of physiotherapy if required.
- **3 months:** review to check post-operative recovery and discharge if appropriate.

DATA COLLECTION

A multimodal data collection system was employed.

The surgical team recorded operative details including any difficulties or intraoperative pain in addition to patient satisfaction and willingness to undergo the procedure again. Two weeks later the final satisfaction and post-operative pain was recorded again along with willingness to undergo the procedure again under IALA. Any complications were recorded.

The anaesthetic team employed a visual analogue pain score to measure the worst pain the patient experienced both during the IALA injection and intra-operatively.

RESULTS

There were 140 patients that underwent local anaesthetic knee at the time of data collection.

The patients' ages varied between 26 and 89 years of age. ASA ranged from 1–3 with over half being between ASA 2 and ASA 3. The highest BMI measurement was 48.

128 (91 %) gave immediate feedback. The remaining patients were discharged from the ward prior to surgical team post-operative ward round. 111 (79 %) gave both immediate feedback, and feedback in clinic at their first clinic appointment. Some patients were seen in the follow up clinics other than lead surgeon's clinic, affecting data collection.

6 patients requested sedation (4 %). There were no conversions to general anaesthesia.

Surgical time varied between 15 and 35 minutes.

The full remit of common arthroscopic procedures were performed with some patients undergoing more than one procedure (Table I).

TABLE I

PROCEDURES UNDERTAKEN	NUMBER
Medial meniscectomy	73
Lateral meniscectomy	19
Medial and lateral meniscectomy	13
Medial meniscus repair (all inside technique)	1
Debridement of joint surface	39
Excision of plica	7
Removal of loose body	3

The pain visual analogue score during the IALA injection ranged from 0 to 10 with 53 % of patients scoring 0-3 (mild), 30 % 4-7 (moderate) and 17 % 7-10 (severe). During surgery the pain score varied between 0 and 6 with 87 % experiencing no pain and 13 % experiencing pain score 4-6. These patients received aliquots of fentanyl as rescue analgesia. The dose ranged from 10-30 mcg fentanyl.

The surgeon's reported intraoperative difficulties included three knees that were found to be tight and difficult to navigate. Although no tourniquet was used there were no reports of poor vision due to blood in the operating field.

In this series no patients suffered vasovagal episodes or required an overnight stay. There were no DVT's.

There was one readmission with knee pain. This patient underwent a re-arthroscopy under GA for clinically suspected joint sepsis. The samples sent for microbiological analysis showed no bacterial growth. The patient made a rapid and complete recovery.

PATIENT SATISFACTION

Of the patients that gave immediate feedback 99 % were satisfied with the anaesthetic technique and 98.5 % would opt to undergo the same anaesthesia for a further knee arthroscopy. In clinic 2 weeks later, 97 % had satisfactory levels of post-operative pain, 95.5 % were satisfied with the operative experience and 93 % would undergo the procedure again under local anaesthesia.

There was some valuable qualitative feedback from the participants; a number reported that watching their procedure on the satellite screen was valuable in understanding their pathological condition. Thus reflecting the value of patients' interactive experience.

COSTS

There was a small cost saving found in performing the procedure under IALA. The anaesthetic cost reduced from £59.33 to £17.06 (Table II). IALA technique does not require scavenging of anaesthetic gases, and consequently is more eco-friendly in the operating room environment.

DISCUSSION

This study shows that IALA is an acceptable anaesthetic technique for knee arthroscopy.

Previous studies have established that intra articular IALA is safe in respect to circulating levels of local anaesthetic (4,5). One study has shown that basic arthroscopic procedures can be performed under IALA (6) but this study found problems with visualisation of the joint as no epinephrine was used in the local mix. In other studies comparing GA versus IALA for knee arthroscopy, technical difficulty and patient satisfaction were comparable (7-9). Furthermore rates of reoperation were also similar (10,11).

There are a number of advantages to IALA compared to GA. Patients may have a better understanding of their condition if IALA is used (12). IALA has also been shown to be more cost effective than GA (13,14).

The results described here are in line with the literature previously published. Only 4 % required sedation, slightly

lower than the 7-8 % found by both Jacobson 2000 (15) and Charalambous 2006 (2).

Previously it has been noted that local anaesthetic knee arthroscopy is both acceptable to patients and as successful in providing the surgeon with a safe, pain free working environment as general anaesthesia (15-17). This study underlines the fact that in a standard district general day case surgical unit local anaesthesia knee arthroscopy is a realistic and viable proposition.

The NHS tariff (government funding) for an elective diagnostic knee arthroscopy on a patient with no co-morbidities is currently £1,092 (PRB code HB24C), a therapeutic knee arthroscopy tariff in the same situation is £1,654 (PRB code HB23C) (18). Although the cost saving per case in small (3.8 % per diagnostic procedure and 2.5 % per therapeutic procedure), arthroscopy is a commonly performed procedure and during this study there was a theoretical cost saving of £5880.

Undoubtedly patient focused multidisciplinary teamwork was key to the success of this service. Patient selection is a key factor: only patients keen to undergo the procedure under IALA were put forward for the surgery. It is of note, however, that during the study period the operating surgeon was able to safely complete a number of knee arthroscopies on patients that had been deemed unfit for GA.

The surgeon was happy to communicate with the patients during the surgical procedure, maintaining a commentary to reassure the patients and explain findings and procedures. This was an additional important factor in achieving patient satisfaction.

TABLE II

COSTS (BASED ON NHS PROCUREMENT PRICES) PER CASE

ITEMS	GA	LA
Sundries	Same	Same
Propofol	£ 4.18	nil
Fentanyl (100 mcg)	£0.75	nil
Anti-emetic (ondanse- tron +/- dexamethasone)	£5.80	nil
Anaesthetic gases, O ₂ and air	£7.60	nil
Laryngeal mask	£3.50	nil
20 mls lidocaine with 1 in 200,000 adrenaline	nil	£1.77
NSAID (Diclofenac Sodium [75 mg IV])	£4.80	£4.80
Paracetamol (1 g IV)	£1.20	£1.20
20 mls 0.5 % levobupivacaine (Chirocaine)	£3.20	£3.20
Recovery and ward nursing	£28.30	£6.09
TOTAL	£59.33	£17.06

LIMITATIONS

There is a learning curve for surgeons as it may not be suitable for surgeons who are not at ease with an awake patient and cannot operate whilst having an interactive session with the patient.

Patients were asked if they would opt for IALA rather than GA in the future if another procedure was required. Most had no prior experience of GA to compare the two anaesthetics, this could affect their ability to decide on which they would choose in the future. Finally, the protocol used makes no provision for training of either surgeon or anaesthetist.

CONCLUSION

The technique documented in this study uses a combination of strategies taken from the previous descriptions to provide a highly reliable technique that allows a safe, cost effective

and acceptable experience for patients undergoing ambulatory day case arthroscopic knee surgery.

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