Section: Anaesthesiology

Original Research Article

BILATERAL ILIOINGUINAL AND ILIOHYPOGASTRIC NERVE BLOCK WITH 0.5% ROPIVACAINE VS 0.5% ROPIVACAINE WITH 50µg DEXMEDETOMIDINE FOR POSTOPERATIVE ANALGESIA IN LOWER ABDOMEN SURGERY

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Abstract

Background: More than 80% of surgery patients experience immediate postoperative pain, which can have a detrimental impact on their quality of life, function, and functional recovery. The purpose of this study is to compare bilateral ilioinguinal and iliohypogastric nerve blocks with 0.5% ropivacaine vs 0.5% ropivacaine with dexmedetomidine for postoperative analgesia in lower abdomen surgery, as well as investigate their postoperative adverse effects. **Materials and Methods:** From January 2023 to June 2023, 60 adult patients were studied in the Department of Anesthesiology at Srinivasan Medical College and Hospital. A thorough general physical examination was performed, including an airway assessment and a spine and systemic examination. The following tests were performed: complete blood count, bleeding and clotting times, blood group and typing, Rh typing, HIV I and II, HBsAg, blood glucose, BUN and serum creatine, and ECG. **Results:** More patients were age group of 26 to 35 years, and more patients were height group of 151 to 160 cm. More patients were weight group of 56 to 65 kg, and more were in the LSCS category. The age, height, weight, and surgery between the groups were insignificant; hence, both groups were comparable. Significant differences in heart rate, systolic blood pressure, and diastolic blood pressure. Duration of postoperative analgesia was prolonged in Group RD when compared with Group R, and there is a significant difference in duration of analgesia and VAS score between groups. **Conclusion:** Adjuvant dexmedetomidine improves postoperative analgesia in lower abdomen surgeries without adverse events.

INTRODUCTION

Surgical treatments are an important element of contemporary medicine, and they have helped millions of patients recover from various illnesses and injuries worldwide. However, acute postoperative discomfort is surgery's most common side effect. More than 80% of surgery patients experience immediate postoperative pain, which can harm their quality of life, function, and functional recovery. Evidence shows that less than half of surgery patients feel appropriate postoperative pain relief. This is a major problem since poorly controlled pain can lead to complications such as longer recovery times, higher healthcare expenses, and the likelihood of persistent post-surgical discomfort.[1,2] Aside from these unfavourable consequences, the presence and severity of acute pain during or after surgery predict the development of chronic pain.

Chronic post-surgical pain (CPSP) is pain that lasts at least three months after surgery. CPSP can harm a patient's quality of life and result in long-term incapacity.[1-4] As a result, it is critical to appropriately manage postoperative pain to reduce the risk of complications and enhance patient outcomes. Several successful postoperative pain control treatments include regional anaesthetic procedures like epidural analgesia and peripheral nerve blocks. Regional anaesthetic procedures have been demonstrated to minimise surgical stress response by suppressing nociceptive input from the surgical site.[5] This can result in lower opioid

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intake, better analgesia quality, faster recovery, and a lower incidence of CPSP. In the last ten years, intense nociceptive somatic and visceral post-surgical pain has been regarded as the most significant development of endocrine and neurohumoral problems in the immediate post-surgical period.[1,6] It is distinguished by increased catabolism, increased stress hormone release, increased burdening of the CVS system, pulmonary function abnormalities, hypercoagulability, fibrinolysis decline, immunological suppression, paralytic ileus, and post-surgical nausea and vomiting.[1,5-7]

Dexmedetomidine is used in intensive care for short-term sedation of intubated and mechanically ventilated patients. It may minimise mechanical ventilation time, shorten ICU stay, and enhance sleep quality. It can also be used to deliver sedation during regional anaesthesia or awake fiberoptic tracheal intubation as an adjunct to general anaesthesia. Dexmedetomidine has been used in children and has shown efficacy in this demographic. It may be more effective than propofol at minimizing delirium in older people who require anaesthesia following surgery. It is used with local anaesthesia to strengthen and prolong sensory blockade by hyperpolarising unmyelinated C fibres in a central or peripheral neural blockade.8-10 The study aims to compare bilateral ilioinguinal and iliohypogastric nerve block with 0.5% ropivacaine vs 0.5% ropivacaine with dexmedetomidine for postoperative analgesia in lower abdomen surgery and to study their side effects in the postoperative period.

MATERIALS AND METHODS

From January 2023 to June 2023, the clinical study was conducted at Srinivasan Medical College and Hospital in the Department of Anesthesiology. The study comprises 60 adult patients undergoing elective and emergency Pfennestial incision and lower abdominal surgery. The hospital's ethical committee authorised the study, and all patients provided written informed permission.

