

Evaluation of the Post-operative Analgesic Effect of Dexmedetomidine Application as an Adjuvant to 0.25% Bupivacaine for Wound Infiltration for Abdominal Hysterectomy: A Prospective Randomised Control Study

Eeshwar Rao Madishetti¹, Srikanth Reddy², Baddila Nikhila³

¹Associate Professor, Department of Anesthesiology, Chalmeda Anand Rao Institute of Medical Sciences, Bommakal Village, Karimnagar, Telangana, ²Professor, Department of Anesthesiology, Chalmeda Anand Rao Institute of Medical Sciences, Bommakal Village, Karimnagar District, Telangana State, ³Post Graduate Student, Department of Anesthesiology, Chalmeda Anand Rao Institute of Medical Sciences, Bommakal Village, Karimnagar, Telangana, India

Corresponding author: Baddila Nikhila, Post Graduate Student, Department of Anesthesiology, Chalmeda Anand Rao Institute of Medical Sciences, Bommakal Village, Karimnagar, Telangana, India

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A B S T R A C T

Introduction: In women of the age group between 3rd and 5th decade abdominal hysterectomy is the second commonest procedure carried out after caesarean section. These patients complain of moderate to severe post-operative pain. Currently multi drug therapy is used in perioperative pain management during hysterectomies. Study aimed to evaluate effects of dexmedetomidine as an adjuvant to local wound infiltration in abdominal hysterectomy.

Material and Methods: Eighty women posted for elective abdominal hysterectomy under general anaesthesia were included in the study. The subjects were randomly divided into two categories. Group I and II subjects were given 30 mL 0.25% bupivacaine and 30 mL 0.25% bupivacaine with 1 µg/kg dexmedetomidine at the end of surgery. Pain at rest and at cough was assessed by means of visual analogue scale.

Results: There was no dissimilarity in relation to patient demographic characteristics, ASA physical status and duration of surgery. The subjects in Group II showed significantly lower pain scores at rest for first 12 hours and on cough for 6 h after operation when compared with patients in Group I. The 24 h morphine consumption was also less in Group II when compared with Group I.

Conclusion: Dexmedetomidine when used as a local anaesthetic adjuvant was found to lower pain and also there was less postoperative analgesic consumption.

Keywords: Adjuvant, Dexmedetomidine, Hysterectomy, Local Wound Infiltration, Opioids

INTRODUCTION

Dexmedetomidine is an α-2-adrenoreceptor agonist that provides sedation, analgesia, and anxiolysis. However, the analgesic effect of dexmedetomidine is controversial.¹ Presently, minimally invasive surgery and open surgery are two methods in abdominal operations. Both methods cannot avoid a postoperative acute wound pain. At present, the treatments for postoperative wound pain are mainly based on intravenous or oral opioids and non-steroidal antiinflammatory drugs (NSAIDs), such as fentanyl, morphine, and flurbiprofen. However, the use of opioids may cause a series of adverse reactions: postoperative nausea and vomiting (PONV), itching, respiratory depression, urinary retention, etc.^{2,3}

Few authors consider epidural analgesia as a gold standard for management of pain after abdominal surgeries. However

this is associated with complications after neuraxial blocks especially in elderly individuals. Hence studies were carried out in drugs which have analgesic efficacy and also cause fewer or no complications. One such alternative are local anaesthetics, which have advantages of being simple, safe and cost-effective. Further studies proved that local anaesthetics with added adjuvants like dexmedetomidine, clonidine, opioids improve the duration and quality of analgesia. The added adjuvants are epinephrine, ketorolac, opioids, clonidine, etc. Does Dexmedetomidine provide a similar effect on local wound infiltration in abdominal hysterectomy? At present, some clinical randomised controlled trials (RCTs) have studied this problem.⁴⁻⁷

We carried this study to find out whether the addition of dexmedetomidine to local anaesthetic after abdominal hysterectomies efficiently lowers the consumption of

morphine postoperatively.

MATERIAL AND METHODS

After obtaining institutional ethical committee clearance and informed consent from the subjects, the study was carried between January 1st 2019 to December 31st 2019. Eighty women posted for elective abdominal hysterectomy under general anaesthesia between 30–60 years were included.

Exclusion Criteria

1. Obese patients
2. Patients with Hepatorenal insufficiency,
3. On adrenoceptor agonists or antagonists or narcotics

The methodology of Swati Singh and Chandrakant Prasad (2017) was followed in our study.⁶ The subjects were divided in to two groups. 30 mL 0.25% bupivacaine was given to Group I (control group) patients and 30 mL 0.25% bupivacaine with 1 µg/kg dexmedetomidine was given to Group II subjects. IV Propofol and fentanyl was given for anesthesia. Vecuronium 0.1 mg/kg IV was used for tracheal intubation. Monitoring of the study subjects was done with Datex Ohmeda GE B40 cardiac monitor. Tramadol 1.5 mg/kg IV every 8 hours was used for post-operative analgesia.

Pain at rest and at cough was assessed by visual analogue scale immediately after arrival in the post anesthetic care unit

and then at 2, 4, 6, 12 and 24 hours. Morphine 3 mg IV boluses was given when VAS score was ≥4. The data of total morphine consumed during the first 24 hours postoperatively was recorded. Sedation-level and PONV were measured on basis of a four-point sedation scale. Any other adverse effects were also recorded.

RESULTS

There was no dissimilarity in respect to demographic characteristics, ASA physical status and duration of surgery (Table 1 and Graph 1).

Group II revealed significantly lower pain scores at rest for first 12 hours and on cough for 6 h after operation when compared with patients in Group I. Morphine consumption was also found to be lower in Group II. There was a statistically significant (P < 0.002) difference in morphine supplementation in group II vs I (Table 2 and Graph 2).

