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Ambulatory Surgery 4 (1996) 81–83

Ambulatory Surgery

Local anaesthesia in postoperative analgesia for herniorrhaphy

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Accepted 15 September 1996

Abstract

Objective: To test the hypothesis that local infiltration with bupivacaine at the time of herniorrhaphy would decrease postoperative pain. Design: Sixty-five patients in whom a polypropylene mesh was implanted to treat an inguinal hernia were included in a random double-blind study. Operative anaesthesia was intradural with prilocaine 5%, 1.25 mg/kg. After the procedure, an ilioinguinal and iliohypogastric block was performed by infiltration of soft tissues with 0.25 ml/kg of either bupivacaine 0.5% or NaCl 9 g/l. Postoperative pain was assessed with an analog pain scale, (range 0–5) in the recovery room, 8 h later and 24 h later. The patient assessed the pain 24 h after surgery (range 0–5) and the relationship with the pain he expected (range 0–2). The time when the first dose of analgesia (diclofenac 75 mg i.v.) was given was also noted (range 0–6). A score (range 0–28) was calculated to quantify postoperative pain. Results: Thirty-three patients were infiltrated with bupivacaine and 32 patients received placebo. Both groups were similar in sex, age, weight and operating time (44 (20 min)). No pain was reported for bupivacaine (score 1.4 (0.9)) and minor pain for placebo (score 2.1 (1.0)) in the recovery room ($P < 0.05$). Further pain assessment was similar in both groups (scores range: 1.1–1.5). The first dose of analgesia was administered 2–3 h postoperatively (score 4.4 (2.0)) in the placebo group and 4 to 5 h postoperatively (score 2.9 (2.4)) in the bupivacaine group ($P < 0.05$). The final postoperative pain score was 11.3 (3.9) in the placebo group and 9.2 (4.4) in the bupivacaine group ($P < 0.05$). Conclusions: Local infiltration of the abdominal wall with bupivacaine reduces immediate postoperative pain and delays the administration of postoperative analgesia.

Keywords: Hernia; Analgesia; Local anesthetics

1. Introduction

The control of pain during surgery and in the postoperative period results not only in comfort for the patient, but it also reduces the metabolic and inflammatory response to surgery. Recent studies on the pathophysiology of acute postoperative pain [1–4] suggest that it is induced by functional changes on the peripheral nerves (hyperalgia) as well as in the central nervous system (hyperexcitability). The combination of hyperalgia plus hyperexcitability increases pain perception. Most of nociceptive stimuli induce the local release of histamine, serotonin, prostaglandins, substance P and other messengers that contribute to hyperalgesia [1,4,5]. Local anaesthetics block the peripheral neural pathways of pain and, therefore, limit the release of pain messengers that induce the hyperalgesia and, indirectly cause the hyperexcitability in the central nervous system.

The objective of this study was to test the hypothesis that the peripheral nerve blockade with the local anaesthetic, bupivacaine, at the time of surgery in patients

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0966-6532/96/$15.00
PII S0966-6532(96)00123-0

operated on for inguinal hernia might decrease postoperative pain.

2. Patients and methods

All patients operated on for inguinal hernia under hospital admission, and in whom a polypropylene mesh was implanted were admitted into the study. Intradural anaesthesia with prilocaine 5%, 1.25 mg/kg was used in all patients. An ilioinguinal and iliohypogastric nerve block was performed by the local infiltration of soft tissues, with a 21 G needle, of either bupivacaine 0.5% without epinephrine, or NaCl 9 g/l, at a dose of 0.25 ml/kg, injected at the end of the surgery on a random double-blind basis. This was achieved by tissue infiltration with bupivacaine or placebo of the area medial to the antero-superior iliac spine, approximately at a depth between the major and minor oblique muscles aponeuroses. Postoperative analgesia was given when required by the patient as opposed to the usual practice of mandatory administration before the beginning of pain. Diclofenac, 75 mg intravenously was used unless the intensity of pain indicated the administration of meperidine, 0.5–1 mg/kg subcutaneously. Patients in whom diclofenac was contraindicated received paracetamol, 500 mg p.o., and were not included in the study.

