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Randomized Double Blind Comparison Between Sciatic-Femoral Nerve Block and Propofol-Remifentanil, Propofol-Alfentanil General Anesthetics in Out-Patient Knee Arthroscopy

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Abstract: The aim of this study is the evaluation preparation and discharge times as well as the side-effects, patient satisfaction and costs after out-patient knee arthroscopy performed with a combined sciatic-femoral nerve block or a propofol-remifentanil, propofol-alfentanil general anesthetics. Sixty patients, (remifentanil group 1, n = 20), (alfentanil group 2, n = 20) and a combined sciatic-femoral nerve block (PNB group 3, n = 20). In group 1, anesthesia was induced with remifentanil (1 mic kg^{-1} followed by 0.5 mic kg^{-1} min^{-1} i.v), in group 2 alfentanil (20 mic kg^{-1} followed by 2 mic kg^{-1} min^{-1} i.v, in both groups (group 1, 2) propofol was given 2 mg kg^{-1} i.v followed by 9 mg kg^{-1} h^{-1} i.v. Patients then received atracurium 0.6 mg kg^{-1} i.v. to facilitate endotracheal intubation. In the PNB group (group 3), patients received a sciatic-femoral nerve block with ropivacaine 25 mL 0.75 mg using a multiple injection technique aided by a nerve stimulator and a short, bevelled, Teflon®-coated stimulating needle. There was no significant difference in the duration of stay in the post anesthesia care unit and day surgery unit between groups, there was significant increase in the time to first urination in PNB group than the other two groups. Also there was no significant difference in the stay in delay surgery. The cost of disposal materials, preoperative and post operative times were higher in PNB group. The cost of drugs was higher in remifentanil and alfentanil groups than PNB group; the total cost was insignificant in the three groups. In conclusion, this prospective randomized study suggests that in patients undergoing out-patient arthroscopy, a combined sciatic-femoral nerve block (using a small volume of ropivacaine 0.75%) compared with a propofol-remifentanil or propofol-alfentanil general anesthetics techniques may provide similar intraoperative analgesic efficacy, a shorter length of stay in the PACU and an increased likelihood of bypassing the first phase of postoperative recovery.

Key words: Combined sciatic-femoral nerve block, remifentanil, alfentanil (GA)

INTRODUCTION

Outpatients with sprains or dislocations of the knee account for over 3 million physician office visits per year. In 1997, 52,000 hospitalizations and 115,000 patient-days in the hospital (2.2 days per patient stay) were attributed to this same admitting diagnosis, dislocations and sprains are annually responsible for 225 million days of restricted activity, 61 million days of bed-disability and 65 million lost days of work. It follows that a pain management strategy for patients undergoing complex knee surgery would have the potential to reduce the number of days of restricted activity and lost work (Praemer *et al*., 1999). Knee surgery can generate significant postoperative pain. Pain is one of the most common symptoms requiring hospital admissions after outpatient surgery (Coloma *et al*., 2001). Few surgical procedures can be performed with sciatic block alone. It is usually combined with femoral (three-in-one) or psoas compartment nerve blocks to produce surgical anesthesia of the entire lower extremity. Application of a thigh tourniquet or involvement of the medial foot and ankle in the surgical field (saphenous nerve distribution) usually necessitates supplementary blockade of the femoral nerve. The advantages of sciatic-femoral blockade as a sole anesthetic technique include avoidance of general anesthesia, avoidance of neuraxial blockade, minimization of hemodynamic effects (Fanelli *et al*., 1998).

Sciatic block with or without femoral nerve block can be used for postoperative pain control following foot and ankle surgery. Neural blockade produces high quality analgesia following open reduction of calcaneal fractures and avoids the side effects related to PCA morphine use (Cooper, 1996). Duration of analgesia may be longest and patient satisfaction highest, when the block is performed at the end of surgery immediately following application of the splint while the patient is still under general anesthesia (Casati *et al*., 2002). The risk of masking the symptoms of developing compartment syndrome with a dense regional block should be considered when the

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block is initiated following open reduction and internal fixation of tibia and fibula fractures. The sciatic nerve is the largest single nerve trunk of the body and in the average adult has a diameter about as large as the thumb (16-20 mm). It arises from the L4, L5, S1, S2, S3 spinal roots and exits the pelvis posteriorly through the greater sciatic foramen and runs laterally along the posterior surface of the ischium anterior to the piriformis muscle. The posterior cutaneous nerve of the thigh accompanies the sciatic nerve as it exits the greater sciatic foramen. The sciatic nerve has medial and lateral components which separate into the tibial and the common peroneal nerves in the superior aspect of the popliteal fossa.

