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"Effects Of Intravenous Administration Of Dexmedetomidine On Hemodynamics, Pain And Post Operative Nausea Vomiting After General Anaesthesia In Adults"

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I. INTRODUCTION

Emergence from general anaesthesia is the final stage of anaesthesia featuring the transition from unconsciousness to complete wakefulness and recovery of consciousness and complete wakefulness.[1] Emergence from General Anaesthesia can be an extremely challenging event.

It involves cessation of drug administration, reversal of paralysis, extubation and sometimes occurrence of emergence phenomenon. Emergence phenomena may be accompanied by cough, agitation, hypertension, tachycardia and shivering. During this phase, patients may also demonstrate hemodynamic instability, retching, vomiting, respiratory compromise and occasionally, uncooperative or frankly

aggressive behaviour.[2]These changes may be detrimental to patients, in particular those with impaired cardiac and pulmonary reserves. Also, they may prolong post anaesthesia care unit (PACU) stay.[3]Rapid recovery from anaesthesia has been associated with development of Emergence agitation.

Emergence agitation (EA) also referred as emergence delirium or emergence

excitement has been defined "as a state of non-purposeful restlessness, non-cooperation and inconsolability which is often accompanied by crying, screaming, incoherence thrashing and disorientation during early recovery from general anaesthesia".[4]Though agitation is observed more frequently in paediatric patients, the incidence in adults has been reported between 4.7% - 21.3% [5,6]

The clinical consequences of Emergence agitation are similarly varied. It is

typically short lived and resolves spontaneously, and its clinical consequences are often considered minimal.[7,8]However, it may have certain clinically significant consequences, such as injury to the affected patient or their medical staff, falling out of bed, bleeding at the surgical site, accidental removal of drains or intravenous catheters, unintended extubation, respiratory depression, and increasing medical care costs.[9-11]

II. AIMS AND OBJECTIVES:

 To assess the effect of dexmedetomidine on recovery profile of patientsemerging from generalanaesthesia by comparing post-operative nausea vomiting and pain scores.

 To assess the effect of dexmedetomidine on intra and post-operativehemodynamic parameters in patients undergoing general anaesthesia.

III. MATERIAL AND METHODS:

This prospective observational study was conducted in the Department of Anaesthesiology at Government College Baramulla from August 2021- August 2022.

After Institutional Ethical Committee approval, a written informed consentwas taken from the patients for participation in this study. Patients undergoingelective surgeries (abdominal, urological, Thyroidectomy) of either sex betweenage group 18-65 years with ASA I and II under general anaesthesia with expectedduration of surgery upto3 hours were included in this study.

EXCLUSION CRITERIA

Following patients were excluded from the study

- Patients allergic to dexmedetomidine.
- Obese (body mass index >35 kg/m2)
- Heart block, liver diseases
- Patients on antidepressants, or
- Patients with chronic pain using opioid or nonopioid analgesics.

During the preoperative visit, all patients were clinically evaluated, assessed andinvestigated. All the required demographic details were noted.

ANESTHESIA TECHNIQUE

After shifting the patient to the operating room, baseline standard monitors likeECG, NIBP, and SPO2 were connected to the patient. Preoperative baselinesystolic and diastolic BP, HR, SpO2 were recorded. Intravenous line wasestablished. Patients were randomly allocated into two groups of 40 each.

Patientswho received adjuvant drug as dexmedetomidine were labelled as subjects ofgroup D (**n=40**). Those who were not given dexmedetomidine were labelled assubjects of group C (**n=40**).The anesthesia technique was uniform for all patients.

Patient was induced with IV lidocaine 1mg/kg, propofol 1.5-2mg/kg, fentanyl 1-2µg/kg and atracurium 0.5mg/kg. After orotracheal intubation anesthesia wasmaintained using nitrous oxide in oxygen in a ratio of 60:40, isoflurane 1% and0.1mg/kg of atracurium after every 20 min. After anesthesia induction the adjuvantdrug, dexmedetomidine was started as per the discretion of the inchargeanesthetist. Whether the patient will receive dexmedetomidine or not was decidedby the incharge anesthetist according to his/her routine.

Dexmedetomidine ampoule with concentration of 200µg/2ml was dilutedwith normal saline to a 50ml volume, with the concentration of 4µg/ml. Theclinician incharge started the adjuvant drug 1µg/kg via infusion pump over aperiod of 15mins, then maintained infusion at the rate of 0.4µg/kg/hr till the end ofthe surgery for group D. At the end of the surgery nitrous oxide, isoflurane and theadjuvant drug (in group D) were discontinued, defined as T0 or "baseline ofemergence process". 100% oxygen was given at 6ltrs/min. Inj ondensteron0.1mg/kg was given. The patients were reversed using neostigmine 60µg/kg andglycopyrolate 10µg/kg. When the patients could breathe spontaneously andfollowed the command to "open their eyes", they were extubated and observed for10 min after extubation and then transferred to the recovery room.

The hemodynamic study parameters HR (beats/min), SBP, DBP, MAP(mmHg) and SPO2 were measured before induction, at induction, at every 15minsafter induction, till the end of surgery. These hemodynamic parameter were againrecorded on arrival in the recovery room and at every 5mins till patient wasdischarged from PACU in both the groups.

In both the groups PONV and pain were recorded at T0, at extubation, 2mins, 5mins and 10mins post extubation. Patients were shifted to PACU, and above mentioned study parameters were recorded at arrival, after every 5mins till patient was discharged from PACU.

Level of pain was measured with the help of 11-point numeric rating scale (NRS)PONV score was assessed using a 4-point scale (1 = absent; 2 = mild nausea; 3 =severe nausea; and 4 = vomiting).

Statistical Analysis

The recorded data was compiled and entered in a spreadsheet (MicrosoftExcel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc.,Chicago, Illinois, USA). Continuous variables were expressed as Mean ± SDand categorical variables were summarized as frequencies and percentages.

Graphically the data was presented by bar and line diagrams. Student'sindependent t-test or Mann-Whitney U-test, whichever feasible, wasemployed for comparing continuous variables.

