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Original Research Article

To Comparative Dexmedetomidine And Clonidne On Perioperative Hemodynamic Stability In Upper Abdominal Surgeries

Dr. Hemlata Patel[1] (Senior Resident), Dr. Meenal Sharma[2] (Senior Resident) & Dr. Shikha Jain[3] (Senior Resident)

Dept. of Anaesthesiology, MGM Medical College & MY Hospital, Indore, M.P.[1&2]
Dept. of SETM, NSCB, Jabalpur, M.P.[3]

Corresponding Author: Dr. Shikha Jain

Abstract

Background & Methods: the aim of the study is to compare dexmedetomidine and clonidne on perioperative hemodynamic stability in upper abdominal surgeries. After approval written informed consent was taken from patients for participation in study. 150 Patients of both sexes aged 18 - 60 years ASA Grade I and II scheduled for elective upper abdominal surgeries under general anaesthesia were randomly divided into two groups of 75 each (n=75).

Results: The mean trend of DBP in both groups was similar over the periods with slightly being higher in Group 1 especially after 75 min to till end (Extubation) as compared to Group 2. DBP between the two groups at all periods was not different statistically. ($p>0.05$). The mean trend of SBP in both groups was similar over the periods with slightly being higher in Group 1 at all periods as compared to Group 2. SBP between the two groups at all periods was not significantly different. ($p>0.05$)

Conclusion: Both were found to be effective in attenuating the hemodynamic response to pneumoperitoneum during upper abdominal surgeries and also provides reliable postoperative analgesia and sedation when used as a premedication agent.

Keywords: dexmedetomidine, clonidine, hemodynamic & surgeries.
Study Design: Comparative Study.

1. Introduction

The anaesthesiologist's traditional approach to anesthesia for laparoscopic cholecystectomy has been the emphasis on maintaining hemodynamic stability by avoiding hypertension, hypotension or tachycardia[1]. The problem has been more complex than that has been originally thought and most of the hemodynamic instability is persistent during the duration of pneumoperitoneum operation. Previous studies reported that intravenous use has a definitive role in postoperative analgesia through the reduction of opioid consumption[2].

Dexmedetomidine with an elimination half-life of two to three hours is a highly selective and potent and specific alpha 2 agonist (1620:1 alpha 2 to alpha 1) and is seven to ten times more selective for alpha 2 receptors compared to clonidine and has a shorter duration of action[3]. Dexmedetomidine is considered full agonist at alpha 2 receptors as compared to clonidine dexmedetomidine also attenuates the hemodynamic response to tracheal intubation decreases plasma catecholamine concentration during anesthesia and decreases perioperative

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requirements of inhaled anesthetics[4]. These characteristics make dexmedetomidine useful anesthetic adjunct during volume. Increasing the success of laparoscopic surgery can be attributed to the fact that it results in multiple benefits compared with open procedures such as reduced trauma to the patient disturbance of homeostasis, morbidity, mortality, recovery time and hospital stay with consequent reduction in healthcare cost[5].
A newer highly selective alpha-2 adrenergic agonist Dexmedetomidine is under study as an intrathecal and epidural adjuvant as it provides stable haemodynamic condition, better quality of intra-operative and prolonged duration of post-operative analgesia with fewer side effects. Other uses like pre-medicant and as an adjunct to general anaesthesia as well as sedative agent in the intensive care unit have made it wonder drugs in anaesthesia. It has eight times higher alpha-2/alpha-1 selectivity ratio than that of clonidine[6]. Therefore, the aim of the present study was to compare the effectiveness of intravenously administered clonidine versus dexmedetomidine for hemodynamic stability and postoperative analgesia during upper abdominal surgeries.

2. Material and Methods

This prospective comparative study was conducted at MGM Medical College, Indore. After approval written informed consent was taken from patients for participation in study. 150 Patients of both sexes aged 18 - 60 years ASA Grade I and II scheduled for elective upper abdominal surgeries under general anaesthesia were randomly divided into two groups of 75 each (n=75). Group I patients were given 2ug/kg of clonidine diluted in 20 ml with normal saline over 10 min intravenously before induction of anaesthesia. Group II patients were given 1ug/kg of Dexmedetomidine diluted in 20 ml with normal saline over 10 min intravenously before induction of anaesthesia.
Group I patients were given 2ug/kg of clonidine diluted in 20 ml with normal saline over 10 min intravenously before induction of anaesthesia.
Group II patients were given 1ug/kg of Dexmedetomidine diluted in 20 ml with normal saline over 10 min intravenously before induction of anaesthesia.
EXCLUSION CRITERIA: I) Patients with H/O Hypertension, Ischemic Heart Disease, Aortic Stenosis, Left Ventricular Failure, asthma, Chronic Obstructive Pulmonary Disease (COPD), any liver or renal disease.

3. Result

Table No. 1: Age Distribution

S. No.	Age	No.	Percentage	P value
1	18-30	09	10.6	.038949
2	31-40	17	22.6	
3	41-50	22	29.3	
4	51-60	27	36	

The chi-square statistic is 0.7407. The *p*-value is .038949. The result is significant at $p < .05$.