Inclusion Criteria

Age 20-60 years, ASA I and II, and elective and emergency surgery were included.

Exclusion Criteria

Patient refusal, H/o epilepsy, allergic to local anaesthetics, coagulation abnormalities, and local infection were excluded.

A complete general physical examination, including airway assessment and spine and systemic examination, was performed on all patients chosen for the study to confirm the inclusion and exclusion criteria. The following tests were performed: complete blood count, bleeding and clotting times, blood group and typing, Rh typing, HIV I and II, HBsAg, blood glucose, BUN and serum creatine, and ECG.

After midnight, patients were recommended to remain nil per oral. An 18G IV cannula was used to secure IV access, and RL was allowed to flow. Emergency medications and equipment were kept on hand in case of failure or difficulties. PR, BP, ECG, respiration, and oxygen saturation were all measured at rest. The patient was placed in the left lateral position, and the back was painted with a 2% povidone-iodine solution while adhering to all aseptic procedures. The L3-L4 gap was palpated, and 1% was invaded. Lignocaine. A 23G spinal needle was inserted, and CSF flow was confirmed. For LSCS, 2cc of 0.5% bupivacaine (heavy) was used, and 3cc for lower abdomen surgery. The surgeon was authorised to proceed after the blockage level was established. Patient vitals were checked at frequent intervals during surgery.

Patients were randomly assigned to one of two treatment groups using random numbers. Patients in Group R received 20 mL of 0.5% ropivacaine. Patients in the RD group got 20ml 0.5% ropivacaine containing 50mcg dexmedetomidine. An anesthesiologist who was not involved in the research opened the randomisation envelope and prepared the study medication. The study drug was prepared separately from the area where the nerve blockade was performed to ensure complete blinding. The drug was scheduled, labelled with the patient's study number, and given to the anesthesiologist performing the nerve block. The final LA drug injected was thus 0.5% ropivacaine or 0.5% ropivacaine with 50mcg dexmedetomidine. The anaesthetist who administered the anaesthesia was not involved in the study's execution and was unaware of which group the patient belonged to.

An ultrasound-guided bilateral Ilioinguinal - Iliohypogastric nerve block was administered at the end of the surgery. The patient was positioned on the operating table supine. Following inguinal preparation, a sterile linear high-frequency probe was placed between the iliac crest and costal margin (more cephalad than the usual location for the ilioinguinal block). The ilioinguinal and iliohypogastric nerves are well-defined between the transverse abdominis and internal oblique. After visualisation, a 22G 1.5-inch needle was used to reach the nerves in an out-of-plane approach. After aspiration, the study drug was injected till the nerves were surrounded by the drug. The required volume was recorded. The patient's vitals will be monitored throughout the procedure. The onset and duration of motor and sensory blocks were recorded. The use of VAS SCORE rescue analgesia When the VAS score exceeds 4, an injection of Tramadol 50 mg will be given. The patient will be monitored postoperatively until rescue analgesia is required. The Ramsay Sedation Scale was used to assess sedation. Heart rate, blood pressure, sedation, VAS score, and side effects were all monitored and recorded.

The Statistical Package for Social Science (SPSS) version 20 was used for the statistical analysis. The demographic information was presented in

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frequency and percentage form. Both groups' mean and standard deviation were calculated, a t-test was run, and a p-value of 0.05 was considered significant.

RESULTS

Among 60 patients, more were between the ages of 26 and 35, and more were between the heights of 151 and 160 cm. More patients were in the 56-65 kg weight range, and more were in the LSCS category. The p-value for age, height, weight, and surgery between the two groups was greater than 0.05, indicating that both groups were comparable (Table 1).

Table 1: Demographic data of the study

		Group R	Group RD	P-value
Age (Years)	18 - 25	8 (26.7%)	8 (26.7%)	0.154
	26 - 35	17 (56.6%)	12 (40%)	
	36 - 45	2 (6.7%)	4 (13.3%)	
	45 - 60	3 (10%)	6 (20%)	
Height (cms)	150 - 160	16 (53.3%)	19 (63.3%)	0.175
	161 - 170	13 (43.3%)	11 (36.7%)	
	171 - 180	1 (3.3%)	0	
Weight (kg)	45 - 55	4 (13.3%)	2 (6.7%)	0.175
	56 - 65	17 (56.7%)	12 (40%)	
	66 – 80	9 (30%)	16 (53.3%)	
Surgery	LSCS	24 (80%)	19 (63.3%)	0.069
	Oophorectomy	2 (6.7%)	1 (3.3%)	
	Ovarian cystectomy	1 (3.3%)	0	
	TAH with BSO	3 (10%)	10 (33.3%)	

A significant difference between group R and RD in heart rate at 8 hours (p=0.028) was reported. However, no significant difference was observed from 0 to 24 hours (Figure 1).

