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Research Article

The analgesic efficacy of continuous fascia iliaca block vs. continuous psoas compartment block after hip surgery: A comparative study

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Abstract *Background:* Both psoas compartment block and fascia iliaca compartment block have been shown to be reliable blocks for postoperative pain relief for procedures involving the hip joint. This study evaluated the efficacy of continuous psoas compartment block with continuous fascia iliaca block for postoperative analgesia after hip surgery.

Methods: In randomized blinded study Forty, ASA I–III patients aged 30–75 years, with BMI less than 40, scheduled for hip surgery, were divided to one of two groups. Group P: continuous psoas compartment block (n = 18) and group F: continuous fascia iliaca block (n = 19). Standard general anesthesia was induced after finishing the block technique. After recovery 30 ml of 0.125% levobupivacaine was injected through the catheter to all patients. Postoperative 24 h meperidine consumption, patient satisfaction, visual analogue scale pain scores at (1, 6, 12, 18, and 24 h) postoperative, postoperative hemodynamics (HR and MAp), evidence of sensory and motor blockades, and incidence of adverse effects were recorded.

Results: There was no significant difference between the two groups in 24 h postoperative meperidine requirements, postoperative VAS, patient satisfaction, postoperative hemodynamics, and distribution of sensory and motor block of (femoral, lateral femoral cutaneous, and obturator nerves). The epidural anesthesia occurred in two patients in psoas group (11%).

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Conclusion: Both continuous fascia iliaca block and continuous psoas compartment block were comparable in providing safe and effective analgesia after hip surgery.

1. Introduction

After total hip arthroplasty (THA), most of patients consider the postoperative pain as severe at rest and is exacerbated during physiotherapy. Postoperative analgesia can be achieved by epidural analgesia or by patient-controlled IV analgesia. But, these techniques are associated with related side effects and poor pain relief during physiotherapy. Peripheral nerve blocks are useful in providing anesthesia and postoperative analgesia [1].

Lumbar plexus block is a good choice for pain relief after hip arthroplasty because it is the most reliable method of blocking the femoral, lateral femoral cutaneous, and obturator nerves [2].

Psoas compartment block (PCB) is a peripheral block technique that blocks the main components of the lumbar plexus (the femoral, lateral femoral cutaneous (LFC), and obturator nerves) within the psoas major muscle. It is also known as the posterior lumbar plexus block which was first described by Winnie et al. [3].

Fascia iliaca compartment block was first described by Dalens for use in pediatric patients [4], the local anesthetic diffuse under the fascia iliaca to block femoral, lateral femoral cutaneous, and obturator nerves. It is used pre and post-operatively, for fractures of the hip, total hip and knee arthroplasties [5].

Both psoas compartment block and fascia iliaca compartment block have been shown to be reliable blocks for postoperative pain relief for procedures involving the hip joint. To our knowledge there was no literature that has compared these two approaches of the lumbar plexus block. This study was designed to compare continuous psoas compartment block with continuous fascia iliaca compartment block for post-operative pain relief after hip surgery.

2. Method

After approval of the ethical committee in Dar Alshifa hospital (State of Kuwait), a written informed consent obtained from 40, American Society of Anesthesiology (ASA) physical status I–III patients aged 30–75 years, with BMI less than 40, scheduled for hip surgery (fixation of fracture neck femur or total hip replacement) under general anesthesia from December 2010–October 2011.

Patients were excluded if they were allergic to amide local anesthetics, had a history of hepatic or renal failure, had a contraindication to regional anesthesia (patient refusal, acquired or congenital coagulopathy, systemic or local infection, neurological disease affecting the lower limbs), or BMI more than 40.

During the preoperative visit, the study protocol, the posterior lumbar plexus block, fascia iliaca block, and the Visual Analogue Scale (VAS) for pain were explained to each patient.

Preoperatively, all the patients were premedicated with oral midazolam 0.1 mg/kg 30–60 min before surgery. In the operating room, 18G intravenous cannula was inserted and 8 ml/kg lactated ringer was given IV and fentanyl 50–100 μg was given. Electrocardiogram (lead II and V with ST segment analysis), pulse oximetry, non-invasive arterial blood pressure recorded every 5 min, and skin temperature were monitored.

The patients were randomly assigned to two equal groups (20 each) using closed envelope technique for randomisation.

Group (P): the continuous psoas compartment block (CPCB), was performed under strict aseptic condition using the approach of Capdevila and colleagues [1], the patient was placed in the lateral position with the side to be blocked upper and 30° flexion of the hip on the side to be blocked. The skin was prepared with antiseptic solution. The site of needle insertion was 1 cm cephalad to the junction of the medial two thirds and lateral third of the intercrestal line between the spinous processes line and the line passing through the posterior superior iliac spine and parallel to the spinous processes line. The injection site was infilterated with 3 ml Lidocaine 1%, a 110-mm 18-gauge insulated Contiplex™ needle (B. Braun Melsungen AG, Melsungen, Germany) connected to nerve stimulator, (HNS11 Stimuplex™, B. Braun Melsungen AG); with a starting current of 1.5 mA and 2 Hz was inserted perpendicular to all planes and advanced until quadriceps twitches were noticed or transverse process of L4 was encountered where the needle was withdrawn and directed under the transverse process and advanced 1.5–2 cm, until contraction of the quadriceps muscles were noticed with a current 0.5 mA. The needle bevel was directed caudally and laterally, 5 ml saline was injected to distend the psoas compartment, and a 20G catheter was introduced through the needle and advanced 5 cm beyond the needle tip and secured (by tunneling though the skin). As catheter migration to the epidural and subarachinoid spaces can occur, therefore, a test dose of 3 ml lidocaine 1% with 1:200,000 adrenaline was administered to detect intravascular or intrathecal placement.

Group (F): the continuous fascia iliaca compartment block (CFICB) was performed under strict aseptic condition using the technique of Dalens and colleagues [4], the patient was placed in the supine position and the site of needle insertion approximately 1 cm below the junction between the lateral third and medial two thirds of the inguinal ligament, The injection site was infiltrated with 3 ml Lidocaine 1% then a 18G Tuohy needle and 20G catheter (PERIFIX, B.BRAUN, Melsungen, Germany) was introduced at a 75° angle. The first resistance break (pop) was felt when the tip of needle passed through the fascia lata. The needle was advanced in the same angle until the second resistance break, corresponding to the fascia iliaca. The angle with the skin was reduced to 30° and the needle was advanced 1 cm cephalad and the catheter was introduced 15 cm beyond the tip of the needle and secured (by tunneling though the skin).

After finishing of the nerve block technique, general anesthesia was induced in all patients with i.v. propofol 2 mg/kg, fentanyl 1 μg/kg, cisatracurim 0.15 mg/kg, oral cuffed endotracheal tube was inserted, anesthesia was maintained with O_2:NO_2, sevoflorane, and mechanical ventilation was initiated with maintenance of endtidal carbon dioxide 35–40 mmHg.