Original Research Article

A prospective randomized comparative clinical study to compare efficacy of Dexmedetomidine and Fentanyl to attenuate the pressor response to pneumoperitoneum during Laparascopic Surgeries

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Abstract

Background: Laparoscopy has evolved over years from a invasive diagnostic tool to a cost effective therapeutic procedure .The induction of pneumoperitoneum triggers sympathetic stress responses and effective attenuation of pressor responses is essential to decrease surgery related perioperative morbidity and mortality. **Aim of the study**: To compare dexmedetomidine and fentanyl for attenuation of pressor response to pneumoperitoneum in patients undergoing elective laparoscopic surgeries. **Materials and Methods**: A prospective randomized comparative clinical study was conducted at Osmania General Hospital during 2017 -2020. Institutional Ethics Committee approved study protocol in which 60 patients of either gender in age group of 18 to 60yrs of ASA grade I , II physical status were included and divided into group D (Dexmedetomidine) (n-30) , group F (Fentanyl) (n-30) to compare effect of dexmedetomidine and fentanyl on hemodynamic responses to pneumoperitoneum in patients scheduled for elective laparoscopic surgeries under general anaesthesia .Intraoperatively systolic and diastolic blood pressure , heart rate were recorded at predetermined time intervals and recored for statistical analysis. **Results:** Intraoperatively Systolic ,Diastolic blood pressure , Mean arterial pressure and Heart rate at 15min after induction of pneumoperitoneum in Group D -123.70±7.16 , 80.2±6.69, 94.68±5.28 , 71± 4.72 and Group F-133±6.81 , 85.00±4.8 , 101.42±3.73,86±4.2 respectively, the difference in SBP,DBP,HR between both groups was statistically significant p value 0.0001 and the difference were also statistically significant during intubation and extubation with 'p' values 0.0023 , 0.0001. **Conclusion**: Dexmedetomidine effectively attenuates stress response to pneumoperitoneum provides better intraoperative hemodynamic stability in laparoscopic surgeries when compared to Fentanyl.

Keywords: Dexmedetomidine, Fentanyl, Laparoscopy, Pneumoperitoneum, Stress response.

Introduction

Laparoscopic surgery has existed since years and pioneers of laparoscopic surgery Semm K and Muehe E changed it from a diagnostic tool to a surgical procedure in 1980s. Since then it has become safe and gold standard technique in surgical treatment providing better clinical outcomes even in elderly patients[1,2]. Insufflation of carbon dioxide and induction of pneumoperitoneum is essential to provide working space for surgeon. Pneumoperitoneum affects homeostasis and leads to significant changes in cardiovascular, pulmonary physiology and stress response. Cardiovascular responses are secondary to rise in intraabdominal pressure resulting in abdominal aortic compression , neuroendocrine effects and also consequent to hypercarbia-induced release of catecholamines vasopressin or both[3,4].

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Anesthesiologist should thoroughly understand pathophysiology of pneumoperitoneum and treat perioperative complications. Opioids,Benzodiazepines, Beta blockers, Ca^{2+} channel blockers , Vasodilators , Local anesthetics , Centrally acting sympatholytics have been used for attenuation of stress response to carboperitoneum . α-2 adrenergic agonist-have potential benefits of hypnosis , sedation, anxiolysis, sympatholytic, and analgesic properties without producing significant respiratory depression. In the present study we compared dexmedetomidine and fentanyl for attenuation of hemodynamic responses to induction of pneumoperitoneum in elective laparoscopic surgeries[4]

Materials and methods

A single centred randomized comparative clinical study was conducted at Osmania General Hospital , Afzalgunj , Hyderabad during 2017 – 2020 after approval of study protocol by the Institutional ethics committee.The study included 60 patients of either sex belonging to ASA grade I and II physical status in age group of 18-60 years scheduled for elective laparoscopic surgeries, study protocol was explained in detail to patients during preoperative visit and were thoroughly examined and investigated for presence of systemic diseases and informed consent was obtained for participation from all the participants , they were divided into two groups , Group D (Dexmedetomidine) -30 : Group F(Fentanyl)-30 using computer generated random numbers using simple randomization method to

compare Dexemedetomidine and Fentanyl for attenuation of hemodynamic stress responses to pneumoperitoneum in patients scheduled for elective laparoscopic surgeries under general anaesthesia.