There was no much difference in the sedation scores in both the groups (Table 3)

Post-operative hypotension incidence was negligible in both the groups and none reported any adverse effects.

DISCUSSION

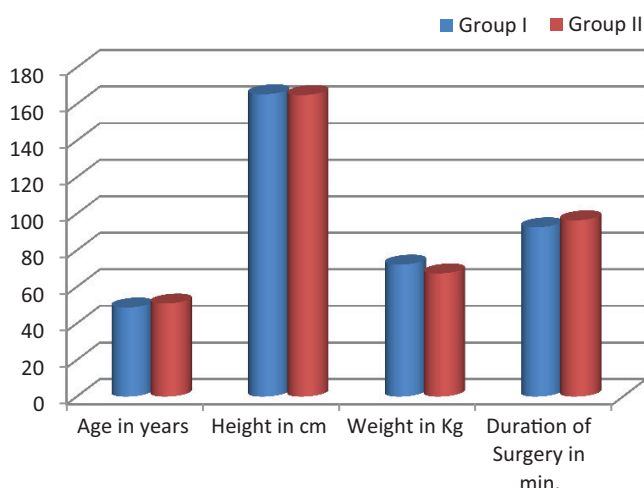
Post-operative pain after surgeries delays the proper recovery

| Variable | Group I (n=40) | Group II (n=40) | P value |
|--------------------------------------|----------------|-----------------|---------|
| Age in years: Mean ±SD | 48.75± 15.30 | 50.92±15.92 | 0.632 |
| Height in cm: Mean ±SD | 165.40±10.28 | 164.96±8.75 | 0.876 |
| Weight in Kg: Mean ±SD | 72.23±5.42 | 67.38±6.38 | 0.625 |
| Duration of Surgery in min. Mean ±SD | 92.63±11.36 | 96.45±10.87 | 0.681 |
| ASA I/II | 28/12 | 30/10 | 0.431 |

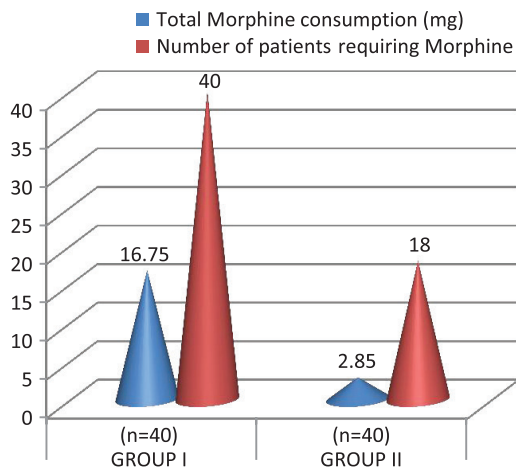
Table-1: Demographic profile

| Variable | Group I (n=40) | Group II (n=40) | P Value |
|--|----------------|-----------------|---------|
| Total Morphine consumption (mg) | 16.75± 3.30 | 2.85±1.52 | <000.1 |
| Number and Percentage of patients requiring Morphine | 40 (100%) | 18 (45%) | <000.1 |

Table-2: Total morphine consumption comparison in between the groups



Graph-1: Demographic Data Of The Study Subjects



Graph-2: Comparison of total morphine consumption in both the groups

| Sedation score | Group I (n=40) | Group II (n=40) | P value |
|----------------|----------------|-----------------|---------|
| 0 | 36 (90%) | 35 (87.5%) | 0.7251 |
| 1 | 4 (10%) | 5 (12.5%) | 0.6924 |
| 2 | 0 | 0 | - |
| 3 | 0 | 0 | - |

Table-3: Sedation score in both the groups

of the patients and in many instances leads to chronic pain.⁷⁻⁹ The analgesic effect of dexmedetomidine in clinical practice is also inconclusive. In a placebo-controlled study, the administration of intravenous dexmedetomidine (1 mg/kg) before induction of anesthesia to patients undergoing abdominal surgery significantly reduced morphine consumption, but not pain scores or opioid side effects.^{8,9}

In another study, dexmedetomidine was compared with placebo-administered patients undergoing total abdominal hysterectomy. Pain scores and time to first analgesic request were similar between groups, whereas cumulative patient-controlled intravenous morphine consumption was significantly decreased.¹⁰

The VAS is often used for assessing pain degree. Three studies reported VAS scores at 6 hours after surgery. In these studies a considerable heterogeneity was noted ($P = .09$, $I^2 = 59\%$), and there was a statistical difference between the two groups ($MD = -0.53[-0.82, -0.25]$, $P < .001$).^{4,5,7}

We found a statistically significant reduction in post-operative morphine need in Group II where bupivacaine and dexmedetomidine was used, without any considerable complications related to IV dexmedetomidine.

Brummett et al (2010) found an increase in duration of bupivacaine analgesia and anaesthesia with dexmedetomidine in rats without any evidence of complications.¹¹

Brummett et al (2011) found that when dexmedetomidine was used as an adjunct to ropivacaine increased the duration of sciatic nerve blockade in rats.¹²

Cheung et al (2011) noticed that when dexmedetomidine and clonidine were added to lignocaine for nerve block, there was an enhancement of local anaesthetic action.¹³

Limitations

Inadequate sample size

There was no comparison between different modes of dexmedetomidine, infiltration and IV.

CONCLUSION

Dexmedetomidine as a local anaesthetic adjuvant added for local wound infiltration in abdominal hysterectomy could reduce VAS scores and postoperative opioid consumption without changing the incidence of PONV. Meanwhile, more large-sample and high-quality RCTs are needed to increase the credibility identified in the current metaanalysis.

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