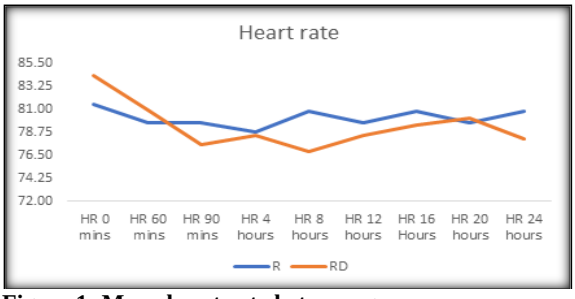

Figure 1: Mean heart rate between groups

There is no significant difference in systolic blood pressure between groups R and RD from 0 to 8 hours, but a significant difference from 12 to 24 hours (Figure 2).

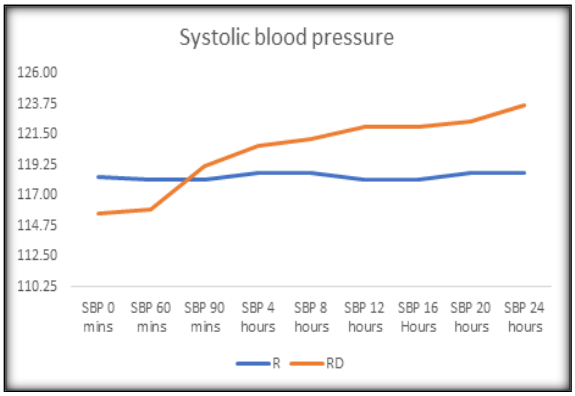

Figure 2: Mean systolic blood pressure between groups

No significant difference was reported between diastolic blood pressure from 0 to 24 hours. A significant difference from 8 to 16 hours between groups R and RD was observed (Figure 3).

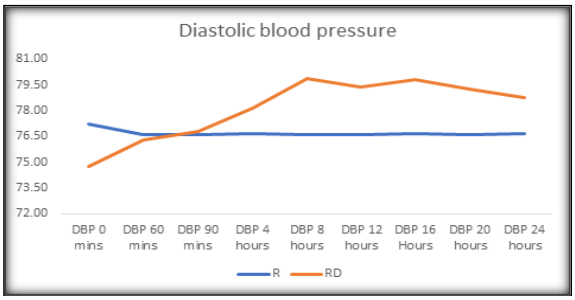

Figure 3: Mean diastolic blood pressure

The duration of analgesia for Group R was 543.33 47.51 minutes and 1295.33 103.014 minutes for Group RD. Compared to Group R, Group RD had a longer duration of postoperative analgesia. The duration of analgesia differs significantly between Group R and RD (p=0.001) (Table 2).

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Table 2: Duration of analgesia between groups

Duration of analgesia	Group R	Group RD	P-value
360 to 540	22 (73.3%)	00	
600 to 720	8 (26.7%)	00	
720-1440	0	30 (100.0%)	
Mean	543.33 ± 47.51min	1295.33±103.014min	<0.001

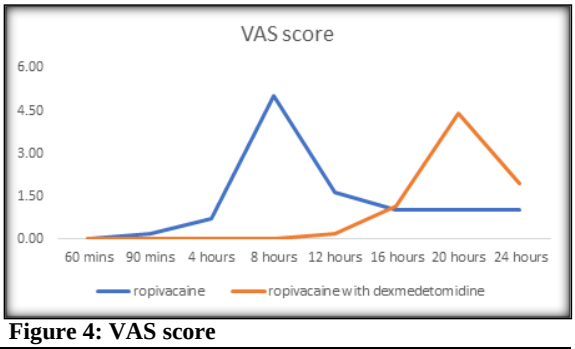

Figure 4: VAS score

The difference in VAS scores between groups R and RD at regular intervals ranging from 60 minutes to 24 hours is statistically significant ($p<0.05$) (Figure 4). Sedation levels among participants were investigated but cannot be calculated because the standard deviation for both groups is 0

DISCUSSION

Dexmedetomidine is an alpha-2 adrenoceptor agonist with excellent specificity and selectivity that induces analgesia, sedation, and anxiolysis. It can be used for intravenous sedation, spinal and epidural anaesthesia, and ilioinguinal-iliohypogastric nerve blocks. Although the ilioinguinal-iliohypogastric nerve block is routinely utilised for lower abdominal and inguinal procedures, standard landmark-guided approaches have a high failure rate and provide limited pain relief. The nerve block only treats pain from the incision and does not treat visceral discomfort caused by peritoneal damage. Local anaesthetic blocks have a short duration of effect as well.

