ABSTRACT

We present a serious postoperative complication related to the use of femoral nerve block in 4 patients, each of whom fell and sustained further injury. Preoperatively, all patients underwent a 3-in-1 femoral nerve block with 30 to 35 ml of 0.25% levobupivacaine with 1:200 000 epinephrine, with guidance by a nerve stimulator. After the falls, neurological examination of the operated legs revealed reduced 2-point discrimination, pain, and/or light touch sensation. All patients underwent further operation for the fall injury and had delayed full weight bearing. We recommend that, after having a femoral nerve block, patients should undergo enhanced postoperative evaluation of blockade and proprioceptive function to ensure safe neurological function before mobilisation.

Key words: accidental falls; arthroplasty, replacement, knee; autonomic nerve block; femoral nerve

INTRODUCTION

The number of surgical procedures performed on a day-case or short-stay basis has increased considerably over the past decade. Anaesthetic techniques have evolved to facilitate early recovery and postoperative mobilisation. Early mobilisation improves both short- and long-term functional outcomes, decreases the risk of respiratory tract infections, and shortens the length of hospital stay.
Femoral nerve block (FNB), first described in 1973, is used either as a single-nerve or 3-in-1 block (including the femoral nerve, the lateral cutaneous nerve of the thigh, and the obturator nerve), both as an independent anaesthetic modality and as an analgesic adjunct to other anaesthetic techniques. Common indications include knee arthroplasty, arthroscopy, ligament reconstruction, foot and ankle surgery, and management of femoral fractures.

The use of a FNB together with general anaesthesia reduces the required doses of general anaesthetic agents, and hence its side-effects, including nausea, vomiting, drowsiness, and respiratory depression. The FNB also confers superior pain control, decreases opioid requirement, and enables earlier ambulation and hospital discharge. Compared with neuraxial (spinal/epidural) anaesthesia, FNB minimises hypotension, urinary retention, pruritus, and eliminates the risks of spinal haematoma and infection.

The common complications of FNB include incomplete nerve blockade, direct nerve trauma with potential quadriceps wasting, local haematoma and subsequent ischaemic injury, infection, and the risks of systemic intravenous injection of the local anaesthetic agent.

We present a serious postoperative complication related to the use of FNB in 4 patients, each of whom fell and sustained further injury.

CASE REPORTS

Case 1
In March 2004, a 79-year-old osteoporotic woman underwent an elective right primary total knee replacement. Prior to the operation, she underwent a 3-in-1 FNB with 32 ml of 0.25% levobupivacaine with 1:200 000 epinephrine, with guidance by a nerve stimulator. The operation was performed under general anaesthesia with the use of a tourniquet. At 20.5 hours following the blockade, the patient was mobilised with the assistance of physiotherapists. She had minimal pain when moved from her bed to a chair. She stood up and on attempting to take a step on her operated leg, the knee gave way. She fell and sustained a supracondylar periprosthetic fracture. Neurological examination revealed reduced 2-point discrimination (using an aesthesiometer), pain (using needle pin-prick), and light touch sensation (using Semmes-Weinstein monofilaments), when compared with the other leg. Proxioception and power were not tested. She underwent further fixation and regained full weight bearing 13 weeks later. Her hospital stay was prolonged by 16 days. At 6-month follow-up, her knee flexion remained disappointing, with a range of 0° to 80° despite having normal neurological status.

Case 2
In November 2004, a 77-year-old woman underwent an elective left primary total knee replacement under general anaesthesia without the use of a tourniquet. Preoperatively, she had a 3-in-1 FNB with 35 ml of 0.25% levobupivacaine with 1:200 000 epinephrine, with guidance by a nerve stimulator. At 21.5 hours after the blockade, she had minimal pain and was mobilised with assistance by physiotherapists. The operated knee gave way and the patient fell and sustained a displaced bimalleolar ankle fracture. Neurological examination revealed normal quadriceps power, but reduced 2-point discrimination and light-touch sensation, compared to the other leg. She underwent further operation and remained non–weight bearing for 6 weeks. At 3-month follow-up, her range of knee movement was poor (0°–90°) despite physiotherapy and mobilisation.

Case 3
In May 2005, a 67-year-old woman with bilateral mild knee osteoarthritis and a degenerated left medial meniscus underwent arthroscopy of the left knee under general anaesthesia with the use of a tourniquet. An overnight hospital stay was anticipated and thus preoperatively she was given a nerve-stimulator guided 3-in-1 FNB with 30 ml of 0.25% levobupivacaine with 1:200 000 epinephrine. While ambulating to the toilet independently 19 hours later, her operated knee gave way and she fell. She inverted her left ankle and sustained a trimalleolar ankle fracture. Neurological examination revealed normal leg power, but reduced great-toe proprioception, proximal tibial vibration sense, 2-point discrimination, and light-touch sensation. She underwent further surgery and was kept non–weight bearing in a plaster cast for 6 weeks. At 6-month follow-up, her ankle remained stiff, with reduced range of movement, despite having good radiological healing.

Case 4
In October 2005, an obese 38-year-old woman underwent a day-case right knee hamstring anterior cruciate ligament (ACL) reconstruction under
general anaesthesia with the use of a tourniquet. Preoperatively, a 3-in-1 FNB with 30 ml of 0.25% levobupivacaine with 1:200 000 epinephrine was used, with guidance by a nerve stimulator. The ACL graft was fixed securely. At 6.25 hours following the blockade, the patient was mobilised with the aid of crutches and physiotherapists. With no pain inhibition, the patient bore her full weight on the operated leg which gave way, causing her to fall and the knee to hyperflex to 140°. Neurological examination revealed very poor quadriceps control, with inability to perform full straight leg raise against resistance (Grade 4 Medical Research Council motor power) and reduced pain and light-touch sensation. She was kept in hospital overnight for observation, and regained normal neurological function 23 hours later. She was discharged and continued rehabilitation. Four months later, the operated knee began to give way because of graft failure. At 9-month follow-up, her knee remained clinically and radiologically unstable. After revision surgery, she recovered well, with a stable knee.

DISCUSSION

These patients underwent surgery at 3 different hospitals, were anaesthetised by 4 different anaesthetists, and operated on by 3 different orthopaedic surgeons. Each patient received a 3-in-1 FNB with 30 to 35 ml of 0.25% levobupivacaine and 1:200 000 epinephrine, which alleviated postoperative pain and enabled early mobilisation. Typically, up to 40 ml of 0.25 to 0.5% levobupivacaine can be instilled in 3-in-1 blocks. Although the proportion of patients with a complete sensory block is smaller with the lower 0.25% concentration, the analgesic quality or the onset of blockade between the 2 different levobupivacaine concentrations were not shown to differ significantly. Epinephrine 1:200 000 is commonly given in FNBs, as it reduces the risk of toxicity, plasma absorption, and enables larger volumes to be given, but its use is not essential.

Although FNB provides good postoperative analgesia, the extended duration of sensory and proprioceptive deficit is a ‘double-edged sword’ with respect to early mobilisation and related falls, as muscle, skin and joint proprioception from the legs are the dominant sensory input determining safe ambulation and balance. The normal duration of levobupivacaine 3-in-1 femoral nerve blockade is reported to range from 3 to 12 hours and even up to 17 hours for 0.5% levobupivacaine concentrations, while duration is shorter in neuraxial use. The addition of epinephrine 1:200 000 may increase the duration of peripheral nerve blockade (range, 4–12 hours), but this is controversial. Prolonged nerve blockade of up to 30 hours is a well-documented risk, the precise aetiolo-

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