

Ultrasound-guided rectus sheath catheters: A feasible and effective, opioid-sparing, post-operative pain management technique: A case series

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ABSTRACT

Epidural analgesia, though the gold standard of post-operative pain management for laparotomies, is associated with limitations and is contraindicated in many patients. Opioid-based pain management, which is an alternative to epidural, has been implicated in post-operative nausea, vomiting, and ileus. We report successful management of post operative pain with ultrasound guided rectus sheath (RS) catheters. RS block is a promising alternative in scenarios where epidural is contraindicated, has failed or in case of unexpected change in the surgical plan.

Key words: Opioid-sparing pain management, rectus sheath block, ultrasound-guided regional catheters

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INTRODUCTION

Epidural analgesia provides extremely effective pain relief^[1] and due to opioid sparing effect it has been advocated by the enhanced recovery after surgery (ERAS) working group for colorectal and urology cases.^[2] Unfortunately, not all patients are suitable for epidurals. Sepsis and coagulopathy are contraindications. Insertion of epidural requires expertise and has a failure rate of 20–30%.^[3] Other regional techniques like rectus sheath (RS) catheters show promise and with the increasing use of ultrasound are effective options for pain relief when epidural anaesthesia cannot be used.

CASE REPORT

We report three case scenarios of successful management of post-operative pain using intermittent local anaesthetic boluses through RS catheters.

Case 1

A 57-year-old female patient, weighing 62 kg with no co-morbidities was posted for laparoscopic surgery for

carcinoma colon and gastrointestinal stromal tumour of the stomach. As minimal invasive surgery was planned, epidural was not attempted, and patient was administered general anaesthesia. Intra-operatively due to surgical reasons, open laparotomy had to be done. Rest of the intraoperative course was uneventful with blood loss of around a litre. In view of the midline incision extending from a point 3 cm above pubic symphysis right up to xiphisternum, adequate post-operative pain relief was essential. After wound closure, under anaesthesia and with adequate asepsis, a 16 gauge Touhy's epidural needle was inserted in the RS space, lateral to the upper end of the incision, under ultrasound guidance. After confirmation of the RS space using saline, epidural catheter was threaded in the space around 5–7 cm of length. The same procedure was repeated on the opposite side. The catheters were fixed with steristrips and tegaderm to prevent accidental dislodgement [Figure 1]. A volume of 20 cc of 0.25% bupivacaine was administered through each RS catheter after insertion and repeated 6–8 hourly. For the next 24 h, the patient received concomitant analgesia in the form of intermittent

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Figure 1: On the right side fixation of catheter with steristrips and tegaderm is seen

doses of diclofenac 50 mg, paracetamol 1 g, and tramadol 50 mg by the intravenous (IV) route. From the 2nd day onward, only paracetamol was continued, and the opioid was administered as a rescue, along with the 20 cc of 0.25% bupivacaine 8 hourly through each RS catheter. The patient was encouraged to ambulate right from the first postoperative day, and the RS catheters were removed after 72 h. The worst pain score recorded by acute pain service team using the numeric rating scale in the first 72 h was 3/10.

Case 2

A 60-year-old hypertensive male, weighing 72 kg, on regular antihypertensive medication underwent radical cystectomy with ileal conduit for carcinoma urinary bladder. Pre-operative investigations were normal except for a serum creatinine value of 1.6 mg % (0.7–1.3 mg %). The initial anaesthetic plan was epidural plus general anaesthesia. However, epidural catheter insertion was abandoned after multiple unsuccessful attempts. In the post-operative period, IV fentanyl was administered using portable patient-controlled analgesia (PCA) machine, along with injectable paracetamol for pain relief. On post-operative day 5, IV PCA was stopped in view of suspected intestinal obstruction for which patient subsequently underwent emergency exploratory laparotomy. Intra-operative findings were suggestive of paralytic ileus with a dilated proximal jejunal loop. After the second operation, opioids were avoided, and the patient complained of moderate to severe pain at the operative site. After obtaining consent, bilateral RS catheters were placed under ultrasound guidance in the post-anaesthesia care unit, under adequate monitoring. A dose of 20 cc of 0.25% bupivacaine

was given through each RS catheter, and the same was repeated every 6 hourly along with injection paracetamol 1 g 6 hourly. RS catheter was removed after 48 h. Average pain score at rest and movement was 2/10 and 3/10, respectively.

