

Epidural infusions versus transversus abdominis plane (TAP) block infusions: retrospective study

Vasanth Rao Kadam · John L. Moran

Received: 26 July 2010 / Accepted: 24 June 2011 / Published online: 13 July 2011
© Japanese Society of Anesthesiologists 2011

To The Editor:

The transversus abdominis plane (TAP) block has been gaining popularity as analgesia in major abdominal surgery during the past 4 years [1, 2]. Comparison of continuous infusions of TAP and epidural methods has not been reported. Our aim was to compare these analgesic methods using retrospective inpatient data for the calendar year 2008–2009. With approval of The Queen Elizabeth Hospital (TQEH) Ethics of Research Committee, the case notes of all patients who had continuous catheter technique using epidural or TAP block for elective abdominal surgery were retrieved from the medical records department, cross-referenced with the acute pain service (APS) data sheets, and reviewed. Patients receiving infusions for less than 72 h and those prescribed rescue analgesia with nonfentanyl opioids were excluded from consideration. Variables recorded over the 3 days of TAP and epidural infusions were pain score at rest and coughing on numerical rating scale (NRS) of 0–10 (0 = no pain to 10 = worst pain imaginable) by the TQEH APS, quantitative estimate of rescue analgesia, procedural and medical complications, and mortality. A postoperative telephone survey was conducted to elicit a patient satisfaction score (recorded as “excellent,” “satisfied,” and “poor”). NRS were reported as range and median and cumulative fentanyl doses as mean \pm SD; group differences were analyzed by the rank-

sum test; and NRS over time were analyzed using a linear mixed model, with covariates age, gender, and physical status [American Society of Anesthesiologists (ASA)].

Results of this study included 15 patients with the TAP and 15 with thoracic epidural procedures. The TAP block was done under ultrasound guidance using either the sub-costal or posterior approach described by Hebbard et al. [3, 4]. Patients received multimodal postoperative analgesia of continuous regional analgesia, 6-h IV acetaminophen 1 g, and intravenous patient-controlled analgesia set to deliver 20 μ g fentanyl bolus with lockout interval of 5 min and no background infusion. The epidural group received 0.2% ropivacaine 8–14 ml/h; the TAP group received 8 ml/h on each side.

The results are summarized in Table 1. There was no significant difference in demographics variables. There was no intergroup difference for pain score over time to 3 days for relief of either pain at rest ($P = 0.62$) or coughing ($P = 0.84$). A modest decline in cough pain occurred over the 3-day observation period ($P = 0.04$). Fentanyl requirements, TAP versus epidural, as μ g/day of fentanyl, were noted to differ ($P = 0.03$) on day 1 [633 (170) vs. 170 (70)] and on day 2 [896 (213) vs. 315 (111)] postoperatively. Patient satisfaction was similar between the groups.

Although this study elicited low pain scores in the post-anesthesia care unit (PACU) in favor of the epidural, no analgesic difference was found subsequently between the two techniques. The fentanyl requirement is expected to be less in epidural patients compared with those undergoing TAP as the latter covers only sensory dermatomes of the anterior abdominal wall [1]. In TAP there is no sympathetic blockade, and pain arising from the viscera is not covered. Unilateral block was recorded in two TAP patients and patchy epidural blockade in four, requiring a modest amount of opioid supplementation, apart from

V. R. Kadam (✉)
The Queen Elizabeth Hospital, The University of Adelaide,
28 Woodville rd, Adelaide 5011, Australia
e-mail: Vasanth.rao@health.sa.gov.au

J. L. Moran
Department of ICU, The Queen Elizabeth Hospital,
Woodville, Adelaide, Australia

Table 1 Patient demographics and pain score as assessed by the acute pain service in the ward

Procedure	Number	Gender (M/F)	Age (years)	Satisfaction (Exc/Sat/poor)	D1: fentanyl (µg)	D2: fentanyl (µg)	D3: fentanyl (µg)	D1 PS: rest	D1 PS: cough	D2 PS: rest	D2 PS: cough	D3 PS: rest	D3 PS: cough
Epidural bowel resection lap.	4	1/3	81	0/3/0 ^a	190	820	590	0.5	4	5	7	4	7.5
Epidural liver resection open	2	2/0	78	1/1/0	0	0	0	0	0	0	0	N/A	N/A
Epidural bowel resection open	1	1/0	88	N/A	50	0	0	0	8	0	5	0	4
Epidural whipples open	3	1/2	66	2/1/0 ^a	80	130	80	6	10	0	5	0	0
Epidural gastrectomy open	4	3/1	62	2/1/0 ^a	90	200	0	0.5	1.5	0.5	4	0	1.5
Epidural laparotomy open	1	0/1	73	0/1/0	0	0	0	0	2	3	7	0	7
TAP high anterior resection open	1	0/1	60	1/0/0	1320	1200	0	1	4	0	0	0	0
TAP bowel resection lap.	6	4/2	71	2/1/0 ^a	390	280	100	2	5	2	5	1	3
TAP liver resection open	1	1/0	79	1/0/0	100	225	0	0	5	3	5	3	3
TAP whipples open	5	3/2	70	1/2/1 ^a	420	780	540	3	5	2	4	2	4.5
TAP laparotomy open	2	2/0	40	2/0/0	560	1500	1480	7	8	1	7	1	3

Fentanyl daily doses (µg) as median. Pain score, median [recorded over the range of 0 (=no pain) to 10 (worst pain imaginable)]

D day, Lap laparoscopic, M male, F female, Exc excellent, Sat satisfactory, N/A not available, PS The Queen Elizabeth Hospital (TQEH) acute pain service (APS) pain score, TAP transversus abdominis plane block

^a Missing data

topping up. Hypotension was recorded in two patients with epidural block but in none with TAP.

The limitations of this study are potential patient selection bias because allocation to technique was not randomized, sensory block observations were not available, sample size was small, and multi-observer bias was possible. However, there would appear to be equipoise between the two techniques in terms of patient response and satisfaction.

In conclusion, our limited retrospective study has suggested that TAP block provides comparable analgesia compared with the epidural technique, although a larger amount of supplemental fentanyl was required by the TAP block technique. Detailed characterization would require an appropriate randomized controlled trial, which is underway at our institution.

References

- McDonnell JG, O'Donnell B, Curley G, Heferman A, Power C, Laffey JG. The analgesic efficacy of transversus abdominis plane block after abdominal surgery: a prospective randomized controlled trial. *Anesth Analg.* 2007;104:193–7.
- Carney J, McDonnell JG, Ochana A, Bhinder R, Laffey JG. The transversus abdominis plane block provides effective postoperative analgesia in patients undergoing total abdominal hysterectomy. *Anesth Analg.* 2008;107:2056–60.
- Hebbard P, Fujiwara Y, Shibata Y, Royse C, et al. Ultrasound-guided transversus abdominis plane (TAP) block. *Anaesth Intensive Care.* 2007;35:616–7.
- Hebbard P. Subcostal transversus abdominis plane block under ultrasound guidance. *Anaesth Analg.* 2008;106:674–5.