Few published data are currently available studies that compare peripheral nerve blocks with general anaesthesia with propofol and remifentanil for orthopaedic out-patient procedures. The ideal opioid for day stay anaesthesia would therefore provide: rapid onset of effect, rapid control of anesthetic depth, haemodynamic stability, rapid, consistent recovery with few side-effects, such as nausea and vomiting (Philip *et al*., 1997). Remifentanil has pharmacodynamics properties similar to other potent mu-opioid receptor agonists. However, it does have some unique characteristics with a rapid onset and rapid offset of effect; regardless of the duration of administration choice and alfentanil is the most widely used opioid. A mu-opioid receptor agonist can provide good control of haemodynamic responses, but if larger doses of traditional opioids are used, there may be slower recovery and more side-effects (Philip *et al*., 1997). We, therefore, conducted a prospective, randomized study to evaluate preparation and discharge times as well as the side-effects, patient satisfaction and costs after out-patient knee arthroscopy performed with a combined sciatic-femoral nerve block or a propofol-remifentanil, propofol-alfentanil general anesthetics.

MATERIALS AND METHODS

With Ethics Committee approval and written informed consents, 60 ASA I-II out-patients aged 18-65 year, undergoing ambulatory arthroscopic knee surgery were studied. Exclusion criteria were respiratory or cardiac disease, diabetes, peripheral neuropathy, those receiving chronic analgesic therapy or undergoing anterior cruciate ligament repair. Based on a previously published clinical study by Casati *et al*. (2002), we wished to detect a 15 min difference in the time to discharge from the Postanaesthesia Care Unit (PACU) between those receiving general anesthesia and those receiving the peripheral nerve block, accepting a two-tailed [alpha]-error of 5% and a [beta]-error of 20%. According to this calculation, the required sample size was 16 patients per group. Using a computer-generated random table. GA group, n = 40, 20 patients (remifentanil), 20 patients (alfentanil) and, a combined sciatic-femoral nerve block (PNB group, n = 20). GA patients were directly admitted to the operating room, while PNB patients were admitted to a block room area and then transferred to the operating room after block placement. After 8 h of starvation, a 20-gauge intravenous (i.v.) cannula was inserted at the forearm and i.v. premedication with midazolam 0.05 mg kg^{-1} and ketoprofen 50 mg was given followed by a continuous i.v. infusion of Ringer's lactate solution (5 mL kg^{-1} h). In the operating room, the automated blood pressure cuff, electrocardiogram leads, capnometer and pulse oximeter sensors (Critical Care 1100®; Criticare Systems, Inc., Milwaukee, WI, USA) were placed. In group I, anesthesia was induced with remifentanil (1 mic kg^{-1} followed by 0.5 mic kg^{-1} min^{-1} i.v). In group 2 alfentanil (20 mic kg^{-1} followed by 2 mic kg^{-1} min^{-1} i.v, in both groups propofol (Diprifusor®; AstraZeneca, Basiglio, Italy) was given 2 mg kg^{-1} i.v followed by 9 mg kg^{-1} h^{-1} i.v. Patients then received atracurium 0.6 mg kg^{-1} i.v. to facilitate endotracheal intubation. After tracheal intubation, patients lungs were ventilated with an air oxygen mixture to maintain $ETCO_2$ between 30 and 35 mmHg for the duration of surgery. Five minutes after skin incision, infusion rates were decreased (alfentanil to 1 mic kg^{-1} min^{-1} remifentanil to 0.25 mic kg^{-1} min^{-1} and propofol to 6 mg kg^{-1} ha^{-1}). Systolic (SAP) and diastolic (DAP) arterial pressures and Heart Rate (HR) were recorded before induction, before and after intubation and incision every 5 min intraoperatively. Patients were observed for responses to intubation, incision, light and deep anesthesia throughout surgery. Light anesthesia was characterized by haemodynamic (SAP > 15 mmHg above preoperative baseline for > 1 min or HR > 90 beats min^{-1} for > 1 min), somatic (movement, eye opening or grimacing), or autonomic (lacrimation, sweating) changes (Allen *et al*., 1998). Light anaesthesia responses were treated by administering a bolus of the study drug followed by 50% increments in infusion rate from the current rate (alfentanil 10 mic kg^{-1} and 0.5 kg^{-1} min^{-1} i.v; remifentanil 0.5 kg^{-1} i.v and 0.25 kg^{-1} min^{-1} i.v). Further responses were treated with propofol bolus injections (up to 20 mg). Deep anaesthesia responses were defined as SAP < 80 mm Hg or HR < 40 min^{-1} for >1 min) (Singelyn *et al*., 1998). Hypotension was treated with fluids and 50% decrements in infusion rate (0.5 mic kg^{-1} min^{-1} i.v alfentanil and 0.125 mic kg^{-1} min^{-1} i.v remifentanil). Vasopressor drugs were administered if a decrease in opioid was unsuccessful. Anti-cholinergic drugs were administered for bradycardia. In the PNB group, patients received a sciatic-femoral nerve block with ropivacaine 25 mL 0.75 (Carbocaine®; AstraZeneca, Sodertalje, Sweden) using a multiple injection technique (Cooper, 1996), aided by a nerve stimulator (Plexival®; Medival, Padua, Italy) and a short, bevelled, Teflon®-coated stimulating needle (stimulation frequency 2 Hz, stimulation intensity 1 mA, which was gradually decreased to 0.5 mA). The patient is placed in the lateral (Sim's) position, with the operative side nondependent. The operative extremity is flexed 45 degrees at the hip and 90 degrees at the knee and rests against the dependent lower extremity (Adkin *et al.*, 1995). The Posterior Superior Iliac Spine (PSIS), greater trochanter and sacral hiatus are identified and marked with a skin marker. Since the greater trochanter is a large landmark, marking the most superior and posterior aspect of the greater trochanter helps maintain consistency in landmarks between patients. Consistency in positioning is also critical for success of the block and can be checked by placing the PSIS, most supero-posterior aspect of the greater trochanter and the head of the fibula along a straight line. This line is bisected. A perpendicular is dropped 3-5 cm from the midpoint of this line to the point of needle insertion. The point of needle insertion should lie along a third line drawn between the greater trochanter and the sacral hiatus (Edkin *et al.*, 1999). The area of needle insertion is sterilely prepped and draped. In a wake patient a wheal of local anesthetic is placed and a 6 inch 22-gauge short-bevel teflon-coated nerve stimulator needle is advanced perpendicular to the skin. The nerve lies about 6-8 cm deep Stimulation intensity is initially set at 1.5-2.0 mA and adjusted downward as the evoked motor response increases Plantar flexion (down going toes) at less than 0.5 mA is the desired motor response and indicates placement of the needle near the medial part (tibial component) of the nerve.

