

## ORIGINAL RESEARCH

### To Compare Postoperative Analgesia According to VAS with Dexmedetomidine and Clonidine and Assessment of Ramsay Sedation Score After Complication of Surgery with Each Drug

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#### ABSTRACT

**Introduction:** Both clonidine and dexmedetomidine are alpha-2 adrenergic agonists that have analgesic as well as sedative properties and are being tried as newer adjuvants for analgesia. In addition to this, both have been shown to reduce the requirements of local anesthetics and enhance the analgesic effects without increasing the incidence of side effects. Thus, the present study was undertaken to compare postoperative analgesia according to VAS with dexmedetomidine and clonidine and assessment of Ramsay sedation score after complication of surgery with each drug.

**Materials and Methods:** 60 patients were divided into two groups (each group containing 30 patients); group I Inj. Dexmedetomidine 2 mcg /kg IV was administered and in group II Inj. Clonidine 2 mcg /kg IV was administered. All 60 patients were intubated with cuffed endotracheal tube of appropriate size. Post operative analgesia was evaluated using VAS score and post operative sedation was assessed using Ramsay's sedation score. Post operative complications were evaluated. Statistical analysis was done using student's 't' test and Chi-square test, result considered significant if p value <0.05.

**Results:** Mean duration of postoperative analgesia 46.83(±10.04) min in group-1 and 29.66(±8.8) min in group-2. On comparison, statistically highly significant difference between two groups (P < 0.0001) regarding post operative analgesia. Regarding post-operative sedation (Ramsay sedation score) at 15 minutes, 20(67%) patients were co-operative, oriented, tranquil and 10(33%) patients were respond to command in group 1. While 28(93%) patients were co-operative, oriented, tranquil and 2(7%) patients were responding to command in group 2. Post-operative sedation at 15 min was better in group 1 then group 2(P<0.05).

**Conclusion:** Dexmedetomidine was more potent in case of postoperative analgesia and postoperative sedation at 2 µg /kg IV in laparoscopic surgery then clonidine 2 µg /kg IV without any significant complication.

**Keywords:** Clonidine; Dexmedetomidine; Ramsay sedation score; VAS score.

## INTRODUCTION

The anaesthetic techniques and surgical methods have developed and improved significantly over the last two decades. Many techniques and drug regimens, with partial or greater success, have been tried from time to time to calm the patients and to eliminate the anxiety component during regional anaesthesia.<sup>1</sup> Dexmedetomidine is a sedative with high affinity for  $\alpha$ -2-adrenoreceptors. It sedates via interaction with the locus ceruleus and has less effect on arousability and patient interaction. In post-surgical patients, dexmedetomidine does not interfere with respiration rate, or arterial oxygenation and carbon dioxide pressure.<sup>2</sup> Clonidine is an imidazole compound that was developed for its antihypertensive properties. However, there is growing evidence for its place in anaesthetics and perioperative medicine. Clonidine was first synthesised in the 1960s as an antihypertensive agent and has since found a variety of clinical uses. It was first used in human anaesthetic practice in 1984, where it was administered epidurally. Unlike some other sedative agents, clonidine does not appear to induce respiratory depression, but its use is often limited by cardiovascular side effects.<sup>3</sup> Both clonidine and dexmedetomidine are alpha-2 adrenergic agonists that have analgesic as well as sedative properties when used as an adjuvant in regional anesthesia and hence are being tried as newer adjuvants for analgesia. In addition to this, both have been shown to reduce the requirements of local anesthetics and enhance the analgesic effects without increasing the incidence of side effects.<sup>4</sup> Thus, the present study was undertaken to compare postoperative analgesia according VAS with dexmedetomidine and clonidine and assessment of Ramsay sedation score after complication of surgery with each drug.

## MATERIALS AND METHODS

After obtaining institutional ethical committee approval and written informed consent, 60 patient of age group 20 to 60 years, of ASA grade I & II, of either sex posted for elective laparoscopic procedures over a period of 1 year, selected and divided into two groups ( each group containing 30 patients ); group I Inj. Dexmedetomidine 2 mcg /kg IV was administered and in group II Inj. Clonidine 2 mcg /kg IV was administered. Patients Allergy to study medications, patients with heart conduction block, patients with significant morbid obesity, advanced diabetic disease, advanced renal disease, Psychiatric illness or history, inability to comply with study assessment, pregnancy, respiratory failure were excluded from the study.