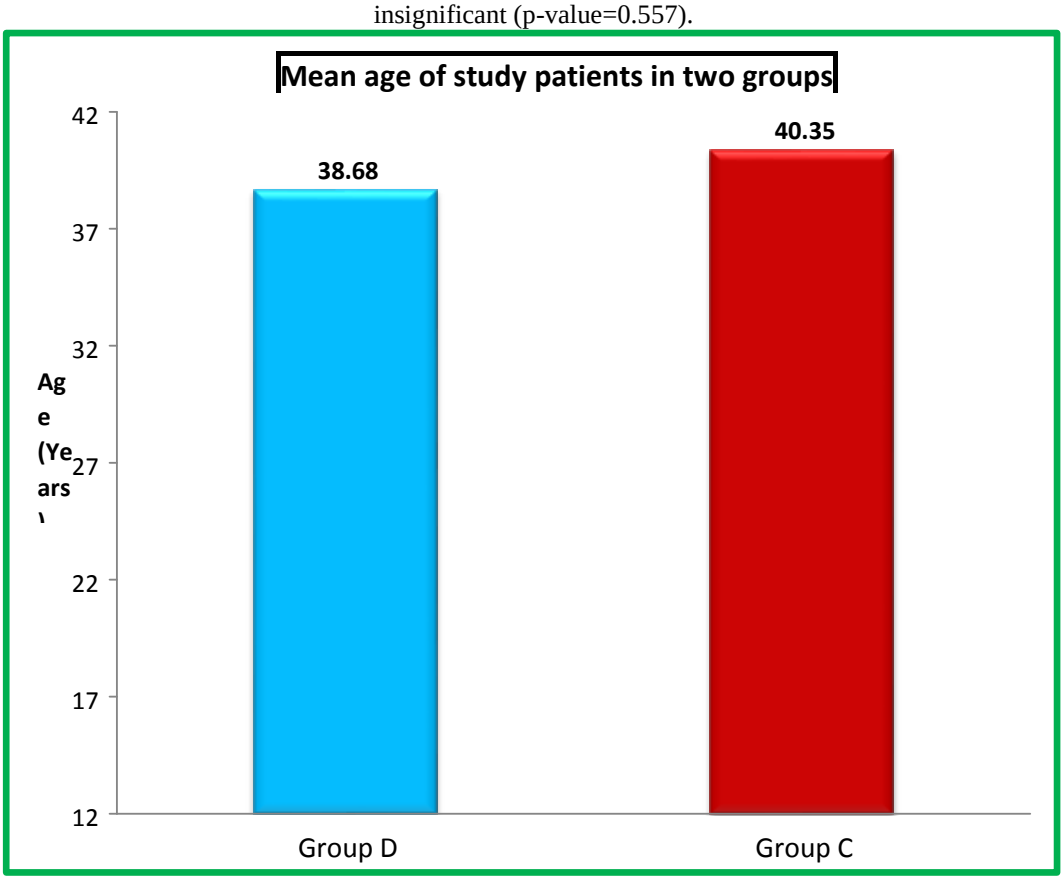
Chi-square test or Fisher's exact test, whichever appropriate, was appliedfor comparing categorical variables. A P-value of less than 0.05 wasconsidered statistically significant. All P-values were two tailed

OBSERVATIONS:

Table 1: Age distribution of study patients in two groups

Age (Years)	N	Mean	SD	Range	P-value
Group D	40	38.68	13.123	18-63	0.557
Group C	40	40.35	12.261	19-65	

The mean age of the patients in our study in group D was 38.68 yrs ± 13.12 yrs, whereas mean age in group C was 40.35± 12.26 yrs. The two groups were comparable in terms of age and the difference was statistically insignificant (p-value=0.557).

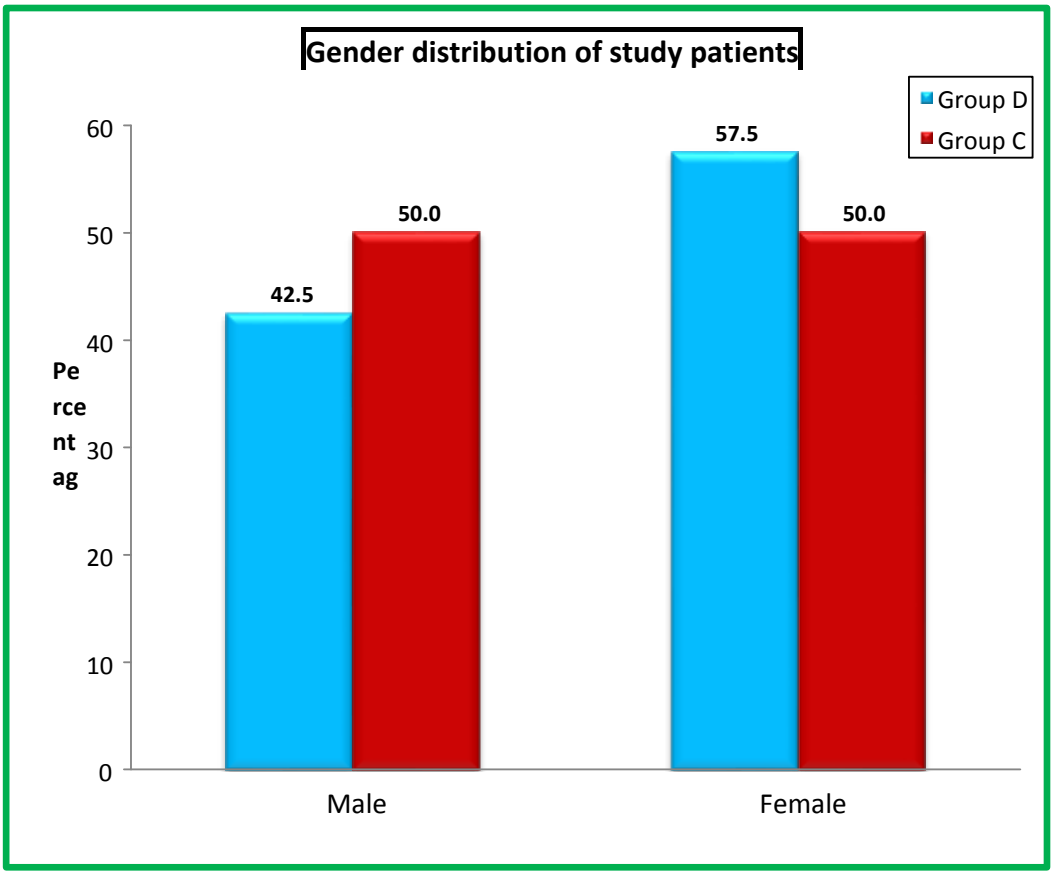


Bar chart representing mean age of patients in two groups

Table 2: Gender distribution of study patients in two groups

Gender	Group D				P-value
	No.	%age	No.	%age	
Male	17	42.5	20	50.0	0.501
Female	23	57.5	20	50.0	
Total	40	100	40	100	