Postoperative pain was assessed by the nursing staff using an analog scale of pain with 6 degrees: 0: no pain; 1: minor pain; 2: moderate pain; 3: pain; 4: intense pain; 5: unbearable pain. Pain intensity was evaluated immediately in the recovery room (range 0–5), 8 h postoperatively (range 0–5) and 24 h postoperatively (range 0–5). At 24 h, the patient was asked whether he had experienced less, equal or more (range 0–2) pain than he had expected. Finally, the time at which the patient required the first dose of analgesia was carefully annotated, and quantified in a score scale (range: < 1 h: 6; > 6 h: 0). Patients with incomplete evaluation or who were unreliable due to difficulty in comprehension of the questionnaire were excluded from the study.

Comparisons were made between bupivacaine and placebo groups using the independent Student's t-test. Data are presented as mean (S.D.) unless stated otherwise. A degree of probability of less than 5% was regarded as significant.

3. Results

Sixty-five patients entered the study. Bupivacaine was infiltrated in 33 patients and placebo in 32 patients. No complications, such as hematomas were observed as a result of local infiltration of tissues. Both groups were similar in sex, age, weight and operating time (44 (20) min). The nursing staff reported no pain (score 1.4 (0.9)) for bupivacaine and minor pain for placebo (score 1.9 (1.1)) in the recovery room ($P < 0.05$). Further pain assessment was similar in both groups (scores range: 1.1–1.5). The first dose of analgesia was administered 2–3 h postoperatively (score 4.4 (2.0)) in the placebo group and 4–5 h postoperatively (score 2.9 (2.4)) in the bupivacaine group ($P < 0.05$).

4. Discussion

Postoperative analgesia after herniorrhaphy is important for patient comfort, early mobilization and hospital discharge in ambulatory surgery. The present study demonstrated that the blockade of the peripheral sensitive pathways of pain in the inguinal region with the local anaesthetic bupivacaine reduces immediate postoperative pain and delays the administration of the first dose of analgesia after inguinal herniorrhaphy. This is in agreement with the studies of Tverskoy et al. [6] that investigated postoperative pain in 36 patients operated on for inguinal hernia and found that patients who had undergone general anaesthesia plus infiltration with local anaesthetic were significantly more comfortable than patients operated on under epidural or general anaesthesia alone. Similarly, Buguedo et al. [7] observed that the association of subarachnoidal block with ilioinguinal and hypogastric blocks with bupivacaine reduced pain and delayed the administration of postoperative analgesia after herniorrhaphy.

Infiltration with bupivacaine was only effective in the immediate postoperative period. At the 8 h evaluation and thereafter the pain scores were similar for the bupivacaine and placebo groups. This was an expected finding, since the duration of the effect of bupivacaine administered by local tissue infiltration is approximately 9 h longer than the anaesthesia provided by its epidural administration, which is 3–4 h [6,8]. Patients in the bupivacaine group did not realize the fact that they had less pain than patients in the placebo group. Despite the additional analgesia provided by bupivacaine, they considered that the pain experienced was similar to what they had expected, as in the placebo group.

As a result of bupivacaine infiltration, the first dose of diclofenac was required 4–5 h postoperatively as opposed to 2–3 h in the placebo group. This is relevant for patients operated on in ambulatory surgical units, that leave the hospital within the first 4 h postoperatively, in whom an appropriate control of pain is important to achieve early ambulation and home return. Infiltration with bupivacaine is also relevant for patients with peptic ulcer disease or other reasons that prevent the use of diclofenac.

In conclusion, the peripheral neural block with bupivacaine at the end of herniorrhaphy is a safe and simple manoeuvre that contributes to an effective analgesia in the early postoperative period. This is of interest for patients that need early mobilization, such as ambulatory surgery patients.

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