Inclusion criteria

1) ASA grade I and II
2) 18 to 60years of age
3) Who gave informed written consent
4) Patients scheduled to undergo elective laparoscopic surgeries

Exclusion criteria

1) ASA grade III or greater
2) Age more than 60years, less than 18years
3) Base line heart rate less than 60bpm
4) Base line blood pressure less than 100/60mmHg
5) Pregnant,lactating and menstruating females.
6) Anticipated difficult intubation
7) H/o previous abdominal surgeries
8) H/o Psychiatric illness
9) Obesity
10)Patients with H/o hypertension, ischemic heart disease, heart block, left ventricular failure, heart block, severe renal or hepatic disease.

At preanesthestic checkup patients were thoroughly evaluated and investigated for presence of comorbid conditions and were explained about procedure and its complications and informed consent obtained. There were no significant differences in patient's height, weight, age and duration of surgery , patients were advised nil by mouth for at least 6 hours prior to surgery. Preoperative vital parameters baseline Heart rate , Blood pressure and Oxygen saturation were recorded.On the day of surgery anaesthesia machine , resuscitation equipment and drugs were checked and kept ready , on arrival of patient into operation theatre an 18G intravenous was secured on right hand and lactated ringer's solution was started as a maintenance fluid .patient was connected to monitor which included NIBP , SpO2 and Heart Rate. Patients were allocated by simple randomization method to two groups using envelope method for allocation of computer generated random numbers. Immediately before induction, Gr F patients received fentanyl 1µg/kg in normal saline , Gr D Group D) patients received dexmedetomidine 1 µg/kg as infusion , total volume of study drug was adjusted to 50 ml and administered over a period of 10 min before induction. Followed by infusion dose of respective drugs at the rate of 0.2µg/kg/hr .A standard general anesthesia technique was adopted in both groups which included Glycopyrrolate 4µg/kg and Ondansetron 15µg/kg iv , preoxygenated with 100% O2 for 3 minutes , induction with Propofol 2mg/kg intubation facilitated by Vecuronium bromide 0.1mg/kg and lungs ventilated with nitrous oxide and oxygen 50: 50 and anesthesia maintained with IPPV , Vecuronium , 1% Sevoflurane with CO_2 absorber . Pneumo - peritoneum was induced with CO_2 insufflation into peritoneal cavity @ of 2 lit/min. Intra-abdominal pressure was restricted to 10-14mmHg and patients were mechanically ventilated to maintain ETCO2 between 35-40 mmhg. Atropine was kept ready to counter the bradycardia (Heart rate <50 bpm) and inotropes were kept ready to counter any untoward hypotension.

Heart rate , Systolic blood pressure , Diastolic blood pressure , Mean Arterial pressure , SpO2 and EtCO2 were recorded intraoperatively at predetermined intervals detailed below.

1. Pre-operatively i.e. before premedication (basal line value)
2. After Induction
3. After Intubation
4. 15 min, 30 min, 45min, 60 min,75 min,90min.
5. Extubation
6. Post operative period.

A 20 %rise in MAP above baseline was managed by increasing sevoflurane conc. At end of surgery, neuromuscular blockade antagonized with neostigmine 50µg/kg and glycopyrrolate10 µg/kg intravenously. After meeting extubation criteria, trachea extubated and patient transferred to post operative ward and observed for any adverse events.

Statistical analysis

The data was expressed as mean and standard deviation. The homogenicity in two groups of mean and standard deviation was analysed using SPSS version, Analysis of variance(ANOVA) for each parameter. Inter group comparison between two groups at a time was done using student's unpaired t- test. P <0.05 was considered statistically significant, value < 0.01 was considered highly significant, > 0.05 was considered insignificant.

Results

In present Prospective Randomized comparative study consisting of 60 patients randomly allocated in two groups - Group D (Dexmedetomidine) and Group F (Fentanyl) of 30 each undergoing elective laparoscopic surgeries, under GA were studied and results were noted

Table 1:Distribution of study patients demographic profile

Parameter	Group D (n-30) (Mean ± SD)	Group F (n-30) (Mean ± SD)	'p'value
Age	30.7 ±7.611	29.23±7.205	0.445
Weight	59.3±3.33	59.9±3.40	0.490
ASA Gr I / II	22 / 08	23 / 07	
Gender (M/F)	12 / 18	13 / 17	

Study patients in both groups were comparable by age, weight , gender. and ASA grading.

Table 2: Comparison of SBP between two study groups at various time intervals.