After a negative aspiration and negative epinephrine-containing test dose, the needle is held immobile and local anesthetic is injected incrementally, with attention paid to the presence of paresthesia, reflex movement and resistance to injection. Although sciatic blocks can be performed without the use of a nerve simulator by seeking paresthesia in the awake patient, use of a nerve stimulator results in high success rates and improves the success of the block the nerve stimulator also allows one to perform the block with patients under general or spinal anesthesia. Since the nerve trunk is large, onset time and efficacy may be improved by injecting local anesthetic in more than one location, such as both laterally (peroneal component) as well as medially (tibial component (Frost *et al.*, 2000; Williams *et al.*, 1998a, b). First, the femoral nerve was blocked with 15 mL local anesthetic, then the sciatic nerve block was performed with the remaining 10 mL solution (Taenzer *et al.*, 2000). The PNB patients were judged as ready for surgery when there was complete loss of a pinprick sensation in the femoral and sciatic nerve distribution, with a concomitant inability to elevate the leg from the operating table with the hip passively flexed. The quality of the nerve block was evaluated as follows: (1) adequate: neither sedation nor analgesics required to complete surgery, (2) inadequate: 0.1 mg i.v. fentanyl required to complete surgery and (3) failed: general anesthesia (Frost At the end of surgery, all infusions (alfentanil or remifentanil and propofol) were discontinued. Patients were given atropine 0.0 1 mg kg^{-1} and neostigmine 0.04-0.07 mg kg^{-1} for antagonism of residual neuromuscular block. Mechanical ventilation was discontinued and patients' lungs were ventilated by hand until spontaneous and adequate respiration was achieved (respiratory rate >8 breaths min^{-1} or $ETCO_2 < 35$ mmHg). If adequate respiration did not occur within 15 min after the end of surgery, incremental doses of naloxone (0.04 mg) were given every 2 min until respiration was sufficient. Recovery was evaluated by obtaining the times to spontaneous and adequate respiration, response to verbal commands and extubation. The response to verbal commands was tested every 15 sec during emergence. During the postoperative period at 0, 15, 30, 45, 60, 90 and 120 min, patients were assessed for Aldrete score = or > 9, the first request for analgesic, the ability to sit unaided, the ability to ambulate, for a Post Anesthetic Discharge Scoring (PADS) system > 9. The postoperative pain scores were assessed in the postoperative care unit by a nurse who was blinded to the study group. If VAS > 4, patients were given diclofenac 75 mg intramuscularly. In PNB patients the surgeon injected bupivacaine 20 mL 0.35% into the knee joint. Patients then received ketoprofen 50 mg orally every 8 h, starting 8 h after the first preoperative i.v. administration for pain control. After the procedure, the modified Aldrete's score and pain intensity (visual analogue scale, VAS) were assessed every 5 min. If VAS >30 mm was reported, rescue analgesia was provided with 100 mg tramadol i.v. When the vitals signs remained stable for two subsequent measurements and the modified Aldrete's score was 9 and VAS for pain intensity was <30 mm - the patients were transferred to the day-surgery unit. If these criteria were satisfied before entering the PACU, patients were immediately transferred to the day-surgery unit, where no i.v. fluids were infused but all patients had free access to liquids by mouth on request. After admission to the day-surgery unit, patients were evaluated every 30 min by an independent observer until they were judged ready to go home. The home discharge criteria were the patient was alert, had stable vital signs, was able to void and ambulate, had their nausea and pain controlled by oral medication and had nerve block resolution. At discharge, rescue analgesia was arranged with codeine 30 mg and acetaminophen (paracetamol) 500 mg, orally. Follow-up was carried out the day after surgery by telephone. A cost comparison was performed including (a) acquisition costs of all drugs administered by an aesthesia staff; (b) acquisition costs of disposable material used during the study period (needles, syringes, cannula) and (c) personnel costs.