All patients were assessed for their preoperative condition on the previous day and routine investigations were done. Patients were fasted for 10 hrs before time of operation. After shifting of patient into the operating room vital data like Pulse, BP, ECG, SPO<sub>2</sub>, were recorded before giving premedication. All patients of group I & II were given IV injection of glycopyrrolate (4 microgram/kg) 10 min before administration of study drug.

After receiving premedication all patients were given study drug according to their group. Patients of Group I was given inj. Dexmedetomidine 2mcg/kg diluted in 10 ml Normal Saline slowly over 10 min. Patients of Group II were given inj. Clonidine 2mcg/kg diluted in 10 ml Normal Saline slowly over 10 min. Vitals were taken in all patients, before and after study drug was given.

All 60 patients were preoxygenated with 100% O<sub>2</sub> for 5 min on operative table by facemask with Mapelson A circuit. All 60 patients of group I & II were induced with injection Sodium thiopental 3 – 5mg/kg IV slowly and injection Succinylcholine 1.5-2mg/kg IV stat

All 60 patients were intubated with cuffed endotracheal tube of appropriate size. All 60 patients of both groups were maintained with O<sub>2</sub>+N<sub>2</sub>O+ intermittent positive pressure ventilation + Inj. vecuronium. All vital data (PR, NIBP, RR, SPO<sub>2</sub>, temp) were recorded before induction after induction and at regular intervals throughout the surgery and postoperatively for 2 hr. ECG monitoring was done using schillarcardioscope ECG monitor. Reversal of anaesthesia was achieved using inj. neostigmine 0.05mg/kg + inj. glycopyrrolate

8 mcg/kg given IV. Pulse rate, blood pressure, SPO<sub>2</sub>, EtCO<sub>2</sub> before and after intubation and throughout surgery was observed and recorded. Post operative analgesia was evaluated using VAS score and post operative sedation was assessed using Ramsay's sedation score. Post operative complications such as nausea, Vomiting, Headache, Dry mouth, Prolonged sedation, hypertension, hypotension, bradycardia, cardiac arrest, dysrhythmia or respiratory depression. Assessment of pain postoperatively was done using visual analogue pain scale<sup>5,6</sup> between 0-10 (0 = no pain, 10 = the most severe pain). Injection diclofenac sodium given as rescue analgesia if VAS $\geq$ 3. Assessment of sedation was done using Ramsay sedation scores as described below:

1=patient anxious and agitated or restless, or both

2=patient cooperative, oriented and tranquil

3=patient responds to command only

4=brisk response

5=sluggish response

6=no response

Statistical analysis was done using student's 't' test and Chi-square test, result considered significant if p value <0.05.

## RESULTS

They were grouped as group-1(30 patients using inj. dexmedetomidine) and group-2(30 patients using inj. clonidine).

Table 1 shows the demographic data of both the groups. The mean age in group-1 was 32.23( $\pm$ 10.39). The mean age in group 2 was 32.63( $\pm$ 11.65). Statistically age in both groups were comparable, there was no significant difference. Mean weight in group-1 was 55.63( $\pm$ 5.26). The mean weight in group-2 was 55.5( $\pm$ 6.61). Statistically weight in both groups were comparable, there is no significant difference.

In group-1 there were 13 female and 17 male patients while in group-2 there were 18 female and 12 male patients. There were 12 ASA grade-1 and 18 ASA grade -2 patients in group-1. There were 13 ASA grade-1 and 17 ASA grade-2 patients in group-2.

Mean duration of surgery in group-1 was 75.83( $\pm$ 20.51), while in group-2 it was 72.33( $\pm$ 20.2). Thus, both the groups were comparable, there was statistically no significant difference between the two groups with regards to demographic data.

Table 2, Fig 1 shows postoperative analgesia (VAS) in both groups. Mean duration of postoperative analgesia 46.83( $\pm$ 10.04) min in group-1. Mean duration of postoperative analgesia 29.66( $\pm$ 8.8) min in group-2. On comparison, statistically highly significant difference between two groups (P < 0.0001) regarding post operative analgesia.

Table 3, Fig 2 shows post-operative sedation (Ramsay sedation score) at 15 min. 20(67%) patients were co-operative, oriented, tranquil and 10(33%) patients were respond to command in group 1. While 28(93%) patients were co-operative, oriented, tranquil and 2(7%) patients were respond to command in group 2. Post-operative sedation at 15 min was better in group 1 then group 2(P<0.05).

