Egyptian Journal of Anaesthesia (2016) 32, 541–547

HOSTED BY

ELSEVIER

Egyptian Society of Anesthesiologists

Egyptian Journal of Anaesthesia

www.elsevier.com/locate/egja
www.sciencedirect.com

Research Article

Bupivacaine constant continuous surgical wound infusion versus continuous epidural infusion for post cesarean section pain, randomized placebo-controlled study

Hossam A. ELShamaa [a,*], Mohamed Ibrahim [b]

[a] Anesthesia Department, Faculty of Medicine, Cairo University, Egypt
[b] Anesthesia Department, Faculty of Medicine, Zagazig University, Egypt

Received 18 May 2016; revised 14 August 2016; accepted 22 August 2016
Available online 11 October 2016

KEYWORDS

Bupivacaine;
Wound infusion;
Epidural analgesia;
Postoperative pain;
Cesarean section

Abstract *Background:* Cesarean section is considered as one of the most commonly done surgical procedures, which have a rising rate of performance. Postoperative pain may lead to poor patient satisfaction and interfere with early rehabilitation. Increasing evidence is now suggesting that less invasive regional analgesic techniques may be as beneficial as epidural analgesia. This study aimed to compare efficacy, safety and side effect of bupivacaine continuous wound infusion using constant flow PainFusor system with epidural infusion for post-cesarean section analgesia.

Methods: 60 patients, ASA physical status I & II, aged 19–42 years, with full-term pregnancy undergoing elective cesarean section were randomly divided into two groups. All patients enrolled in the study performed cesarean section under standardized protocol of general anesthesia. Group A patients received continuous surgical wound infiltration, while group B patients received bupivacaine continuous epidural infusion. Pain was assessed using Visual analogue scale (VAS). Diclofenac sodium 75 mg was administered IM as a rescue analgesic.

Results: The current study showed no significant difference between the two groups in the hemodynamic parameters, respiratory parameters as well as pain scores at rest during the whole period of study. Side effects were statistically non-significant, and only patients who requested analgesia were significantly higher in group A. Furthermore, pain VAS scores on mobilization were significantly lower in group B during the first postoperative day.

Conclusion: The current study demonstrated that bupivacaine administered by continuous epidural infusion provided a significantly lower pain scores with mobilization, and hence better analgesia for post cesarean section pain in the first postoperative day compared to continuous bupivacaine wound infusion through fenestrated catheter using the constant flow PainFusor system.

* Corresponding author.
E-mail address: hossamshamaa@yahoo.com (H.A. ELShamaa).

Peer review under responsibility of Egyptian Society of Anesthesiologists.

http://dx.doi.org/10.1016/j.egja.2016.08.017

1. Introduction

Effective management of postoperative pain is a patient right and essential requirement to minimize stress response following surgical intervention [1]. Obstetric patients differ from other surgical patient population due to the increased concerns about postoperative pain as well as the need for early patient mobilization besides newborn care and nursing [2]. Cesarean section (CS) is considered as one of the most commonly done surgical procedures, which have a progressively rising rate of performance. Being associated with intense and severe postoperative pain, CS pain may lead to poor patient satisfaction and interfere with early rehabilitation and movement in addition to improper or delayed newborn care [2]. Epidural analgesia is considered as the most effective technique for postoperative pain control in abdominal surgery. Its use as an effective modality for pain relief following major surgery via local anesthetic and opioids, bolus or infusion, started as early as 1980s [3]. However when using regional anesthesia, anesthesiologist may have to use certain neuraxial medications e.g. intrathecal or epidural opioids which beside improving the analgesia is associated with higher risk of side effects such as pruritus, urine retention, constipation and nausea and vomiting [4]. Recently, evidence-based data suggested that the benefits of the epidural analgesia are not as significant as it was previously thought. Although it has benefits in deceasing cardiothoracic and pulmonary complications especially in high risk patients who undergo major abdominal or thoracic surgery, yet increasing evidence is now suggesting that less invasive regional techniques for analgesia e.g. paravertebral, femoral, or sciatic blocks may be as beneficial as epidural analgesia [5]. Furthermore, surgical wound infusion techniques are suggested as a safe and simple alternative to epidural in various surgical procedures [5].

