

A comparison of postoperative outcomes provided by a continuous preperitoneal infusion versus ultrasound guided rectus sheath block for midline emergency laparotomy.

Poor pain control in the post-operative period can lead to chronic pain syndromes (1) , increased post-operative morbidities (2) and poor quality of life (3). Therefore , good post-operative pain management is imperative for the patient and is one of the new pain management standards recommended (4).

Pain control after laparotomy can be difficult to achieve and often requires a multimodality approach . Opiate use can have serious side effects, including significant nausea, respiratory depression , slowing of gastrointestinal function and urinary retention (5).

Epidural analgesia , when used as an adjunct to parenteral opioids in elective intra-abdominal surgery , results in superior postoperative pain control compared with systemic opioids alone (6). Unfortunately , there are many unique morbidities associated with epidural infusion catheters , including, hypotension , fluid retention , urinary tract infections (UTIs) , urinary retention , epidural site infection , epidural hematoma and inadequate analgesic distribution which may affect a patient's postoperative outcomes and hospital costs (7).In addition , epidural analgesia is not an option for every patient undergoing laparotomy . Coagulopathy is a contraindication to epidural placement , and epidurals are often not used in emergency surgery(5).

Continuous preperitoneal infusion (CPI) of loco-regional anesthetic through an elastomeric pain pump is an alternative to epidural analgesia . Multiple studies have shown that CPI is a safe adjunct for postoperative analgesia in many subspecialties (8-10).A CPI system can be placed in emergent cases, can be used in patients with coagulopathy , can be removed without interruption of deep vein thrombosis prophylaxis , does not require a consulting physician service to monitor and has not been shown to increase rates of wound infection in clean-contaminated cases (5).

In recent years , rectus sheath block provided safer and more reliable analgesia by the development of ultrasound tools. Ultrasound guided rectus sheath block can reduced the risk of peritoneal puncture and bleeding. Rectus sheath block is very effective to reduce postoperative pain in upper abdominal surgery as an alternative method to epidural anesthesia in anticoagulated patients (11).

The aim of this study is to compare the postoperative analgesia provided by a continuous preperitoneal infusion versus ultrasound guided rectus sheath block for midline emergency laparotomy.

Patients and Methods:

This randomized prospective study will be carried out after the approval of Rashid Hospital's Research Ethical Committee and patient's written informed consent.

Sixty adult patients , of both gender , 18-70 years old, ASA I-III who will be scheduled for emergency laparotomy with upper abdominal midline incision will be included in the study. Exclusion criteria will be patients with known allergic response or contraindications to paracetamol, parecoxib, morphine or ropivacaine and pregnant women

The enrolled patients will be randomly assigned to one of three groups:

Group I (20 patients) will receive an ultrasound guided rectus sheath block by the end of the surgery using 15 ml ropivacaine 0.5% on either side.

Group II (20 patients) for whom a 7.5 , 15 , 30 cm 19-gauge multiholed catheter will be inserted at the end of surgery and after the closure of the peritoneal layer at 3 to 5 cm away from the lower end of the surgical incision through an introducer peel-away needle. The length of the catheter will be established to guarantee homogenous distribution of the holes all along the length of the incision of the fascia. The catheter will be allocated above the peritoneum within the musculofascial layer and secured to the skin with an occlusive transparent dressing. A 10 ml bolus of ropivacaine 0.2% will be administered through the catheter and then connected to an elastomeric pump delivering a continuous fixed -rate of ropivacaine 10 ml/h.

Group III(20 patients) a multiholed catheter will be inserted as in Group II and will receive also an ultrasound guided rectus sheath block as described for Group I.

No premedication will be administered. General anesthesia will be induced using target controlled intravenous infusion (TCI) using remifentanyl (1-10 ng/ml effect concentration) and propofol (1-10 mcg/ml effect concentration) titrated to Bi-spectral index (BIS) value between 40-60. Once anesthesia level will be reached , succinyl choline 1mg/kg intravenously will be given. After the airway will be secured , TCI will be adjusted to maintain BIS value between 40 to 60. An initial dose of 0.1 mg/kg intravenous cisatracurium will be administered and further doses will be given according to neuromuscular monitoring maintaining a train of four (TOF) value of zero.

Pre-incision , all patients will receive 15 mg/kg intravenous bolus and 40 mg intravenous parecoxib. 0.5 mg intravenous ketamine will be administered to avoid remifentanyl's induced hyperalgesia.

All patients will be mechanically ventilated to maintain normocapnia throughout the procedure. Standard intraoperative monitoring will include electrocardiography, pulse oximetry , automatic non-invasive blood pressure , end tidal capnography , Bi-spectral index and train of four monitoring.

At the end of surgery and before extubation , patients who will be randomly assigned to Group I will receive an ultrasound-guided bilateral rectus sheath block using 15 ml of ropivacaine 0.5% on each side.

For patients who will be assigned to either Group II or Group III , a 7.5 , 15 or 30 cm 19-gauge multiholed catheter will be inserted by the operating surgeon at the end of surgery and after the closure of the peritoneal layer at 3 to 5 cm away from the lower end of the surgical incision through an introducer peel-away needle. The length of the catheter will be established to guarantee homogenous distribution of the holes all along the length of the incision of the fascia. The catheter will be allocated above the peritoneum within the musculofascial layer and secured to the skin with an occlusive transparent dressing. A 10 ml bolus of ropivacaine 0.2% will be administered through the catheter and then connected to an elastomeric pump delivering a continuous fixed -rate of ropivacaine 10 ml/h.

For patients who will be assigned to Group III will receive also an ultrasound-guided bilateral rectus sheath block using 15 ml of ropivacaine 0.5% on each side.

Then the patients will be extubated and shifted to Post-Anesthesia Care Unit (PACU) where they will be monitored for heart rate , blood pressure , oxygen saturation by pulse oximetry and pain score using visual analogue scale (VAS) both at rest and deep breathing . These data will be recorded every 15 minutes for the first hour.

After one hour , the patients will be discharged from PACU according to Modified Aldrete Scoring if they will reach a score of 9 or more. All patients will receive parecoxib 40 mg intravenously twice a day and paracetamol in a dose of 40 mg/kg intravenously in three divided doses regularly for 48 hours postoperatively.

In the postoperative period, all the patients will be evaluated for their hemodynamic variables (heart rate , respiratory rate , arterial blood pressure and arterial oxygen saturation) and postoperative analgesia using VAS at rest and with deep breathing at 2,4,8,12,18,24,36 and 48 hours postoperatively.

If the patient's VAS will reach 4 at any time in the 48 hours postoperatively, 0.1 mg/kg titrated intravenous morphine rescue analgesia will be administered and repeated if required to maintain VAS less than 4.

All patients will respond to a quality of life questionnaire (QR 40) at 24 and 48 hours postoperatively.

Statistical methods:

Data will be presented as mean (+/- standard deviation) . Data from the three groups will be compared using the unpaired t test. Statistical analysis will be performed using Statistical Package for the Social Science program (SPSS) . A p value of < 0.05 will be considered statistically significant.

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