Table 4, Fig 3 shows post-operative sedation (Ramsay sedation score) at 45 min. 23(77%) patients were co-operative, oriented, tranquil and 7(23%) patients were respond to command in group 1. While 26(87%) patients were co-operative, oriented, tranquil, 1(3%) patients were respond to command and 3(10%) patients were anxious and restless in group 2. Post-operative sedation at 45 min was better in group 1 then group 2(P<0.05).

**Table 1: Demographic data**

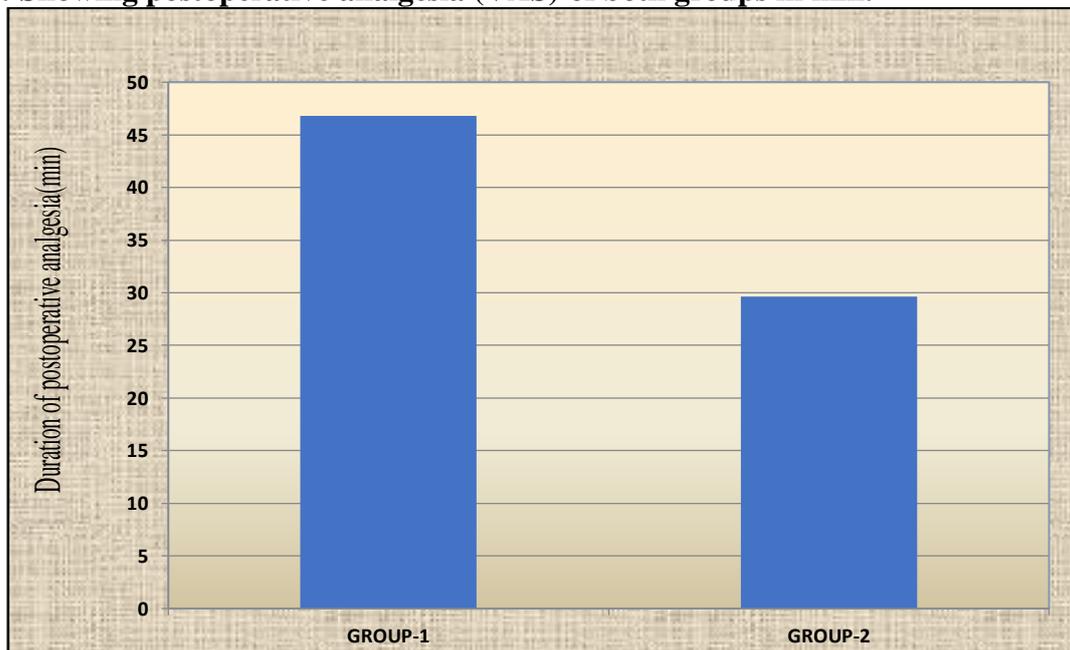
		Group 1	Group 2	P value	Inference
Age(yrs.)	Range	20 - 55	20 - 57	0.8	NS
	Mean	32.23	32.63		
	SD	10.39	11.65		
Weight (kg.)	Range	45 - 65	40 - 65	0.9	NS
	Mean	55.63	55.5		
	SD	5.26	6.61		
ASA grade	I	12	13		
	II	18	17		
Sex	Male	17	12		
	Female	13	18		
Duration of surgery(min.)		75.83±20.51	72.33±20.2	0.5	NS