Case 3

A 40-year-old female, weighing 53 kg and diagnosed to have carcinoma rectum was planned for subtotal colectomy. She had received oxaliplatin- and capecitabine-based chemotherapy 2 months earlier. There was a history of dust allergy for which the patient occasionally required asthalin puffs. Her pre-operative investigations revealed a low platelet count ($50 \times 10^9/L$) with a hypocellular bone marrow picture. The liver enzymes and bilirubin were elevated (serum glutamic oxaloacetic transaminase [SGOT] 298 U/L, serum glutamic pyruvic transaminase [SGPT] 192 U/L, serum bilirubin 2.5 mg/dl), though the rest of the liver functions (Total protein - 7.3 g/dl, Serum albumin - 4 g/dl, international normalized ratio - 1.04) were normal. As a repeat liver function test showed a decreasing trend in the enzymes and bilirubin (SGOT - 122 U/L, SGPT - 113U/L, serum bilirubin 1.46 mg/dl), after discussion with the gastroenterologist and the haematologist; and in view of a large and sessile polyp with a greater risk of bleeding, it was decided to go ahead for surgery. General anaesthesia was administered without attempting epidural analgesia, in view of the low platelet count. At wound closure, under ultrasound guidance, RS catheters were inserted on either side of the midline incision. Post-operatively, the patient received boluses of 20 cc of 0.25% bupivacaine 6–8 hourly through each catheter. The patient needed injectable tramadol 8 hourly on the 1st day and on need basis thereafter. The catheters were removed at the end 96 h, with adequate pain relief.

DISCUSSION

In the above case scenarios local anaesthetic boluses through the RS catheter provided good pain relief as part of a multimodal analgesia regime. It is not unusual in our day-to-day practice to come across such cases where epidural analgesia is not a feasible option for pain management. The possible reason could be a contraindication for the procedure as in patient 3 or a failure of technique as in case 2, or an unexpected change in the surgical plan (case 1). Traditionally, in the above-reported cases, our option of pain management has always remained opioid-based, with

patients being offered morphine- or fentanyl-based PCA pumps.

With the current emphasis on fast-tracking after surgery and considering the fact that opioids contribute to nausea, vomiting, and ileus; it is necessary to have a viable alternative for pain management. RS catheters provide a feasible option for effective pain management in these scenarios. In this technique, thin multiorifice catheters, are placed beneath the rectus muscle above the posterior RS on either side.^[4] The deposition of the local anaesthetic in the relative avascular plane posterior to the muscle contributes to the slow vascular uptake of local anaesthetic.^[5] A 20 ml bolus of 0.25% bupivacaine bolus every 6 h, through each catheter is recommended for effective analgesia^[4] and is within safe limits for a healthy 50 kg and above adult.

The RS block has come a long way since its first description by Schleich in 1899 for perioperative relaxation of anterior abdominal wall. There are several case reports^[6-8] and retrospective studies^[9,10] looking at the efficacy of this technique. The results of these retrospective analyses conclude that RS block is a safe and effective technique of pain management. At present, there is a paucity of prospective randomized clinical trials comparing the efficacy of this technique with respect to its opioid sparing effect or the current gold standard, namely epidural analgesia.

Use of ultrasound has increased the success rates of regional techniques. Dolan *et al.* have shown that ultrasound guidance significantly improves accuracy of RS block versus loss of resistance techniques.^[11] With the ERAS group focussing on epidural analgesia as part of multidimensional approach of post-operative care; it is essential to have an effective opioid sparing technique, especially for patients in whom epidural analgesia is not a viable option. With the current available evidence, RS block is a feasible technique in scenarios that we have reported; that is, in cases where epidural is contraindicated, or has failed or in case of unexpected

change in surgical plan. It is probably the need of the hour to formulate and propose an alternate algorithm to epidural analgesia, for effective pain management.

CONCLUSION

Ultrasound-guided RS block with catheterisation can be feasible and effective pain management technique for midline laparotomies and can be considered when epidural analgesia is not a suitable option.

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