

# Comparison of Postoperative Analgesia amongst Subjects Receiving Ropivacaine and Clonidine versus Ropivacaine Alone: A Hospital Based Study

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## Abstract

**Background:** Pain is the most common complain causing distress to the patients in immediate postoperative period. Various studies have shown that transverse abdominal plane (TAP) 13 block is effective modality for postoperative pain relief using ropivacaine or bupivacaine. But duration of these blocks with local anesthetics only is limited to few hours. The present study was conducted with the aim to compare the postoperative analgesia amongst subjects receiving ropivacaine and clonidine versus ropivacaine alone. **Subjects and Methods:** The present prospective and double blinded study involving 70 patients was performed for a period of 2 years at the Department of Anesthesiology. Monitors were attached and baseline (preoperative) heart rate by ECG, systolic and diastolic blood pressure was measured by noninvasive blood pressure monitoring. The duration of postoperative analgesia and complications like nausea, vomiting or any other were noted during the procedure. Student t test was used for statistical analysis and probability value of less than 0.05 was considered as significant. **Results:** Abdominal Hysterectomy was performed in 4 patients in Group c and 6 patients in Group R. Hernioplasty was performed in 5 patients in Group c and 7 patients in Group R. The mean time for first dose in Group c was 646.83 mins and in group R was 393.43 mins. The mean time for second dose in Group c was 1284.89 mins and in group R was 393.43 mins. **Conclusion:** TAP block under USG guidance should be used to provide better analgesia in postoperative Period. Adjuvants like clonidine should be used along with local anesthetics for prolongation of analgesic effect of TAP block in post-operative period.

**Keywords:** Anesthetics, Hysterectomy, Prospective, Ropivacaine.

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## Introduction

Pain is the most common complain causing distress to the patients in immediate postoperative period. A number of studies have looked at various reasons for such pain. The proposed mechanisms for the pain in the postoperative period is by tissue trauma (surgical incision, dissection, burns) or direct nerve injury (nerve transection, stretching, or compression).<sup>[1]</sup> TAP Block has been used for a variety of surgeries such as caesarean section, abdominal hysterectomy and colorectal surgery.<sup>[2-4]</sup> The advantage of TAP block is that sympathetic and motor blockade is absent and damage to spinal cord structures is avoided. TAP block is best done under ultrasound guidance.<sup>[5]</sup> Use of Tap block has shown superior results to other post-operative pain relief methods involving i.v. tramadol / diclofenac sodium.<sup>[3]</sup> Various studies have shown that transverse abdominal plane (TAP) 13 block is effective modality for postoperative pain relief using ropivacaine or bupivacaine. But duration of these blocks with local anesthetics only is

limited to few hours.<sup>[6,7]</sup> Alpha 2 agonists like clonidine and dexmedetomidine have been used as adjuvants in peripheral nerve block to increase duration of analgesia and found to be relatively safe to use with local anesthetic.<sup>[8,9]</sup> The present study was conducted with the aim to compare the postoperative analgesia amongst subjects receiving ropivacaine and clonidine versus ropivacaine alone.

## Subjects and Methods

The present prospective and double blinded study involving 70 patients was performed for a period of 2 years at the Department of Anesthesiology, Northern Railway Central Hospital, Basant Lane, New Delhi, India. All the subjects were informed about the study and a written consent was obtained from them in their vernacular language. Patient belonging to either sex, being operated under spinal anaesthesia for caesarean section, abdominal hysterectomy, bilateral inguinal hernia and other infraumbilical surgery like open cystolithotomy in age group of 18 to 70 years,

under ASA grade I and II at Northern Railway Central Hospital were included in the study. Patients with alcohol and or drug abuse, Patients taking medication with psychotropic or adrenergic activities, Patients on chronic analgesic other than simple analgesics (NSAIDs), Patients with history of bleeding disorders and patients on anticoagulant therapy, Abnormal BT, CT or on anticoagulant therapy, Local infection at the site or patients operating under general anesthesia were excluded from the study. Group C was given 20 ml of 0.2% ropivacaine with 25 microgram clonidine on each side, total of 40 ml of 0.2% ropivacaine with 50 mcg clonidine. Group R was given 20 ml of 0.2% ropivacaine on each side, total 40 ml of 0.2% ropivacaine. All patients were given tablet alprazolam 0.25 mg at the night before surgery and 0.25 mg in morning on day of surgery. Monitors were attached and baseline (preoperative) heart rate by ECG, systolic and diastolic blood pressure was measured by noninvasive blood pressure monitoring. A crystalloid infusion was started and preloading with 500ml crystalloid was done. A total volume of 20 ml of 0.2% ropivacaine was injected on each side for a bilateral TAP block. An oval spread of the local anesthetic in the plane confirmed the presence of the needle in the correct plane. The duration of postoperative analgesia and complications like nausea, vomiting or any other were noted during the procedure. All the data thus obtained was arranged in a tabulated form and analysed using SPSS software. Student t test was used for statistical analysis and

probability value of less than 0.05 was considered as significant.

### Results

All the patients belonged to age group of 18 -70 years. Statistical analysis was done using unpaired t-test. Since the P values are > 0.05, this indicates that the two study groups are comparable with regard to age.

[Table 1] shows the different surgeries carried out in Group C and Group R. Abdominal Hysterectomy was performed in 4 patients in Group c and 6 patients in Group R. Hernioplasty was performed in 5 patients in Group c and 7 patients in Group R. LSCS was performed in 21 patients in Group c and 19 patients in Group R. Open cystolithotomy was performed in 5 patients in Group c and 3 patients in Group R.