The gender distribution was comparable in the two groups with p-value of 0.501, [Table 2] Hence no significant demographic differences were observed between two groups in our study



Graphical representation of gender distribution in two groups

Table 3: Physical status of study patients in two groups

Gender	Group D		Group C		P-value
	No.	%age	No.	%age	
ASA I	30	75.0	33	82.5	0.412
ASA II	10	25.0	7	17.5	
Total	40	100	40	100	

(Legend: ASA –American Society of Anesthesiologist)

Table 3, shows 30 patients had an ASA I grade, while 10 patients had an ASA II grade in Group D, while 33 patients had an ASA I grade and 7 patients had an ASA II grading, with p value 0.412.

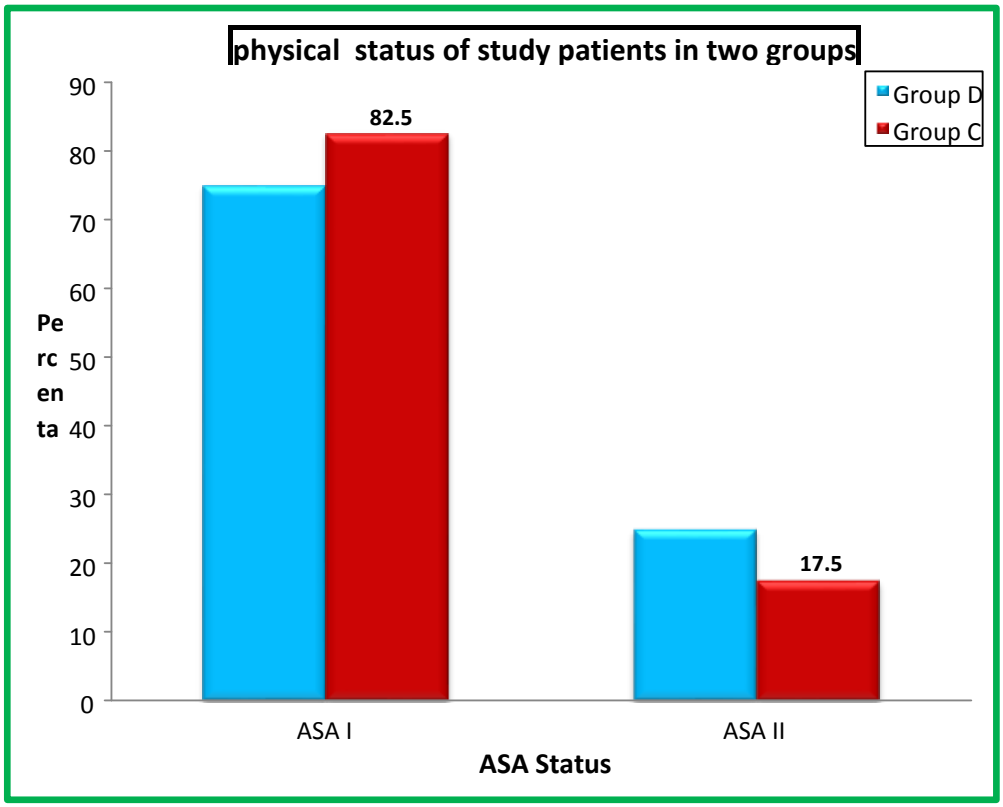
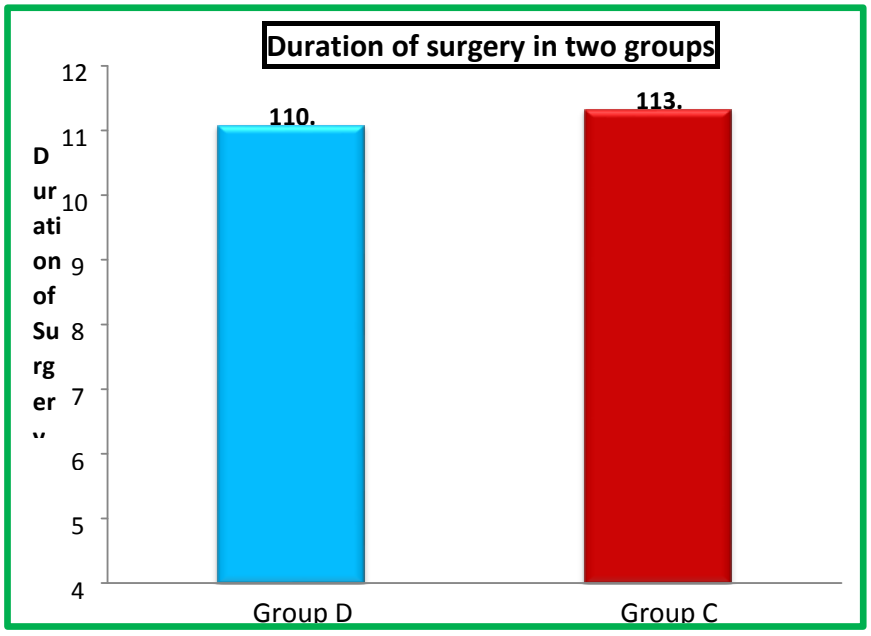


Figure 3: Graph depicting physical status of patients in two groups

Table 4: Comparison based on duration of surgery in two groups

Duration of surgery (Minutes)	N	Mean	SD	Range	P-value
Group D	40	110.7	13.929	78-130	0.883
Group C	40	113.2	14.855	82-130	