Statistical analysis: Data are presented as mean±SD, paired tow tailed student t-test was used to compare between groups, continuous variables were evaluated with analysis of variance (ANOVA). Ordinal data were analyzed using contingency table and the chi-square test with appropriate correction (SPSS. Inc, Chicago, IL) software, U test was used for post operative pain score and X^2, tests was used for analgesic demand. Preparation time, unassisted ambulation, urination and cost comparisons and analysis of variance for repeated measures analyzed changes over time. Continuous variables are presented as the median (range), A p-value < 0.05 was considered statistically significant.

RESULTS

Sixty patients (20 in each group) were enrolled prospectively and randomized. No differences were reported between the three groups in terms of demographic variables (Table 1).

No untoward intraoperative cardiovascular side-effects were reported in the PNB group. Three patients in remifentanil group (15%) and four patients in alfentanil group (21%) showed clinically relevant hypotension after induction (p = 0.013) and one in remifentanil and two of alfentanil, required phenylephrine i.v. (p = 0.24). Clinically relevant bradycardia was reported in four patients in the remifentanil group (21%) (p = 0.11). Two patients in the PNB group (12%) complained of mild pain during surgery: in one patient surgery was completed uneventfully with fentanyl supplementation, while the other patient required propofol anesthesia to complete the surgery.

There was no significant difference in the duration of stay in the post anesthesia care unit and day surgery unit between groups, there was significant increase in the time to first urination in PNB group than the other two groups. Also there was no significant difference in the stay in delay surgery Table 2.

One patient in the PNB group required overnight admission due to surgical problems and was then excluded from the postoperative 24 h follow-up. Six patients in the remifentanil group (30%) and seven in the PNB group (37%) required rescue analgesia during the first 24 h after surgery (p = 0.74). The anesthesia technique was well accepted by all patients.

The cost of disposal materials, preoperative and post operative times were higher in PNB group. The Cost of drugs was higher in remifentanil and alfentanil groups than PNB group; the total cost was insignificant in the three groups Table 3.