Our investigation found that the patient's age, weight, and height were equivalent in clinical and statistical groups. There were no significant variations in the pattern of changes in heart rate, systolic blood pressure, and diastolic blood pressure postoperatively between the study groups. Oriola F et al.[11] found that total PCA morphine intake was reduced by more than 50% in the Ilioinguinal Iliohypogastric group compared to the placebo group in a study of 70 female patients undergoing gynecologic surgery through suprapubic laparotomy under GA. Sakalli M et al.[12] discovered that when the block was administered after wound closure, the Ilioinguinal Iliohypogastric nerve block group had lower pain levels and used less PCA tramadol throughout the 24 hours following caesarean birth.

According to research conducted by Lundbald M et al.13, the duration of analgesia was considerably greater in the group that received adjuvant dexmedetomidine, with patients in that group requiring less rescue analgesia within 24 hours than the other group. In one research, Nigatu YA et al.[14] randomly assigned 80 patients undergoing caesarean birth through Pfannenstiel incision under spinal anaesthesia to either bilateral Ilioinguinal Iliohypogastric nerve block with 16ml of 0.25% bupivacaine per side or no block. When the time of the initial opioid analgesia request was compared across the groups, it was discovered that the control group had a shorter period than the Ilioinguinal Iliohypogastric nerve block group.

In a research conducted by Poudel A et al.[15] 60 patients were randomly assigned to one of two groups: Group B got bilateral Ilioinguinal and Iliohypogastric nerve blocks with 20ml of 0.5% bupivacaine, while Group C received no treatment. The NS group got the block in 20 ml of 0.9% normal saline. The average effective duration of analgesia was determined to be 264 ± 78.27 minutes in Group B and 178.17 ± 30.61 minutes in Group NS. According to the study, bilateral ilioinguinal and iliohypogastric nerve block considerably reduces tramadol use and offers acceptable postoperative pain management for patients undergoing lower-segment caesarean delivery.

Kiran LV et al.[16] studied 60 LSCS patients randomly assigned to US-guided TAP block or Ilioinguinal Iliohypogastric nerve block. 57% of those in the TAP block group did not require additional analgesics, whereas 13% did. The TAP block provided 409 minutes of analgesia, whereas the Ilioinguinal Iliohypogastric block provided 329 minutes. The TAP block offered better postoperative analgesia than the Ilioinguinal Iliohypogastric block after LSCS. According to Karan D et al.[17], the mean duration of analgesia, as measured by the time for the first administration of rescue paracetamol dosage, was substantially longer in Group RD (970.23 ± 46.71 mins) than in Group R (419.56 ± 46.71 mins). The number of patients in Group RD who required rescue analgesia within 24 hours was much lower than in the other group.

In our study, the mean duration of analgesia for Group B was 543.33 ± 47.51 minutes and 1295.33 ± 103.014 minutes for Group BD. Group BD's postoperative analgesia was longer than Group B's. As a result, the difference between the two groups is statistically significant. Lundbald M et al.[13] conducted a trial in which children were randomly assigned to either an ultrasound-guided ilioinguinal iliohypogastric nerve block with plain ropivacaine 0.197% or ropivacaine 0.197% with adjuvant dexmedetomidine 0.3mcg kg. The main goal was the time to the first postoperative dose of supplementary analgesia prompted by a pain score

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of ≥4. Pain levels were greater in Group RD than in Group R after 24 hours. Karan D et al.17 discovered that the median pain scores in Group RD were considerably lower than those in Group R at 6 and 8 hours. At 24 hours, Group R had greater pain scores than Group RD.

According to our findings, patients were followed for at least 24 hours after surgery and were given rescue analgesics if they had VAS ratings of > 4. The VAS scores of patients in both groups were comparable during the postoperative observation period due to the analgesic effects of both medicines. A statistically significant p-value exists between the two groups, B and BD, at intervals ranging from 60 minutes to 24 hours.

CONCLUSION

In conclusion, when compared to Group R, Group RD had a longer duration of postoperative analgesia. Our findings show that 50 mcg of dexmedetomidine is used as an adjuvant to 0.5% ropivacaine for ilioinguinal iliohypogastric nerve block improves postoperative analgesia in lower abdomen procedures, causing no adverse events. Throughout the research, the patients' sedation score was two.

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