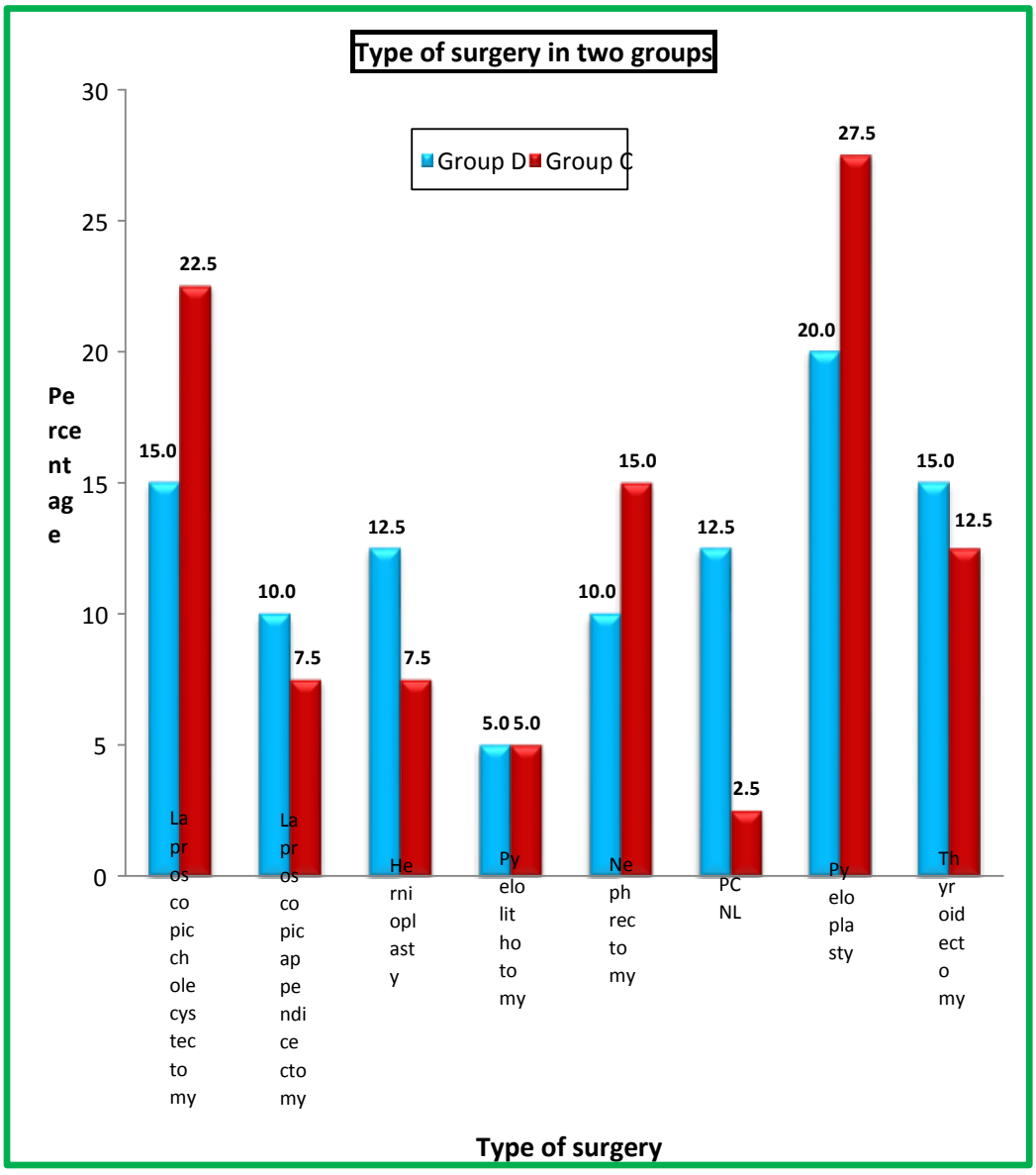
The mean duration of surgery of group D was 110.7 ± 13.92 min, whereas in group C duration was 113.2 ±14.85min.The two groups were comparable in terms of duration of surgery and the difference was statistically insignificant (p value 0.883).



Bar diagram showing the duration of surgery in two groups

Table 5: Type of surgery in two groups			
S.No	**Type of Surgery**	**Group D**	**Group C**
1.	**Abdominal Surgery**		
a)	**Laproscopic cholecystectomy**	6	9
b)	**Laproscopic appendicectomy**	4	3
C)	**Hernioplasty**	5	3
2.	**Urological Surgery**		
a)	**Pyelolithotomy**	2	2
b)	**Nephrectomy**	4	6
c)	**PCNL**	5	1
d)	**Pyeloplasty**	8	11
3.	**Thyroidectomy**		
A)		6	5

Table 5 shows type of surgeries in both groups. In group D 15 Patients underwent abdominal surgeries and 19 patients underwent urological studies. 6patients had Thyroidectomy. In group C 15 Patients underwent abdominal surgeries and 20 patients underwent urological studies. 5 patients had Thyroidectomy.



Graph showing the type of surgery in two groups.

Table 6: Comparison based on intra-operative heart rate (beats/min) between two groups					
Time interval	**Group D**		**Group C**		**P-value**
	Mean	**SD**	**Mean**	**SD**	
Before Induction	82.98	10.91	81.48	8.20	0.489
At Induction	87.33	12.60	87.55	10.86	0.932
15 Min after Induction	73.20	8.98	79.15	12.51	0.017*
30 Min	70.98	10.09	78.23	12.12	0.005*
45 Min	74.85	12.37	80.75	11.17	0.028*
60 Min	72.40	8.68	79.53	12.91	0.005*
75 Min	73.88	7.65	81.65	12.30	0.001*
90 Min	74.71	7.36	82.97	8.47	<0.001*
105 Min	76.18	6.44	83.85	6.67	<0.001*
120 Min	81.64	5.64	88.40	7.13	0.009*

