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Defining the optimal analgesic strategy for erector spinae plane (ESP) blocks in unanticipated open cholecystectomy

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Laparoscopic cholecystectomy (LC) is the standard operative procedure for cholelithiasis, but the reported conversion rate to open cholecystectomy (OC) is 4.8% or higher [1]. Postoperative pain after OC is significantly greater than after LC and regional anesthesia techniques are useful for improving analgesia and recovery [2]. The erector spinae plane (ESP) block is a novel paraspinal plane block first described for thoracic analgesia [3] but is also effective in providing somatic and visceral analgesia following abdominal surgery [4]. It is relatively simple and safe to perform and thus is a feasible option where other more invasive blocks are contraindicated. We report three consecutive cases of ESP blocks performed under general anesthesia at the end of the surgery following unexpected conversion to OC via a right subcostal incision. We also describe the clinical evolution of our approach for providing optimal analgesia with the ESP block in this setting. Written Institutional Review Board consent was obtained for publication of these reports.

In the first case (a 51-year-old woman, height 165 cm, weight 107 kg), an ESP block was selected as the regional analgesia technique because of concerns related to subcutaneous injection of 5000 IU heparin at the beginning of surgery and the risk of bleeding complications with other options such as a thoracic paravertebral block. The patient was turned to a left lateral decubitus position. A high-frequency linear ultrasound probe 15-6 MHz (XPORTE, Sonosite, Canada) was placed in a parasagittal orientation over the right T5 transverse process. A 22 G × 80 mm block needle (Pajunk, Germany) was inserted using an in-plane, caudal-to-cranial approach. Thirty ml of ropivacaine 0.5% (AstraZeneca, Canada) was injected under the erector spinae muscle. Upon arrival to the post anesthesia care unit (PACU), the patient reported diffuse abdominal pain without any particular localization to the incision site. The severity was rated as 8/10 on the numeric rating scale (NRS) and a total dose of IV hydromorphone 2.5 mg was administered to relieve this pain. Assessment of sensory block was not performed. Over the first two postoperative days (POD) the patient received oral acetaminophen 975 mg 6-hourly, celecoxib 200 mg 12-hourly, and IV patient-controlled analgesia with hydromorphone 0.2 mg every 5 min as needed. Total hydromorphone doses were as follows: 1.8 mg on POD 0 (following PACU discharge), 3.6 mg on POD 1, and 4 mg on POD 2. Resting and dynamic NRS pain scores remained below 4/10 and 5/10 respectively during this time. The patient was discharged home on POD 3.

In the second case (a 44-year-old woman, height 155 cm, weight 90 kg), the ESP block was performed in the same manner as described at the T6 transverse process, but this time bilateral blocks were performed in an attempt to improve the analgesic effect. Twenty ml of ropivacaine 0.5% was injected on both sides. On arrival in the PACU, the patient reported mild abdominal pain (NRS 3/10) that was again diffuse rather than localized.

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She had bilateral sensory loss to cold over T4–T9 dermatomes. Three doses of IV hydromorphone 0.2 mg were administered in PACU to maintain pain scores < 3/10. Postoperative analgesia included oral acetaminophen 975 mg 6-hourly, oral celecoxib 200 mg 12-hourly, and subcutaneous hydromorphone as needed. Total hydromorphone doses were as follows: 2 mg on POD 0 (following PACU discharge) and 8 mg on POD 1. There was no discernible sensory block to cold on POD 1. The resting and dynamic NRS pain scores remained below 4/10 until the patient was discharged home on POD 2.

In the third case (an 86-year-old woman, height 162 cm, weight 73 kg), bilateral ESP blocks were again performed at the T6 transverse process, with injection of 15 ml of ropivacaine 0.5% per side. A further modification to the analgesic strategy in this case was insertion of a 20-gauge catheter (Stimucath®, Arrow, USA) on the right side, threaded 3 cm beyond the needle tip, in an effort to prolong the analgesia provided by the ESP block. In the PACU, the patient had bilateral sensory loss to cold over T4–T10 dermatomes. Postoperative analgesia comprised a continuous infusion of 0.2% ropivacaine at 10 ml/h through the right-sided ESP catheter and oral acetaminophen 975 mg 6-hourly. On arrival in the PACU, the patient reported mild generalized abdominal discomfort of NRS 4/10 severity. A total of 0.6 mg of IV hydromorphone was administered in PACU; however no further opioids were required during the remainder of the postoperative period. Resting and dynamic NRS pain scores were < 3/10 during this time. The patient had right-sided sensory loss to cold over the T5–T9 dermatomes during the period of continuous ESP blockade. The ESP catheter was removed on POD 3 and the patient was discharged home on POD 5.

These three cases reflect the clinical evolution of the use of the ESP block in OC. In the first case, possible reasons for the suboptimal analgesia provided by the unilateral ESP block include 1) failure to cover laparoscopic incisions on the left hemi-abdomen and 2) crossover innervation of the right-sided subcostal incision [5]. To address these limitations, we performed bilateral ESP blocks in the second patient, and also targeted the T6 instead of the T5 transverse process as it was more congruent with the subcostal incision. This resulted in better analgesia; however there was a rebound in opioid requirements on POD 1 that coincided with the resolution of the cutaneous sensory block. We therefore inserted a right-sided ESP catheter in the third case to prolong regional analgesia that provided excellent pain relief with minimal opioid requirements. In summary, our experience indicates that probably bilateral ESP blocks are required to cover unilateral incisions extending medial to the mid-clavicular line, and that a continuous catheter technique may provide optimal analgesia where moderate-to-severe postoperative pain is expected beyond 24 hours.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

Author Contributions

Julien Raft (Conceptualization; Supervision; Validation; Visualization; Writing–original draft)
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