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Table No. 2: Diastolic Blood Pressure (DBP) in mmHg

DBP	Clonidine		Dexmedetomidine		
	Mean	± SD	Mean	± SD	p value
Pre	76.10	4.958	76.96	5.451	0.311
1 Min	81.90	4.087	81.54	5.257	0.603
5 min	79.08	4.125	73.84	5.793	0.003
15 min	74.24	5.309	70.82	5.743	0.004
30 min	72.32	5.709	70.92	5.465	0.315
45 min	73.60	7.166	70.33	5.610	0.023
60 min	74.42	6.399	71.23	5.201	0.008
75 min	74.69	6.688	71.20	5.488	0.020
90 min	86.44	3.856	73.59	4.524	<0.001
105min	78.45	6.083	71.71	6.462	0.048
120 min	81.00	5.692	71.75	4.349	0.037

The mean trend of DBP in both groups was similar over the periods with slightly being highe r in Group 1 especially after 75 min to till end (Extubation) as compared to Group 2. DBP bet ween the two groups at all periods was not different statistically. (p>0.05)

Table No. 3: Systolic Blood Pressures (SBP) in mmHg

SBP	Clonidine		Dexmedetomidine		
	Mean	± SD	Mean	± SD	p value
Pre	118.20	8.776	120.62	7.767	0.47
1 Min	126.88	5.663	126.68	6.858	0.514
5 min	120.86	5.827	116.51	7.095	0.002

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15 min	116.86	6.071	111.59	6.764	<0.001
30 min	113.25	9.333	112.55	8.279	0.651
45 min	117.32	7.898	112.18	8.981	<0.001
60 min	117.08	9.918	114.15	7.472	0.207
75 min	118.88	9.160	113.88	8.768	0.011
90 min	127.19	2.788	114.38	7.867	<0.001
105min	123.90	7.615	114.21	10.850	0.003
120 min	122.83	6.242	117.7	5.315	0.023

The mean trend of SBP in both groups was similar over the periods with slightly being higher in Group 1 at all periods as compared to Group 2. SBP between the two groups at all periods was not significantly different. ($p>0.05$)

4. Discussion

During premedication and induction, to reduce these hemodynamic responses during laparoscopic surgeries, a wide variety of agents are being used. Various authors have conducted studies using beta blockers, magnesium sulphate, opioid, vasodilators, and gasless approach to negate the hemodynamic variations. In the current study, the two most commonly used in the anaesthetic practice were taken into consideration and comparison was done regarding their efficacy in reducing stress response and hemodynamic changes associated with laparoscopy and in postoperative pain relief[7].

In our study, both the groups showed significant reduction in SBP as compared to baseline. It was also observed that the SBP was lower with dexmedetomidine at intubation, during pneumoperitoneum, at extubation and during postoperative period than clonidine, and this difference was found to be statistically significant. The fluctuations in SBP were also recorded in both the groups, which suggested that dexmedetomidine and clonidine stabilize the SBP and minimize the increase in SBP during various phases of anaesthesia and laparoscopy. These results are in concordance with the studies done by Kalra et al[8].

In this study, there was increment in SBP at the time of extubation in clonidine which was not seen with dexmedetomidine. Thus, it was revealed that SBP

stabilizing effect of dexmedetomidine lasted till extubation while clonidine was less effective in preventing the hemodynamic response to extubation. Similarly, clonidine and dexmedetomidine reduces the DBP and prevents its rise during early periods of procedure but does not suppress increase of DBP during extubation completely[9].

During the first phase of the procedure, regarding MAP, it was found that there was no significant difference in the two groups. At the end of procedure, both the drugs were equally

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effective in preventing the increase in MAP. The efficacy of clonidine was reduced as it was unable to suppress the increase in MAP in response to surgical stress completely.
The mean heart rate throughout the procedure was lower in clonidine as compared to dexmedetomidine and was found to be statistically significant. However, the heart rate was lower in both the groups as compared to baseline and was statistically significant. Instead of the more noticeable effect on heart rate, few of the patients suffered from significant bradycardia that received clonidine and also required treatment or dose reduction for bradycardia.
Dexmedetomidine as a preanaesthetic medication and intraoperative infusion significantly attenuates sympathoadrenal response to tracheal intubation compared to clonidine and it was also seen in previous study. Previous study using clonidine 1 μg/kg intravenous showed attenuated hemodynamic stress response to pneumoperitoneum but not due to intubation and extubation[10].
To prevent the hemodynamic stress response to pneumoperitoneum, clonidine 2 μg/kg was given along with intubation and extubation. In this study, 2 μg/kg of clonidine and the response to laryngoscopy and intubation were prevented but the response to extubation was not suppressed completely although this difference was not statistically significant as compared to 1μg/kg dose of dexmedetomidine. So, 1μg/kg dose of dexmedetomidine was more effective than 1μg/kg of clonidine and its effect was comparable to 2 μg/kg of clonidine.

5. Conclusion

Both were found to be effective in attenuating the hemodynamic response to pneumoperitoneum during upper abdominal surgeries and also provides reliable postoperative analgesia and sedation when used as a premedication agent.

6. References

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