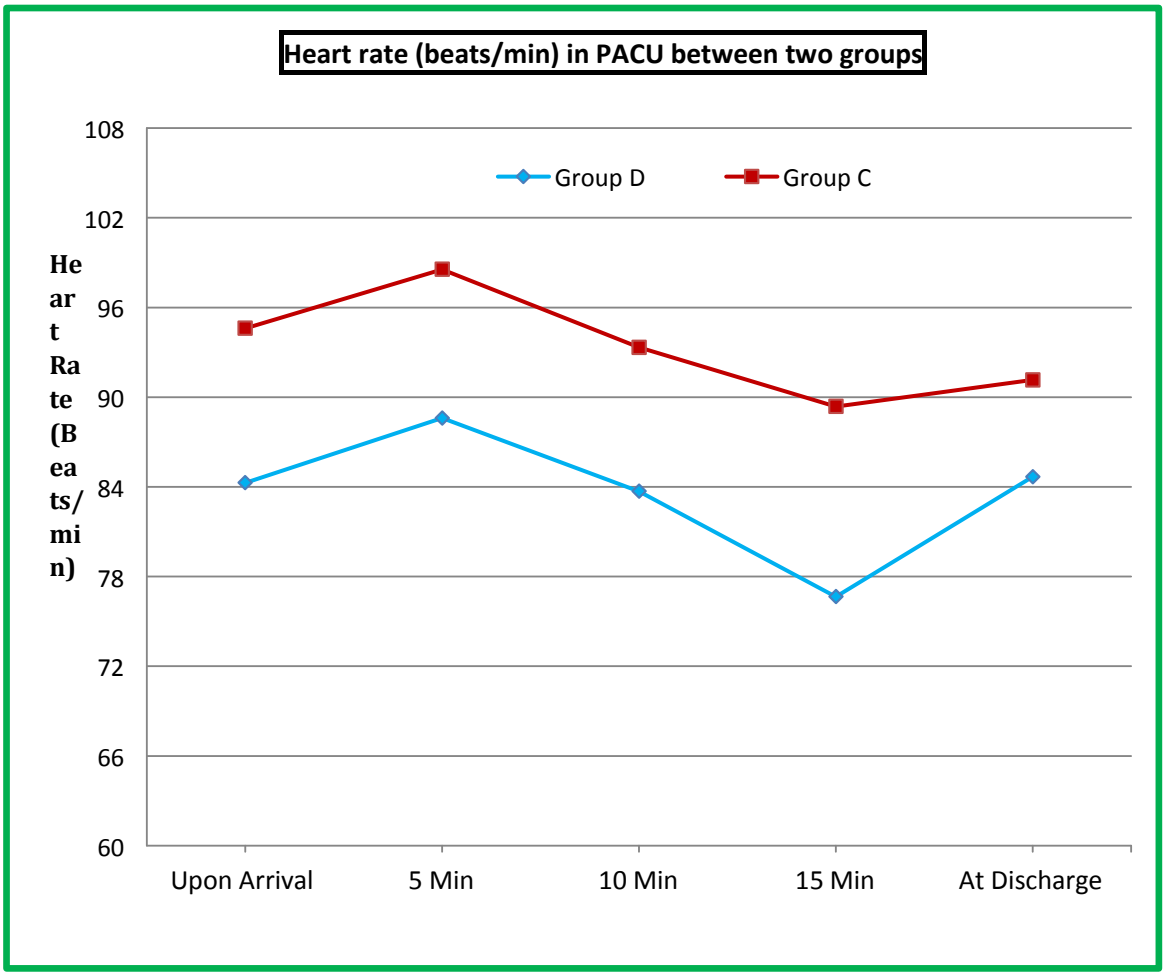
Statistically Significant Difference (P-value<0.05)

Intraoperative heart rate was statistically significantly lower in group D than in group C at15 min, after induction, till the end of surgery as given in Table 6,with P value <0.001respectively.

Table 7: Comparison based on heart rate (beats/min) in PACU between two groups					
Time interval	**Group D**		**Group C**		**P-value**
	Mean	**SD**	**Mean**	**SD**	
Upon Arrival	84.28	8.42	94.60	6.71	<0.001*
5 Min	88.60	8.35	98.55	6.60	<0.001*
10 Min	83.70	7.58	93.33	6.43	<0.001*
15 Min	76.65	7.05	89.38	5.45	<0.001*
At Discharge	84.68	6.87	91.15	5.99	<0.001*

Statistically Significant Difference (P-value<0.05)

In PACU heart rate was statistically significantly lower in group D than in group C as given in Table 7, this trend continued till discharge, with P value <0.001.



Line diagram depicting intra operative heart rate between the two groups in PACU.

Table 8: Comparison based on intra-operative SBP (mmHg) between two groups					
Time interval	**Group D**		**Group C**		**P-value**
	Mean	**SD**	**Mean**	**SD**	
Before Induction	130.85	5.56	128.55	7.38	0.120
At Induction	135.78	6.77	134.13	7.30	0.298
15 Min after Induction	95.78	6.96	126.33	7.09	<0.001*
30 Min	95.45	7.59	123.30	10.00	<0.001*
45 Min	94.55	7.84	119.85	7.33	<0.001*
60 Min	92.55	6.28	123.25	6.93	<0.001*
75 Min	93.45	5.68	118.60	7.01	<0.001*
90 Min	98.13	7.13	110.73	5.27	<0.001*
105 Min	98.43	6.26	113.59	5.09	<0.001*
120 Min	94.29	6.52	112.53	4.27	<0.001*

Statistically Significant Difference (P-value<0.05)

Intraoperative systolic blood pressure was statistically significantly lower in D group than in C group at 15min after induction, till the end of surgery as given in Table 8 with P value <0.001 .

Table 9: Comparison based on SBP (mmHg) in PACU between two groups					
Time interval	**Group D**		**Group C**		**P-value**
	Mean	**SD**	**Mean**	**SD**	
Upon Arrival	118.48	4.91	128.70	4.39	<0.001*
5 Min	125.98	6.10	134.45	5.93	<0.001*
10 Min	119.63	5.79	128.25	6.06	<0.001*
15 Min	116.63	4.94	127.45	6.08	<0.001*
At Discharge	122.13	5.80	130.48	6.20	<0.001*

Statistically Significant Difference (P-value<0.05)

In PACU systolic blood pressure was statistically significantly lower in group D than in group C as given in Table 9, this trend continued till discharge, with P value <0.001

Table 10: Comparison based on intra-operative DBP (mmHg) between two groups					
Time interval	**Group D**		**Group C**		**P-value**
	Mean	**SD**	**Mean**	**SD**	
Before Induction	83.73	6.17	84.93	4.86	0.652
At Induction	84.30	6.51	85.28	4.30	0.819
15 Min after Induction	63.03	4.70	79.85	4.75	<0.001*
30 Min	61.60	4.58	76.18	6.37	<0.001*
45 Min	62.10	3.14	81.15	5.69	<0.001*
60 Min	61.73	3.89	84.23	6.38	<0.001*
75 Min	61.08	4.20	78.75	6.05	<0.001*
90 Min	62.42	3.73	75.05	4.59	<0.001*
105 Min	61.11	3.93	76.74	4.27	<0.001*
120 Min	62.64	2.68	74.20	4.00	<0.001*