S= Significant; NS= Not significant

**Table 2: Shows postoperative analgesia (VAS) in both groups in min.**

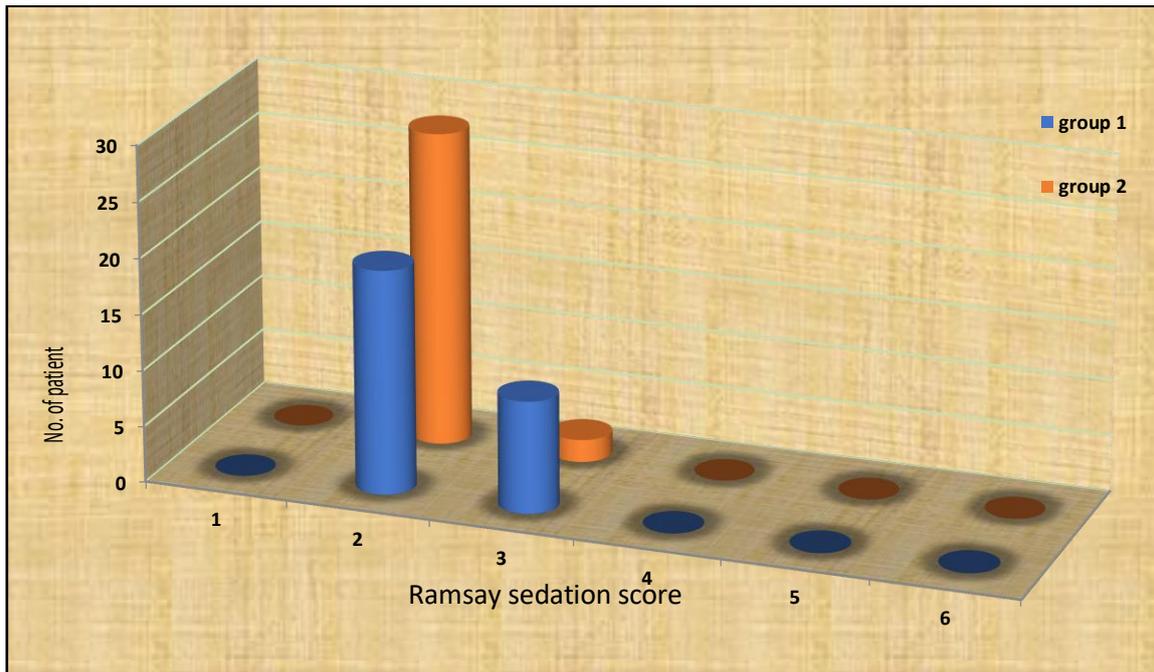
		Group 1	Group 2	P value	Inf.
Postop analgesia(min.)	Range	30 - 60	20 - 50	P < 0.0001	HS
	Mean	46.83	29.66		
	SD	10.04	8.8		

HS= High Significant

**Fig1: Showing postoperative analgesia (VAS) of both groups in min.****Table 3: Shows post-operative Ramsay sedation score at 15 min.**

Ramsay sedation score	1	2	3	4	5	6	Chi.sq.test	Inf.
Group 1	0	20(67%)	10(33%)	0	0	0		
Group 2	0	28(93%)	2(7%)	0	0	0	0.02	S

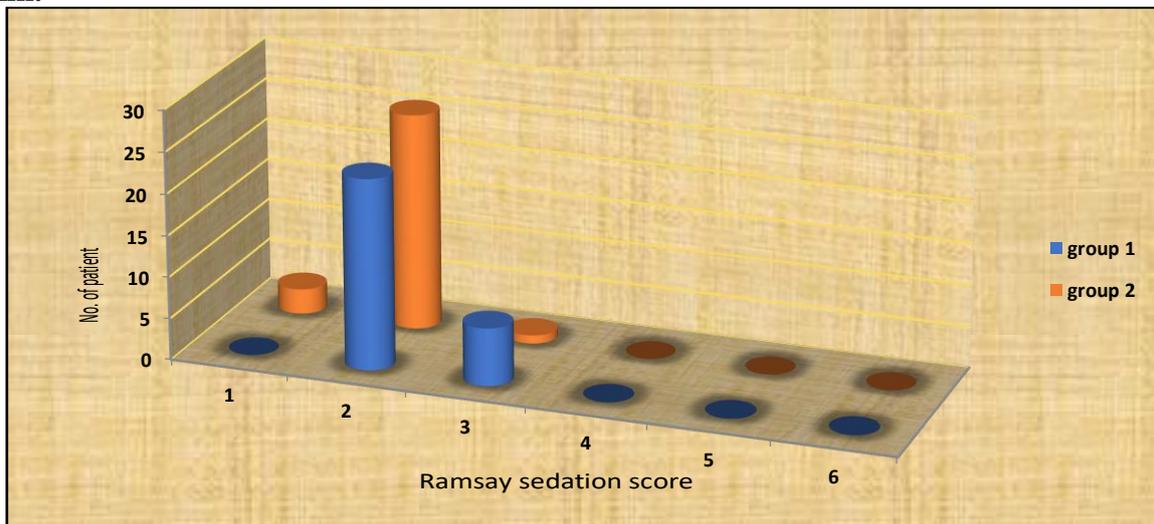
**Fig 2: Showing postoperative sedation (Ramsay sedation score) of both groups at 15 min.**



**Table 4: Show post-operative Ramsay sedation score at 45 min.**

Ramsay sedation score	1	2	3	4	5	6	Chi.sq.test	Inf.
<b>Group 1</b>	0	23(77%)	7(23%)	0	0	0		
<b>Group 2</b>	3(10%)	26(87%)	1(3%)	0	0	0	0.022	S

**Fig 3: Showing postoperative sedation (Ramsay sedation score) of both groups at 45 min.**



**DISCUSSION**

Laparoscopic surgeries are now a days common in practice. These surgeries offers many benefits than conventional surgeries, however, this procedure is not risk free.

