Original Research Article

A study of post-operative pain and sedation in response to low dose dexmedetomidine infusion in patients undergone laparoscopic surgery

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Abstract

Background: The laparoscopic surgeries allow significant reduction in post-operative pain, there may be pain resulting from the diaphragmatic irritation. Multimodal analgesia is now recommended to prevent and treat the post-laparoscopic pain. **Aims and Objective:** To study the effect of low dose dexmedetomidine infusion on post-operative pain and sedation in the patients undergone laparoscopic surgery. **Materials and Method:** In the present study we selected total 60 patients aged 20-60 years of either sex admitted for laparoscopic surgery under general anesthesia with ASA physical grade I or II. All the selected patients were randomly allocated in three groups containing 20 patients each. Control group in which patients received normal saline 0.9% infusion during the procedure. In Group A the patients received dexmeditomidine infusion 0.2 mcg/kg/hr and in Group B the patients received dexmeditomidine infusion 0.4 mcg/kg/hr. The base line parameters of the patients including heart rate (HR), pulse oximetry (SPO2), Noninvasive Systolic blood pressure (SBP), Diastolic Blood pressure (DBP), Mean Arterial pressure (MAP) and End tidal Co2 (Etco2) were measured intra operatively and post operatively also. Post operative pain score was calculated by using visual analog scale. It was calculated 2, 4, 8, 16 and 24 hrs post operatively. The post operative sedation was calculated by using Ramsay sedation score. The mean duration of surgery was 92.71 ± 14.19 in control group while in group A and group B was 88.72 ± 17.82 and 88.34 ± 16.65min respectively. The difference observed between mean duration of surgery and man duration of infusion between control group with group A and B was statistically insignificant. **Results:** The pain score was 7.07±1.51 in control group and 7.07±1.51 and 7.07±1.51 in group A and B. The pain score was decreasing with time more in group A and B as compared to control group. The difference observed in pain score in control group with group A and B was statistically significant. It was observed that the sedation score immediately after surgery were statistically significant in group A and B as compared to control group. After 24 hours the sedation score was nearly same all the three groups and the difference was not statistically significant. **Conclusion:** Dexmedetomidine decreased the post-operative pain level and has produced better sedation scores as compared with control group.

Key Words: Dexmedetomidine, pain score, sedation score, laparoscopic surgery.

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Received Date: 18/03/2017 Revised Date: 10/04/2017 Accepted Date: 08/05/2017
DOI: https://doi.org/10.26611/1015225

Access this article online	
Quick Response Code:	Website: www.medpulse.in
	Accessed Date: 18 May 2017

INTRODUCTION

The laparoscopic surgeries allows significant reduction in post-operative pain, there may be pain resulting from the diaphragmatic irritation. Multimodal analgesia[1] is now recommended to prevent and treat the post-laparoscopic pain.[2] Dexmedetomidine is a potent, highly selective α-2 adrenoceptor agonist, with sedative, analgesic, anxiolytic, sympatholytic, and opioid-sparing properties. It provides a unique type of sedation, "conscious sedation", in which patients appear to be sleepy but are easily aroused, cooperative and communicative when stimulated.[3] Jung *et al in* their comparative study showed significant

How to cite this article: Abhinay Ramchandra Harankhedkar, Prakash Kisanrao Surwade. A study of post-operative pain and sedation in response to low dose dexmedetomidine infusion in patients undergone laparoscopic surgery. *MedPulse International Journal of Anesthesiology*. May 2017; 2(2): 34-38. http://medpulse.in/Anesthsiology/index.php

advantage of Dexmedetomidine at dose of 1 µg/kg bolus followed by 0.2-0.7 µg/kg/h infusion for 24 hr.[4] It is a safe sedative alternative to benzodiazepine/opioid combination in patients undergoing monitored anesthesia care for a multitude of procedures because of its analgesic, "co-operative sedation" and lack of respiratory depression properties.[5]

MATERIALS AND METHOD

The present study was conducted in the department of anesthesia in the Dr Ulhas Patil Medical College, Jalgaon for the purpose of study we selected total 60 cases with following inclusion and exclusion criteria.

Inclusion Criteria

- Patients aged 20-60 years of either sex admitted for laparoscopic surgery under general anaesthesia
- ASA physical grade I or II.

Exclusion Criteria

- Patients less than 20 years and more than 60 years of age.
- Patients with diabetes, chronic hypertension or severe cardiac disease,
- Patients not willing for informed consent.

All the selected patients were randomly allocated in three groups containing 20 patients each.

- Control group: patients received normal saline 0.9% infusion during the procedure.
- Group A: patients received dexmeditomidine infusion 0.2 mcg/kg/hr.
- Group B: patients received dexmeditomidine infusion 0.4 mcg/kg/hr.

The base line parameters of the patients including heart rate (HR), pulse oximetry (SPO2), Noninvasive Systolic blood pressure (SBP), Diastolic Blood pressure (DBP), Mean Arterial pressure (MAP) and End tidal Co2 (Etco2) were measured intra operatively and post operatively also. Post operative pain score was calculated by using visual analog scale. It was calculated 2, 4, 8, 16 and 24 hrs post operatively. The post operative sedation was calculated by using Ramsay sedation score.