[Table 2] shows the mean timing of analgesic used in two groups in postoperative period. The mean time for first dose in Group c was 646.83 mins and in group R was 393.43 mins. The mean time for second dose in Group c was 1284.89 mins and in group R was 393.43 mins. The mean time for third dose in group R was 1291.92 mins whereas it was not required in Group C. There was a significant difference in the postoperative analgesia between the groups.

**Table 1: Showing different surgeries carried out in Group C and Group R.**

Surgery Carried	Group C		Group R		p value
	n	%	n	%	
Abdominal Hysterectomy	4	11.43%	6	17.14%	>0.05
Hernioplasty	5	14.29%	7	20.00%	>0.05
LSCS	21	60.00%	19	54.29%	>0.05
Open cystolithotomy	5	14.29%	3	8.57%	>0.05
Total	35	100%	35	100%	

**Table 2: Showing mean timing of analgesic used in two groups in postoperative period.**

Time (mins) at which analgesic used	Group C		Group R		p value
	Mean	SD	Mean	SD	
1st dose	646.83	45.67	393.43	66.63	<0.01
2nd dose	1284.89	65.77	393.43	62.06	<0.01
3rd dose			1291.92	86.81	

### Discussion

Pain relief has significant physiological benefits, hence monitoring of pain relief is increasingly becoming an important postoperative quality measure. Prolonged postoperative pain leads to delay in early ambulation and performing deep breathing exercises. Delay in starting deep breathing exercises increases the risk of pulmonary complications and delay in ambulation leads to increased risk of deep vein thrombosis Uncontrolled acute pain is also associated with the development of chronic pain with reduction in quality of life. The postoperative analgesia leads to shortened hospital stays, reduced hospital costs, and increased patient satisfaction. Different studies have shown that adjuvants like epinephrine, dexamethasone and α2

agonists when used with local anesthetic in TAP block, leads to prolonging the analgesic effect of TAP block. Waleed A et al,<sup>[10]</sup> found similar results to our study. They also found reduction in VAS score was more in their group using dexmedetomidine as adjuvant compared to group using only 0.25% bupivacaine for TAP block. Swati Bisht et al,<sup>[11]</sup> found out average VAS score for the 24 hours was lower in group using bupivacaine and dexmedetomidine (3.20±0.579) compared to group using only bupivacaine (4.91±1.63) (p value <0.05). In our study, a significant prolongation of analgesic effect occurred due to use of clonidine as adjuvant. Our study has showed similar result to Swati Bisht et al.<sup>[11]</sup> In their study there was a statistically significant difference in the time for first morphine and pain score for 24 hours between the two methods (p value<

0.05). The time for the first demand of rescue analgesia i.e. morphine was earlier in group using bupivacaine,  $5.91 \pm 1.28$  hours as compared to group using bupivacaine and dexmedetomidine, i.e.  $10.18 \pm 2.12$  hours. In study by Neha Fuladi et al,<sup>[12]</sup> they found that the mean duration of analgesia was  $22.6 \pm 3.26$  minutes in saline group,  $420.6 \pm 14.01$  minutes in bupivacaine (0.25%) group and  $2187 \pm 1011.09$  minutes in ropivacaine group. Their duration of analgesia for ropivacaine group was significantly higher than our duration. This may be due to the use of higher concentration of ropivacaine (0.5%) compared to our dose (0.2%). Paleti Sophia et al,<sup>[13]</sup> in their study found mean time to first request of rescue analgesia was 8.5 to 9 hours in group using 0.5% ropivacaine in TAP block, while our mean time in ropivacaine group was  $393.43 \pm 66.63$  minutes (6.56 hours) which was lower than their result. The difference in concentration of ropivacaine (0.5% versus 0.2%) used may be the cause for that. However, some investigators reported different results. Costello et al,<sup>[14]</sup> found no analgesic benefit from TAP block using ropivacaine 20 ml 0.375 % per side in patients undergoing caesarean section under spinal anesthesia. Similarly Elizabeth Puddy et al,<sup>[15]</sup> in their study stated that ultrasound-guided transversus abdominis plane block does not improve analgesia after elective caesarean section when intrathecal diamorphine is used. Shona Charlton et al (2010),<sup>[16]</sup> carried out their study on perioperative transversus abdominis plane (TAP) blocks for analgesia after abdominal surgery. TAP block resulted in significantly less postoperative requirement for morphine at 24 hours (mean difference (MD) -21.95 mg, 95% confidence interval (CI) -37.91 to 5.96; five studies, 236 participants) and 48 hours (MD -28.50, 95% CI -38.92 to -18.08; one study of 50 participants) but not at two hours (all random-effects analyses). R. C. N. McMorrow et al (2011),<sup>[17]</sup> compared the analgesic efficacy of the TAP block with and without spinal morphine after Caesarean section in a prospective, randomized, double-blinded placebo-controlled trial. Their result showed that spinal morphine is more effective than TAP Block for postoperative analgesia. According to a study by P. Raghunath (2017) et al 0.5% Ropivacaine lead to longer length of analgesia in comparison to 0.25% Levobupivacaine when used in TAP block for managing postoperative analgesia after lower abdominal surgeries.<sup>[18]</sup> Qi Chen et al (2018) compared the analgesic effectiveness and recovery time after gynecological surgery by addition of dexmedetomidine or fentanyl and found a significant difference in VAS scores amongst the groups.<sup>[19]</sup>

## Conclusion

TAP block under USG guidance should be used to provide better analgesia in postoperative Period. Adjuvants like clonidine should be used along with local anesthetics for prolongation of analgesic effect of TAP block in post-operative period. Our study concluded that USG guided TAP block is a feasible, safe and minimally invasive technique for postoperative analgesia in patients undergoing

infra umbilical surgeries under spinal anesthesia.

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