Statistically Significant Difference (P-value<0.05)

Intraoperative diastolic blood pressure was statistically significantly lower in D group than in C (Table 10) ,with P <0.001(Table 10)

Table 11: Comparison based on DBP (mmHg) in PACU between two groups					
Time interval	**Group D**		**Group C**		**P-value**
	Mean	**SD**	**Mean**	**SD**	
Upon Arrival	76.68	3.37	83.48	2.28	<0.001*
5 Min	80.58	3.73	86.13	3.95	<0.001*
10 Min	78.93	4.05	84.58	4.11	<0.001*
15 Min	75.65	4.10	81.63	3.61	<0.001*
At Discharge	74.35	4.38	82.05	2.93	<0.001*

Statistically Significant Difference (P-value<0.05)

In PACU Diastolic blood pressure was statistically significantly lower in group D than in group C as given in Table 11,this trend continued till discharge, with P value <0.001.

Table 12: Comparison based on intra-operative MAP (mmHg) between two groups

Time interval	Group D		Group C		P-value
	Mean	SD	Mean	SD	
Before Induction	99.43	5.38	99.46	4.71	0.917
At Induction	101.46	5.75	101.56	4.43	0.875
15 Min after Induction	73.95	3.71	95.35	4.55	<0.001*
30 Min	72.89	4.31	91.89	6.87	<0.001*
45 Min	72.92	3.08	94.05	5.47	<0.001*
60 Min	72.00	3.12	97.23	5.34	<0.001*
75 Min	71.87	3.25	92.04	5.94	<0.001*
90 Min	74.33	4.25	86.95	3.55	<0.001*
105 Min	73.54	3.91	89.02	3.61	<0.001*
120 Min	73.19	3.28	86.97	3.40	<0.001*

Statistically Significant Difference (P-value<0.05)

The MAP value was statistically significant in intraoperative period (Table 12) with P value <0.001.

Table 13: Comparison based on MAP (mmHg) in PACU between two groups

Time interval	Group D		Group C		P-value
	Mean	SD	Mean	SD	
Upon Arrival	90.61	2.91	98.55	2.14	<0.001*
5 Min	95.71	3.21	102.24	3.28	<0.001*
10 Min	92.49	3.67	99.14	3.48	<0.001*
15 Min	89.31	3.42	96.90	3.45	<0.001*
At Discharge	90.28	3.86	98.19	2.84	<0.001*

Statistically Significant Difference (P-value<0.05)

In PACU MAP was statistically significantly lower in group D than in group C as given in Table 13, this trend continued till discharge, with P value <0.001.

Table 14: Comparison based on PONV score between two groups

PONV score	Group D		Group C		Pvalue
	No.	%age	No.	%age	
No nausea	29	72.5	15	37.5	0.012*
Mild nausea	7	17.5	14	35.0	
Severe nausea	4	10.0	8	20.0	
Vomiting	0	0.0	3	7.5	
Total	40	100	40	100	

Statistically Significant Difference (P-value<0.05)

Table 14, showed significant reduction in PONV for group D, as compared to Group C with P value .012.The results showed that only 27.5% of group D had mild or severe nausea, while 55% in group C had mild or severe nausea. No patient in Group D had vomiting, while 3 patients in Group C had vomiting.

Table 15: Comparison based on pain score (NRS) between two groups at various intervals of time					
Time interval	**Group D**		**Group C**		**P-value**
	Mean	**SD**	**Mean**	**SD**	
T0	0.00	0.00	0.00	0.00	-
At extubation	0.00	0.00	0.48	0.68	<0.001*
2 Min after extubation	0.23	0.42	0.73	0.91	0.002*
5 Min after extubation	0.35	0.48	1.18	1.22	<0.001*
10 Min after extubation	0.43	0.64	1.73	1.50	<0.001*
Upon arrival in PACU	0.43	0.64	1.63	1.71	<0.001*
5 Min	0.55	0.88	1.25	1.66	0.021*
10 Min	0.75	1.19	0.53	1.04	0.371
15 Min	0.75	1.28	0.48	0.55	0.215
At discharge	0.53	0.93	0.50	0.72	0.893

Statistically Significant Difference (P-value<0.05)

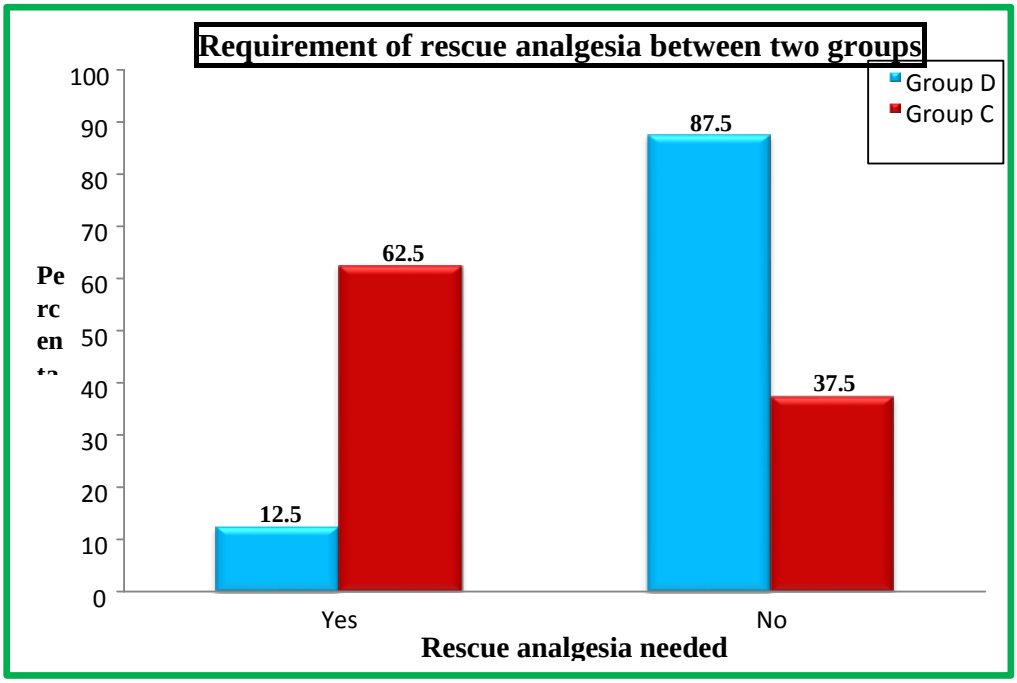
Table 15Comparison based on pain score (NRS) between two groups at various intervals of time. It was assessed using Numeric pain rating scale. The results indicated that pain scores were significantly higher in group C than in group D with P value<0.001.