Times to spontaneous and adequate spontaneous respiration, extubation and the response to verbal commands and until the Aldrete score >9 were shorter in group 1 (remifentanil) than in group 2 (alfentanil) (Table 4). The times until the patients could sit unaided

Table 1: Demographic data of patients receiving knee arthroscopy with remifentanil or alfentanil and sciatic-femoral blockade

Demographic data	Remifentanil group (n = 20)	Alfentanil group (n = 20)	PNB group (n = 20)
Age (year)	51 (19-65)	46 (25-65)	48 (23-65)
Weight (kg)	82 (53-95)	70 (60-100)	74 (56-96)
Height (cm)	120 (80-110)	125 (90-110)	110 (80-120)
Gender (m/f)	13/7	11/9	1/28
AS physical status (1/2)	11/9	12/8	13/7

Results were presented as median and (range) except for gender and ASA (count)

Table 2: Duration of stay in post anesthesia care unit and day surgery unit and time of first urination in out patients receiving knee arthroscopy with remifentanil or alfentanil or sciatic-femoral blockade

Demographic	Remifentanil group (n = 20)	Alfentanil group (n = 20)	PNB group (n = 20)
Length of stay in the postoperative care unit (min)	28 (15-95)	25 (12-90)	28 (15-95)
Time to first urination (min)	130 (50-150)	147 (85-280)	220 (155-350)*
Stay in delay surgery unit (min)	150 (70-150)	170 (100-380)	250 (140-400)

*: p<0.05 significant

Table 3: Cost analysis of disposal material, drugs, preoperative time, postoperative time (Egyptian pound)

The cost in Egyptian pound	Remifentanil group (n = 20)	Alfentanil group (n = 20)	PNB group (n = 20)
Cost of disposal material	200 (150-300)	180 (120-280)	50 (40-150)*
Cost of drugs	300 (100-400)*	280 (200-380)*	80 (50-120)
Cost of preoperative time	50 (40-120)	45 (30-130)	60 (55-140)*
Cost of post anesthesia care unit	60 (50-150)	65 (55-160)	200 (180-400)*
Total cost	500 (350-700)	550 (450-600)	400 (350-550)

*: p<0.05 was considered statistically significant difference between groups

Table 4: Times to emergence and recovery

Duration (min)	Remifentanil group (n = 20)	Alfentanil group (n = 20)
Spontaneous respiration	7±3*	12±3
Adequate respiration	9±3*	13±3
Extubation	9±4*	13± 3
Respond to command	9±4*	14±3
Aldert score>or = 9	14±3*	19±4
Able to sit unaided	44±19	45±14
Able to ambulate	97±23	95±22
PADS>or = 9	112±27	104±30

*: p<0.05 was considered statistically significant difference between two groups

and ambulate and the time until PADS > 9 were similar between groups. Six patients in the alfentanil group were given naloxone whereas no patient in the remifentanil group required the antagonist. Preoperative arterial pressures were similar in both groups. Systolic arterial pressure and heart rate were significantly lower at 5 min after intubation in group 1 compared with preincubation values ($p<0.05$).

DISCUSSION

Discharging patients directly from the operating theater to the day-surgery unit is an effective means for reducing the costs of out-patient procedures, since the second phase of recovery requires less intensive monitoring and a lower nurse-to-patient ratio (Williams *et al*., 2000). Results from this prospective, randomized study suggest that there was no significant difference in the duration of stay in the post anesthesia care unit and day surgery unit between groups, there was significant increase in the time to first urination in PNB group than the other two groups. Also there was no significant difference in the stay in delay surgery. The times until the patients could sit unaided and ambulate and the time until PADS > 9 were similar between groups and enabled up to 50% of patients to be transferred directly from the operating room to the day-surgery unit, some studies Casati *et al*. (2002) and demonstrated that the major determinant for costs in a PACU is the distribution of admission, while decreases in labor costs are possible from implementing rapid emergence and protocols to bypass the unit. The present data confirm the relevance of this strategy to minimize costs related to the PACU. The longer time for urination and home discharge observed in PNB patients compensated for this advantage and no differences in total costs were observed between the three groups. In the present study, both recovery of bladder function and complete resolution of nerve blockade were necessary for home discharge. No direct effect on bladder function was expected after sciatic and femoral nerve blocks. The longer time for urination as observed in the PNB group may simply reflect the fact that the majority of our patients were male who could urinate with more confidence when standing. However, the resumption of spontaneous voiding is no longer viewed as a prerequisite for discharging the patient from the ambulatory surgery unit, when using peripheral blocks, which do not affect sympathetic tone (Williams's *et al*., 1998b). Moreover, peripheral nerve blocks are now frequently prolonged into the postoperative period at home to optimize pain relief. This approach has been demonstrated to be effective and safe (Aldrete, 1995; Chung *et al*., 1995). Thus, the presence of a partial nerve block on the operated limb must not be considered as an absolute contraindication to home discharge. Changing the criteria for home readiness for patients who received a peripheral nerve block could reduce the costs related to hospitalization, emphasizing the benefits of peripheral nerve blocks. Other important factors delaying discharge after outpatient procedures include the availability of personnel affecting the patient discharge, the process of getting the patient dressed and the availability of transport Improving the efficiency of these tasks could potentially result in further improvements in patient discharge (Adkins *et al*., 1995).