Peritoneal insufflation induces alterations of hemodynamics, characterized by decreases of cardiac output, elevations of arterial pressure, and increases of systemic and pulmonary vascular resistances. Hemodynamic changes are accentuated in high-risk cardiac patients.<sup>7</sup>

The  $\alpha$ 2-agonists, including clonidine and dexmedetomidine, decrease central sympathetic outflow and modify intraoperative cardiovascular and endocrine responses favourably to surgical stimuli and laryngoscopy.<sup>8,9</sup> Premedication has been shown to affect both oxygen consumption and metabolic rate.<sup>10</sup> The reduction in tachycardia, hypertension, sympathetic activity and consequently total body oxygen consumption may be of benefit in patients at risk of developing inadequate cardiac output or myocardial ischaemia.<sup>11-13</sup>

In the present study a total of 60 patients were randomly selected undergoing laparoscopic cholecystectomy and appendicectomy. Mean age, weight was comparable in both the groups as shown in table-1. All the patients were from ASA Physical status 1 and 2. Mean duration of surgery in both groups is also comparable as shown in table-1. Regarding postoperative sedation, 10(33%) patients were responding to command in group 1 (in group 1 Inj. Dexmedetomidine 2 mcg /kg IV was administered) while only 2(7%) patients in group 2 (in group 2 Inj. Clonidine 2 mcg /kg IV was administered) at 15 min after completion of surgery ( $p < 0.05$ ). At 45 min 3(10%) patients were anxious and restless in group 2 while none of patients in group 1 ( $p < 0.05$ ), concluding that post op sedation was better quality in group dexmedetomidine when compare group clonidine. Our results are similar to above study regarding hemodynamic stability and sedation, in which dexmedetomidine provide better hemodynamic stability and sedation then clonidine. Postoperative analgesia was longer duration in group 1 ( $46.83 \pm 10.04$ ) min, then in group 2 ( $29.66 \pm 8.8$ ) min that was statistically highly significant difference between two groups ( $P < 0.0001$ ).

Goel S et al<sup>14</sup> conducted a study among 100 patients of ASA grade I and II, and used oral clonidine as a premedicant. Patients were randomly assigned to two groups of 50 patients each. One group received tablet clonidine 100 mg orally one hour prior surgery and the other group received placebo. All the patients underwent major laparoscopic surgery. They observed that the anxiolysis in the clonidine group was better than in the placebo group. The number of analgesics required in the placebo group was also higher than in the clonidine group, 20 of them were given ketorolac 30 mg, 10 were given hyocine 10 mg and midazolam 1 mg and 7 were given both of them, as an additional analgesic and anxiolytic post surgery. In contrast to 5 patients in the clonidine group who received ketorolac 30 mg. They conclude oral clonidine 100mg provide better haemodynamic stability, postoperative analgesia and anxiolysis in laparoscopic surgeries then placebo.

Similar to above study, in our study dexmedetomidine provide longer duration of postoperative analgesia  $46.83 (\pm 10.04)$  min when given as bolus  $2 \mu\text{g}/\text{kg}$  IV before induction. Postoperative analgesia in clonidine group was shorter  $29.66 (\pm 8.8)$  min then dexmedetomidine ( $P < 0.0001$ ). Taittonen MT et al<sup>10</sup> compared the perioperative metabolic and haemodynamic effects of two alpha 2-agonists, clonidine and the more selective dexmedetomidine, in 30 ASA I patients undergoing plastic surgical procedures under general anaesthesia and reported that both clonidine  $4 \text{ micrograms kg}^{-1}$  and dexmedetomidine  $2.5 \text{ micrograms kg}^{-1}$  decreased perioperative oxygen consumption effectively, with a similar haemodynamic profile. We observed, no significant complication in both groups.

## CONCLUSION

After study we conclude that Dexmedetomidine was more potent in case of postoperative analgesia and postoperative sedation at  $2 \mu\text{g}/\text{kg}$  IV in laparoscopic surgery then clonidine  $2 \mu\text{g}/\text{kg}$  IV without any significant complication.

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