Table 16:Requirement of rescue analgesia between two groups					
Rescue analgesia needed	**Group D**		**Group C**		**P-value**
	No.	**%age**	**No.**	**%age**	
Yes	5	12.5	25	62.5	<0.001*
No	35	87.5	15	37.5	
Total	40	100	40	100	

Statistically Significant Difference (P-value<0.05)

Table 16, shows the requirement of rescue analgesia between the two groups. It shows 62.5% of patients in Group C required rescue analgesia.

While only 12.5% in group D required rescue analgesia.



Graphical representation of requirement of rescue analgesia between two groups

IV. DISCUSSION:

Emergence from general anaesthesia is a passive process and is not simply the reverse process of induction. The exhaustive knowledge of its complex neurobiological mechanisms is mandatory for avoiding or limiting a large number of anaesthesia complications including altered mental status, and emergency awareness. ED in adults can lead to serious complications, such as self-extubation, accidental removal of catheters and injury[81]

Dexmedetomidine because of its unique properties offers its promising use in wide spectrum of clinical settings and ICUs. It is a part of fast-tracking anaesthesia regimens and offers anaesthetic sparing and hemodynamic stabilizing effects. Dexmedetomidine is a highly selective α2-adrenergic receptor (α2-AR) agonist that is associated with sedative and analgesic sparing effects, reduced delirium and agitation, perioperative sympatholysis[53]

This study was intended to determine the role of dexmedetomidine on complications that may occur during emergence from general anaesthesia such as coughing, PONV and pain.
The following data was analysed and collected for statistical analysis.

- Demographic data (Age/gender)
- Duration of surgery
- Effect of dexmeditomidine on hemodynamics of the patient
- Assessment of post-operative pain using Numeric Rating State.
- Assessment of post-operative Nausea Vomiting using 4 point ordinal scale.

The mean age of the patients in our study in group D was 38.68yrs with SD± 13.12yrs, whereas mean age in group C was 40.35yrs with SD ±12.26yrs. The two groups were comparable in terms of age and the difference was statistically insignificant (p-value=0.557) (Table1).

The gender distribution was comparable in the two groups with p-value of 0.501, (Table 2) hence no significant demographic differences were observed between two groups in our study.

The mean duration of surgery in group D was 110.7min with SD ±13.92 min, whereas in group C duration was 113.2min with SD ±14.85min. The two groups were comparable in terms of duration of surgery and the difference was statistically insignificant (p value 0.883) (Table 4).

Jeong Soo Lee et al studied "the efficacy of a single dose of dexmedetomidine for cough suppression during anesthetic emergence: a randomized controlled trial". The study included two groups undergoing elective Thyriodectomy under sevoflurane anesthesia who were randomly allocated to receive either dexmedetomidine 0.5 μg/kg iv (Group D, n = 70) or saline (Group S, n=71), each combined with a low-dose remifentanil infusion ten minutes before the end of surgery. The duration of anesthesia was 123mins in group DEX and
115min in group S.[73]

Our finding are in agreement with the findings of the study done by KIM SY et al. 2013, their results suggested that the incidence of agitation was lower in Group Dexmedetomidine than Group in controls (28 vs 52%, P=0.014)**.** They concluded thatintraoperative infusion of dexmedetomidine provided smooth and hemodynamically stable emergence. It also improved quality of recovery after nasal surgery.[82]

R Polat et al 2015 also concluded that the incidence of EA was significantly lower in group R (ramifentanil) and group Dex (3.3% and 20% respectively p<0.001) compared to group S (control group) 46.7%[83]

In other previous studies dexmedetomidine has been used as premedication, 1μg/kg intranasal 45 min before induction,[84] loading dose 2μg/kg followed by maintenance of 0.7μg/kg/hr[66] and at dose of 0.3μg/kg iv 10 min before discontinuation of anesthetics.[85] The results of all these studies showed decreased incidence of emergence agitation.

S Y Ham,J E Kim, did a randomized controlled study; they concluded that addition of a single dose of dexmedetomidine (1 μg/kg) to low-dose remifentanil infusion did not attenuate emergence agitation in intubated patients after orthognathic surgery compared with low-dose remifentanil infusion alone. However, single-dose dexmedetomidine suppressed coughing, hemodynamic changes, and pain during emergence and recovery phases, without respiratory depression.[86] So it indicates that single dose of dexmedetomidine is not enough to attenuate ED, we used continuous infusion in our patients which was helpful in attenuating emergence agitation.

Dexmedetomidine is a potent alpha 2 agonist and has sedative analgesia and anxolysis effect. Therefore potentiation of sedative analgesic property of dexmedetomidine may be responsible for reduction of incidence of Emergence Delirium, which is echoed in the results of our study as well. The distinct property of Dexmedetomidine as a sedative offers easy arousabilty, rapid falling asleep. These characteristics are not shared by other sedatives.[87]

In our study, one of the outcome measures was postoperative pain. It was assessed using Numeric pain rating scale. The results indicated that pain scores were significantly higher in group C than in group D with P

value<0.001. Requirement of rescue analgesia was higher 62.5% in group C than in group D 12.5% with a p value <0.001

Our results are in accordance with other study done by Kateryna Bielka,Iurii Kuchyn, et al. They concluded that intraoperative dexmedetomidine (DEX) infusion is safe and effective for improving analgesia during and after elective laparoscopic cholecystectomy. DEX appears to significantly reduce the number of patients with severe postoperative pain, postoperative morphine consumption and prolong time to first use of rescue analgesia.[88]

Rebecca A. Hong Aleda Leis, did a retrospective study to compare pain scores from the Postoperative Anesthesia Care Unit (PACU) and from PACU discharge until midnight between posterior spinal fusion patients who did and did not receive intraoperative dexmedetomidine. Intraoperative use of dexmedetomidine during posterior spinal fusion for adolescent idiopathic scoliosis appeared to have no effect on postoperative pain scores.[89] The possible reason might be that both groups received intrathecal morphine and iv ketamine intraoperatively that masked the analgesic effect of dexmedetomidine.