Ramsay sedation score

Score	Response
1	Anxious and agitated or restless or both
2	Co-operative, oriented, tranquil
3	Responsive to verbal commands, drowsy
4	Asleep, brisk response to light, glabellar tap or auditory stimulus
5	Asleep, slow response to light glabellar tap or auditory stimulus
6	No response to stimulation

RESULTS

Table 1: Demographic featurs of study patients

	Control (n=20)	Group A (n=20)	Group B (n=20)
Sex (male/female)	5/15	7/13	6/14
Age (yrs)	35.55 ± 6.64	33.62 ± 7.78	37.23 ± 8.53
Weight (kg)	62.27 ± 9.34	63.07 ± 10.65	66.54 ± 9.81
ASA Grade (I/II)	12/8	11/9	13/7

It was observed that mean age of patients in control group was 35.55 ± 6.64years, in group A was 33.62 ± 7.78years and in group B was 37.23 ± 8.53 years. Majority of the patients in all the three groups were female and were of ASA grade I. The mean weight of patients in control group was 62.27 ± 9.34kg, in group A was 63.07 ± 10.65kg and in group B was 71.64 ± 9.81. The difference in group A, B and control group was statistically non significant.

Table 2: Mean duration of surgery and infusion.

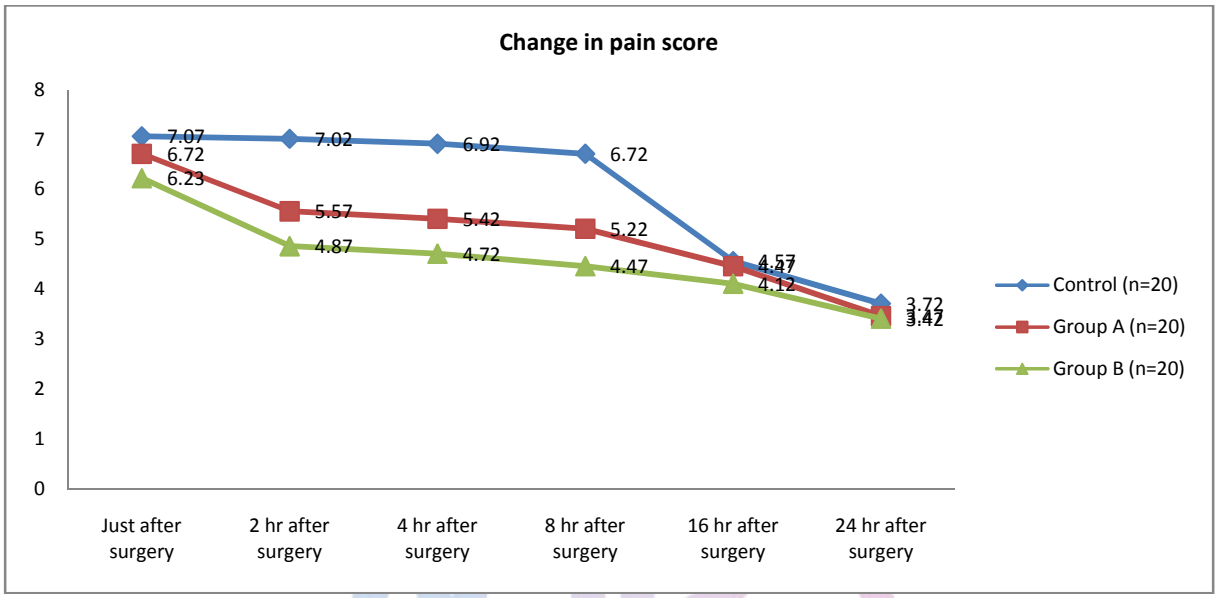
	Control (n=20)	Group A (n=20)	Group B (n=20)
Duration of surgery (min)	92.71 ± 14.19	88.72 ± 17.82	88.34 ± 16.65
Duration of infusion (min)	99.75 ± 16.76	102.75 ± 18.01	102.12 ± 15.15

The mean duration of surgery was 92.71 ± 14.19 in control group while in group A and group B was 88.72 ± 17.82 and 88.34 ± 16.65min respectively. The difference observed between mean duration of surgery and man duration of infusion between control group with group A and B was statistically insignificant.

Table 3: Distribution according to change in pain score

Periods	Control (n=20)	Group A (n=20)	Group B (n=20)
Just after surgery	7.07 ±1.51	6.72 ±1.48	6.23 ±1.78
2 hr after surgery	7.02 ±1.42	5.57 ±1.88*	4.87 ±1.43*
4 hr after surgery	6.92 ±1.41	5.42 ±1.9*	4.72 ±1.23*
8 hr after surgery	6.72 ±1.39	5.22 ±1.66	4.47 ±1.79*
16 hr after surgery	4.57 ±1.24	4.47 ±1.87	4.12 ±1.8
24 hr after surgery	3.72 ±1.36	3.47 ±1.3	3.42 ±1.15

*Statistically significant



It was observed that the pain score was 7.07±1.51 in control group and 7.07±1.51 and 7.07±1.51 in group A and B. It was observed that the pain score was decreasing with time more in group A and B as compared to control group. The difference observed in pain score in control group with group A and B was statistically significant.

