Analgesic Effectiveness of Modified Continuous Transversus Abdominis Plane Block with Low Dose of Local Anesthetic Continuous Infusion in Closure Loop Stoma in accordance with ERAS Pathway.

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Background: Closure loop stoma can be performed as a minor surgery, but patients still suffer from postoperative pain. With the enhanced recovery after surgery (ERAS) concept increasingly becoming a concern among surgeons, one key success is new evidence about modern alternatives to traditional morphine-based analgesic regimens. We have therefore modified a technique of continuous transversus abdominis plane block (MCTAP) by a catheter insertion into TAP plane by surgeon under direct visualization. Also, we used very low dose of local anesthetic continuous infusion at 2 ml/hr that has never before been experimented. The aim of this analytic cohort study was to evaluate the analgesic effectiveness of MCTAP block compared with opioid-based analgesia in stoma reversal patients.

Methods: After approval of the Institutional Review Board, patients undergoing closure loop stoma were examined and divided into two groups. Patients who received postoperatively continuous infusion of 2 ml/hr bupivacaine 0.2% via TAP catheter plus intravenous morphine injection as needed were enrolled in MCTAP group, while patients receiving intravenous morphine injection on demand alone were enrolled in conventional group. Opioid consumption, numeric rating pain scores (NRPS), time to bowel function returns, and surgical recovery were recorded.

Results: A total of 42 patients, 20 were in MCTAP group and 22 in conventional group. Demographic data was compared as shown in Table 1. No significant difference was found in any of the demographic variables between the two groups and interoperation variables did not differ (Table 1). Total morphine consumption in MCTAP patients was significantly lower than conventional patients (7.4±2.4, 21.82±5.4 mg respectively, P<0.005). The marked differences in opioid consumption were at PS 12 h (mean difference [95% CI] 3.86 [0.934 - 6.786], P < 0.01) and PS 14 h (5.09 [2.164 - 8.016], P < 0.001). (Table 2 and Figure 1). The numeric rating scores for both rest and motion pain showed no significant difference at any time points. (Figure 2) The median of time to first flatus was significantly less among MCTAP patients (35 and 42 hrs, respectively, P <0.05) Also, Time to first clear liquid intake was significantly less among MCTAP patients (41 and 46.5 hrs, respectively, P <0.05). Patients in MCTAP group required significantly less postoperative length of stay than those in conventional group (median = 85 and 96 hrs, respectively, P <0.01). (Figure 3)

Table 1: Demographic Data

Parameter	MCTAP Block N=20	Conventional N=21
Sex (Male/ Female)	14/6	11/11
Underlying disease (negative/ positive)	14/6	13/9
Age (years) (mean ± SD)	58.65 ± 12.41	52.82 ± 14.8
BMI (kg/m ²) (mean ±SD)	23.18 ± 4.79	23.84 ± 4.16
Operative time (min.) (mean±SD)	103 ± 21.05	90.91 ± 29.22
Intraoperative opioid use (mg) (mean±SD)	8.475 ± 5.035	8.375 ± 4.18

Table 2: Postoperative Opioid Consumption

	Opioid Consumption (≈ mg Morphine) Mean [95% CI]			
	PACU	PS 12 h	PS 24 h	PS 48 h
Conventional (N = 21)	5.672 [3.401-8.122]	5.676 [3.344-8.009]	6.086 [3.433-8.739]	2.067 [-1.300-4.263]
Modified CTAP (N = 20)	3.775 [2.298-5.252]	1.95 [0.777-3.123]	1.3 [0.155-2.445]	0.375 [-0.410-1.16]

Figure 1: Postoperative Opioid Consumption

Figure 2: Numeric Rating Pain Scores

Figure 3: Postoperative Recovery Outcomes

Discussion: This study demonstrated that the patients in MCTAP group required less postoperative opioid consumption as compared to the conventional group. Pain scores were not different between the two groups. The patients receiving MCTAP block also expressed better postoperative recovery status with showing less time to first clear liquid intake, time to first flatus, and postoperative length of stay, but time to first ambulation was not different. In addition, the MCTAP group showed significantly less nausea and vomiting, which are common side effects of systemic opioid-based analgesia. This highlights that the key advantage of MCTAP block is not only to provide effective analgesia, but also to reduce unwanted side effects from systemic opioid use.

Conclusions: This study demonstrates that MCTAP block with low dose local anesthetics is an effective analgesic technique in closure loop stoma and may also be a useful alternative analgesic remedy following stoma reversal in accordance with ERAS concept.