Adequate analgesia is sometimes difficult to achieve even after balance analgesia. Uncontrolled postoperative pain is associated with an increased morbidity and complications, prolonged hospital stays, and the risk of chronic postsurgical pain.

Opioids are mostly used for post-operative analgesia, even after minimally invasive and laparoscopic surgery, although they have significant side effects (nausea, ileus, respiratory depression, delay in mobilization and rehabilitation). In the last decades non-opioid analgesic strategies have become more important to minimize opioid related side effects and enhances recovery.[90]

Intraoperative opioids could induce hyperalgesia, which increase pain intensity and opioid consumption, while intraoperative DEX infusion may be a new and effective treatment option for preventing opioid-induced hyperalgesia. Opioid induced hyperalgesia is a result of neuroplastic change in pain perception that auguments pain sensivity. N-methyl –D –aspartate receptor activation may have a central role in the development of opiod induced hyperalgesia.[91]

In our study, another outcome measures was cough. It was assessed using 4point ordinal scale. The results indicated that overall incidence of coughing was lower in group D than in group C 32.5% vs. 62.5% with p value < 0.001. Also the incidence of severe cough (grade 3) was 2.5% in group D and 15% in Group C with P value of 0.048 (Table 17).

Coughing during emergence from general anesthesia may increase the risk of serious complications. Various modalities have been studied to suppress its occurrence, such as lidocaine and remifentanil.[92,93] Intraoperative infusions of dexmedetomidine have been shown to allow for a smooth emergence from anesthesia by attenuating agitation, cough, and hemodynamic changes in children and adults.[82,94]Nevertheless, there has been conflicting results regarding the efficacy of dexmedetomidine as a cough suppressant. In adult patients undergoing nasal surgery, some studies showed that intraoperative dexmedetomidine infusion at a rate of 0.4 μg/kg/h from induction of anesthesia until extubation did not reduce cough as compared to saline.[82,83] Whereas, Guler et al[57] found that DEX 0.5 μg/kg/h before extubation attenuate airway reflexes during extubation in patients undergoing ocular surgery. When compared to a remifentanil targetcontrolled infusion, a single dose of dexmedetomidine 0.5 μg/kg given 10 minutes before the end of surgery was shown to be less efficient than remifentanil in reducing cough during emergence from general anesthesia in patients undergoing elective thyroidectomy.[75] Conversely, the same bolus dose of dexmedetomidine seems to be superior to fentanyl 1 μg/kg for cough suppression during extubation in patients undergoing rhinoplasty.

PONV is a frequent complication in post-operative period. It is more common in general anesthesia than spinal anesthesia.[31,32]It can cause electrolyte imbalance and aggravate bleeding that delay hospital discharge.[33]

PONV one of the study parameter in our study, showed significant reduction in group D, as compared to Group C with P value 0.012.The results showed that only 27.5% of group D had mild or severe nausea, while 55% in group C had mild or severe nausea. No patient in Group D had vomiting, while 3 patients in Group C had vomiting. (Table 18)

Our study is in accordance with the study done by Wang WG, Gex XY et al, the results from this meta-analysis indicated that perioperative dexmedetomidine decreased postoperative nausea and shivering in laparoscopic surgical patients.[95]

The possible reason for the reduced PONV in our study may be due to the direct antiemetic properties of alpha 2 agonist through inhibition of catecholamine by parasympathetic tone. Administration of Dexmedetomidine reduces the perioperative fentanyl consumption which may explain the reason for decrease reason for PONV.[96]

Aouad, Marie T. MD, Zeen, did a prospective, randomized double-blind trial, 216 adults patients were randomly assigned to dexmedetomidine group of 3 different doses or control(C). During emergence, cough, agitation, hemodynamic parameters, shivering, time to extubation and sedation scores were recorded. Though

cough and other emergence phenomena were decreased in dexmedetomidine group, other secondary outcomes such as pain and PONV in the PACU in this study did not show any consistent and clinically significant differences among the 4 groups.[97]

HEMODYNAMIC PARAMETER

The heart rate and systolic and diastolic blood pressure were statistically significantly lower in dexmedetomidine group compared to the group C without development of bradycardia or hypotension.

Intraoperative heart rate was statistically significantly lower in group D than in group C, this trend continued in PACU till discharge with P value <0.001 respectively. (Table 6, 7)

Intraoperative systolic blood pressure was statistically significantly lower in D group than in C group at 15min, after induction, till the end of surgery as given in (Table 8) with P value <0.001. The same trend was followed in the results of PACU (Table 9).

Intraoperative diastolic blood pressure was statistically significantly lower in group D than in C (Table 10), the same trend echoed in results of PACU with P <0.001(table 11).

Similarly the MAP value was statistically significant in both intraoperative (Table 12) and post-operative (Table13) with P value <0.001respectively.

The possible reason may be the fact that dexmedetomidine is a highly selective α 2-adrenoceptor agonist, with hemodynamic stability, analgesic and sympatholytic affects, it also maintains adequate organ perfusion. It attenuates the stress responses during surgery and maintains intraoperative hemodynamics.[98]

In agreement with the results of the present study, a study by Rao et al.[99] showed that patients who underwent elective surgeries under general anesthesia (e.g., oral, maxillofacial, ENT, general, orthopedic, spine, brain, thyroid and laparoscopy) and given a loading dose of dexmedetomidine 1 μg/kg and then continuous infusion of 0.5 μg/kg/h had a stable intraoperative hemodynamics .A study by Kang et al.[100] Twenty seven inpatients undergoing breast surgery concluded that dexmedetomidine (1 μg/kg) given before induction of anesthesia followed by infusion of (0.6 μg/kg/h) resulted in hemodynamic stability.

A study by Yacout et al.[101] showed that intravenous dexmedetomidine infusion in patients scheduled for elective major abdominal surgery under general anesthesia was associated with significantly lower heart rate and mean arterial blood pressure compared to the placebo group.

V. CONCLUSION:

In our study we found that intraoperative intravenous administration of dexmedetomidine decreased the incidence of emergence agitation and other emergence phenomena like cough, pain and PONV. It also provided stable hemodynamics both intra and post operatively.

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