Table 4: Distribution according to change in sedation score

Periods	Control (n=20)	Group A (n=20)	Group B (n=20)
Just after surgery	1.65 ±0.68	3.75 ±0.94*	4.6 ±0.93*
2 hr after surgery	1.7 ±0.69	3.6 ±0.93*	4.25 ±1.04*
4 hr after surgery	1.75 ±0.69	3.35 ±0.9*	3.75 ±1.01*
8 hr after surgery	1.85 ±0.68	3.1 ±0.55*	3.2 ±0.87*
16 hr after surgery	2.05 ±0.59	2.55 ±0.75*	2.72 ±0.59*
24 hr after surgery	2.0 ±0.62	2.3 ±0.4	2.35 ±0.49

* Statistically significant

It was observed that the sedation score immediately after surgery were statistically significant in group A and B as compared to control group. After 24 hours the sedation score was nearly same all the three groups and the difference was not statistically significant.

DISCUSSION

The present study was conducted in the department of anesthesiology of Dr Ulhas Patil Medical College, Jalgaon with the objective to study the to study the effect of low dose dexmedetomidine infusion on post-operative pain and sedation in the patients undergone laparoscopic surgery. It was observed that mean age of patients in control group was 35.55 ± 6.64years, in group A was 33.62 ± 7.78years and in group B was 37.23 ± 8.53 years. Majority of the patients in all the three groups were female and were of ASA grade I. The mean weight of patients in control group was 62.27 ± 9.34kg, in group A was 63.07 ± 10.65kg and in group B was 71.64 ± 9.81. The difference in group A, B and control group was statistically non significant thus all the three groups were comparable with each other. In the study conducted by Gourishankar Reddy Manne et al[6] also all the three groups under study were comparable to each other with

respect to age, sex, weight, ASA grading. Neha Garg et al[7] and Sarbari Swaika et al[8] also observed similar findings. Alpha 2 agonists have been recognised as having significant analgesic effects. The analgesic potential of alpha 2 agonists however does not approximate the potency of opioids.[9] Nevertheless alpha 2 agonists offer specific advantages in certain types of pain in which opioid relief is suboptimal such as in neuropathic pain[10]. It was observed that the pain score was 7.07±1.51 in control group and 7.07±1.51 and 7.07±1.51 in group A and B. It was observed that the pain score was decreasing with time more in group A and B as compared to control group. The difference observed in pain score in control group with group A and B was statistically significant. Hall et al[11] also observed that 20-30% reduction in pain VAS scores among subjects who received small dose dexmedetomidine infusions in comparison to control. It was observed that the sedation score immediately after surgery were statistically significant in group A and B as compared to control group. After 24 hours the sedation score was nearly same all the three groups and the difference was not statistically significant. Aho and Erkola[12] in their study have studied the effects of 0.2 µg/kg/ hr dexmedetomidine infusion and reported that good sedation levels were achieved with dexmedetomidine. Parikh et al[13] in their study compared the sedative properties of dexmedetomidine and midazolam – fentanyl in patients undergoing tympanoplasty and reported that Dexmedetomidine in doses of 0.2 µg/kg/ hr gave higher satisfactory scores. Dexmedetomidine is chemically related to clonidine, but is approximately eight times more specific for α-2 adrenoceptors with α-2: α-1 selectivity ratio of 1620:1, compared with 200:1 for clonidine, especially for the 2a subtype, which makes dexmedetomidine more effective than clonidine for sedation and analgesia[14]. Gourishankar Reddy Manne et al[6] in their study observed the mean sedation scores more in dexmedetomidine groups compared to normal saline group patients. Dex 0.4 group patients had better sedation than Dex 0.2 group patients. None of the patients in dexmedetomidine groups developed siginificant sedation levels and the patients were cooperative, oriented and tranquil all the time. In group NS sedation score, which was less initially, improved subsequently due to early requirement of analgesia in this group. Tanmay Tiwari[15] also studied the effect of dexmedetomidine infusion at two different doses on sedation and post-operative pain. The author observed that the mean pain in subjects of both Dex 0.3 and Dex 0.6 just after surgery till 6 hrs post-surgery was significanmtly lower as compared to control. The mean Sedation in subjects of Dex 0.3 and Dex 0.6 just after surgery till 12 hrs post-surgery were found to be significantly ($p<0.05$ or $p<0.01$) higher when compared to Control. Further, the mean Sedation in subjects of Dex 0.6 just after surgery and 2 hrs after surgery were also found to be significantly ($p<0.01$) higher than that of Dex 0.3. However, the mean sedation in all three groups at 18 hrs after surgery and 24 hrs after surgery remains the same i.e., did not differed significantly ($p>0.05$). thus the findings were comparable with the present study.

CONCLUSION

Thus from the above results and discussion we conclude that dexmedetomidine decreased the post-operative pain level and has produced better sedation scores as compared with control group.

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Source of Support: None Declared
Conflict of Interest: None Declared