Infiltration of the surgical wound with local anesthetic has been widely described and used for multimodal pain management [6]. A systemic review of randomized controlled trials of surgical wound infiltration emphasized the safety and advantages of this technique with reduction in opioid consumption, and hence opioid side effects [7]. Single bolus local anesthetic wound infiltration has been used in a wide range of surgeries including thoracic, abdominal, cardiac or pelvic procedures, yet its efficacy and duration of action were much lower than continuous surgical wound infiltration with local anesthetic through a fenestrated catheter placed above or below the muscle sheath by the surgeon at the site of surgical incision [8,9]. Several recommendations of well designed, large sampled, homogenous RCT were made, suggesting that such studies are valuable to optimize outcomes, and to assess the effect of continuous wound infusion on the length of hospital stay and cost effectiveness in ambulatory surgery [10].

The objective of this randomized, controlled study was to compare the efficacy and side effects of bupivacaine continuous surgical wound infusion (BCWI) using a fenestrated catheter connected to a constant flow PainFusor system, with continuous epidural infusion, in controlling postoperative pain following CS in the first 24 h postoperatively. Our hypothesis was that wound infusion may offer better postoperative pain relief.

2. Patients and methods

After obtaining approval from the Clinical Research Ethics Committee of Erfan and Bagedo General Hospital and obtaining written informed consent, the study was conducted. Sixty patients, (ASA) physical status I & II, aged 19–42 years, with full-term pregnancy (37–40 weeks gestational age), body mass index ranging from 20.0 to 30.0 kg/m^2, undergoing elective cesarean section were enrolled in the current study. The patients were randomly divided, using computer-conducted concealed envelope method, into two equal groups: patients in group A (n = 30) received continuous surgical wound infiltration with bupivacaine 0.25% while Group B (n = 30) patients received continuous epidural infusion with bupivacaine 0.125% and fentanyl. Inclusion criteria were ability to consent; and ability to understand and communicate (the absence of language barrier). Exclusion criteria were cardiovascular, hepatic or renal dysfunction, coagulation disorders or anticoagulant therapy, neuromuscular diseases, opioid or analgesic abuse, alcohol abuse, allergy to any of the used drugs and history of chronic pain syndrome or drug addiction.

The linear visual analogue scale (VAS) for assessment of pain, which is a 10 cm linear scale where zero is no pain and ten is the worst imaginable pain, was explained to all patients in both groups of the study before surgery starts. Patients were asked to locate their pain on this linear scale. All surgical procedures were performed by the same surgeon. All patients after admission to operating theater were placed in sitting position; the back was sterilized, and local anesthesia given. Then an 18 gauge Tuohy needle was used to insert epidural catheter using loss of resistance to air technique through midline approach at the level of L3-4 vertebrae. 10 ml of normal saline was injected to ensure catheter patency. All patients enrolled in the study performed CS under standardized protocol of general anesthesia, where only ondansetron 0.1 mg/kg was given as the sole premedication and induction was done using propofol 2 mg/kg and succinylcholine 1 mg/kg followed by atracurium 0.5 mg/kg, and maintained using sevoflurane with 50% nitrous oxide in oxygen, and after delivery of the baby fentanyl 100 μg was given. In both groups, after closure of the peritoneum the surgeon was asked to puncture the skin 2–3 cm lateral to the end of the skin incision and pass a 15 cm long fenestrated catheter (Baxter PAINfusor® catheter 15; Baxter Healthcare S.A., Zurich, Switzerland) placing it pre-peritoneal under the fascia such that the fenestrations are available along the whole wound length. The catheter was then taped and fixed to the skin to prevent its slipping out or changing position during the rest of the surgical procedure. 10 ml normal saline was injected through the catheter to confirm its patency.

Following the end of surgery, and immediately after patient extubation, in **group A:** bupivacaine 0.25% infusion was started at a rate of 10 ml/h in the abdominal catheter using the constant infusing PainFusor system (Baxter LV5 INfusor® and PAINfusor; Baxter Healthcare International Inc, Deerfield, IL 60015 USA) and epidural infusion was started with normal saline as a placebo at the same rate as in the other group. On the other hand in **group B:** normal saline was connected to the catheter as a placebo simulating group A and epidural infusion of bupivacaine 0.125% with fentanyl 2 μg/ml was started at a rate of 10 ml/h. Infusions were continued