Physicians are often concerned about the use of peripheral nerve blocks owing to the increased preoperative time required for the onset of adequate nerve blockade. In the present study, there was a median delay in the preparation time of 30 min between patients receiving a peripheral nerve block and those receiving general anesthetics. The median difference in costs for anaesthesia-controlled time was significantly higher in PNB group. Since the surgical procedure involved the knee, we did not wait for a complete motor blockade of the sciatic nerve, which has a relatively slow induction time. This could have reduced the total preoperative time in the PNB group. However, similar onset times have been reported in previous studies using the same clinical setting for foot procedures where complete blockade of the sciatic nerve was necessary to perform surgery (Bailey *et al*., 1994). Although statistically significant, the clinical relevance of such a small difference in preparation time between the PNB and GA groups may be questioned. When the effects of regional and general anaesthesia for out-patient knee surgery were analyzed, placement pf the peripheral nerve blocks outside the operating room in a properly designed area may have allowed some time to be saved (Soderlund *et al*., 2000) discharged patients from their ambulatory surgical centre after 1 h when using a three-in-one block and after 1.5 h when using a narcotic with nitrous oxide as a general anesthetic. This difference was due to the different quality of pain relief. Casati *et al*. (2002) compared spinal, epidural and propofol anaesthesia for outpatient knee arthroscopy, showing that although propofol anaesthesia resulted in the shortest stay in the operating room, it was associated with the most postoperative pain and the highest costs for drugs and disposable items. On the other hand (Ben-David *et al*., 2001), evaluating the ideal regional anaesthesia techniques for out-patient knee arthroscopy, demonstrated that epidural anaesthesia with 2-chloroprocaine provided comparable recovery and discharge times with a propofol-nitrous oxide anesthetic, while spinal anaesthesia with procaine and fentanyl was associated with a longer discharge time and increased side-effects. Likelihood of a pain-free postoperative course, allowing discharge within 23 h, after arthroscopic reconstruction of the Anterior Cruciate Ligament (ACL) with patellar tendon autograft (Smith and Siggins, 1988, 2000; Soderlund *et al*., 2000). Duration of analgesia may be longest and patient satisfaction highest, when the block is performed at the end of surgery immediately following application of the splint while the patient is still under general anesthesia. The risk of masking the symptoms of developing compartment syndrome with a dense regional block should be considered when the block is initiated following open reduction and internal fixation of tibia and fibula fractures. Both general and regional anesthesia is used for out-patient knee arthroscopy with similar effects on patient discharge (Williams *et al*., 1998a). However, recent studies have suggested that the newer short-acting anesthetic drugs such as propofol, sevoflurane and remifentanil may reduce discharge times after surgery (Chung *et al*., 1995). Spinal anesthesia is the most commonly used regional anesthesia technique for knee arthroscopy (Williams *et al*., 2000) the increased costs of modern anesthetics drugs (Chung *et al*., 1995) as well as hospital budget restrictions require a comparison of these new drugs. In conclusion, this prospective randomized study suggests that in patients undergoing out-patient arthroscopy, a combined sciatic-femoral nerve block (using a small volume of ropivacaine 0.75%) compared with a propofol-remifentanil or propofol-alfentanil general anesthetics techniques may provide similar intraoperative analgesic efficacy, a shorter length of stay in the PACU and an increased likelihood of bypassing the first phase of postoperative recovery. The advantages of sciatic-femoral blockade as a sole anesthetic technique include avoidance of general anesthesia, avoidance of neuraxial blockade, minimization of hemodynamic effects and provision of long-lasting postoperative analgesia.

The evaluation of anaesthesia-related costs, though of interest, is difficult and requires methodological improvement. The results of the present cost analysis may not be entirely relevant to other hospitals because of the different costs of drugs, materials and personnel. But further studies are required before extensive modification of guidelines and hospital policies can be recommended.

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