Systolic BP	Group D (Mean ±SD)	Group F (Mean ±SD)	'p' value
Pre-op	124.3±10.31	125±10.21	0.792
Induction	112.46±7.97	112±7.30	0.816
Intubation	122.70±10.41	130±8.13	**0.003**
15min after PNP	123.70±7.16	133.00±6.81	**0.0001**
30min after PNP	125.70±6.13	127.00±5.54	0.392
45min after PNP	123.70±4.97	125.00±5.18	0.325
60min after PNP	124.00±4.95	125.00±4.82	0.431
Exttubation	132.50±3.73	134.60±4.81	**0.022**
Post-op	126.80±3.66	126.00±4.47	0.451

Table 3: Comparison of DBP between two study groups at various time intervals

Diastolic BP	Group D (Mean ±SD)	Group F (Mean ±SD)	'p'value
Pre-op	80.10±8.87	77.00±7.30	0.144
Induction	75.06±8.84	72.00±6.70	0.136

Intubation	78.90±8.32	86.2 ± 4.56	**0.0001**
15min after PNP	80.2± 6.69	85.00± 4.80	**0.0023**
30min after PNP	78.53±5.77	79.00 ±4.80	0.732
45min after PNP	77.67±4.61	75.90±4.02	0.118
60min after PNP	74.6±3.90	75.70 ± 4.79	0.334
Exttubation	80.00±4.26	83.60 ±4.91	**0.003**
Post-op	76.10±3.79	77.50 ± 4.32	0.183

Table 4: Comparison of MAP between two study groups at various time intervals.

MAP	Group D (Mean ±SD)	Group F (Mean ±SD)	'p' value
Pre-op	94.86±8.62	93.26±7.77	0.453
Induction	87.53±7.60	85.31±7.60	0.209
Intubation	93.53±8.32	100.93±5.13	**0.0001**
15min after PNP	94.68±5.28	101.42±3.73	**0.0001**
30min after PNP	94.24±4.33	95.31±3.97	0.322
45min after PNP	93.02±3.42	92.15±3.40	0.327
n after PNP	91.06±3.46	91.97±3.43	0.310
Exttubation	97.48±3.16	100.60±4.16	**0.0018**
Post-op	93.02±2,76	93.71±2.96	0.354

Table-5: Comparision of HR between two study groups at various time intervals

MAP	Group D (Mean ±SD)	Group F (Mean ±SD)	'p' value
Pre-op	77.30±7.25	80±5.30	0.105
Induction	78.36±5.14	76.00±8.40	0.194
Intubation	72.07±8.32	100.93±5.13	**0.0001**
15min after PNP	71.00±4.72	86.00±4.20	**0.0001**
30min after PNP	75.30±5.63	78.20±5.09	**0.040**
45min after PNP	74.33±4.759	75.50±4.22	0.317
60min after PNP	74.70±4.316	74.80±4.29	0.928
Exttubation	76.10±3.78	85.90±5.44	**0.0001**
Post-op	74.97±4.37	76.60±4.58	0.163

In present study conducted in patients scheduled for elective laparscopic surgeries under general anaesthesia, intraoperatively hemodynamics were monitored at predetermined time intervals and tabulated in Microsoft excel sheet for statistical analysis to calculate p value between two groups and find out significance of intervention done. Intraoperatively systolic , diastolic , mean arterial pressure and heart rate were monitored at predetermined intervals and difference in parametres between two groups at intubation , 15min after induction of pneumoperitoneum and at extubation was statistically highly significant with 'p' values of 0.0001.

Discussion

Laparoscopic surgeries are minimally invasive procedures require insufflation of peritoneal cavity for visualization and operative manipulation. Pneumoperitoneum used for laparoscopic procedures is a complex pathophysiologic phase with significant hemodynamic variation Carbon dioxide is used for induction of pneumoperitoneum, because of its low combustibility and high blood solubility , rapid rate of excretion which decreases risk of gas embolism (0.0014%–0.6%) , CO_2 is insufflated to an intraabdominal pressure (IAP) of 12 to15 mm Hg . Laparoscopic surgeries are divided into 4 phases, each phase has unique hemodynamic effects as follows[5,6]. (i) Induction of Anesthesia (ii) Abdominal insufflation (iii) Abdominal desufflation and (iv) Recovery from Anesthesia . The increase in IAP results in hemodynamic changes secondary to mechanical and neurohormonal responses , rise in IAP also leads to splanchnic vasoconstriction and decrease in inferior vena cava, renal and portal vein blood flow, which decreases venous return to heart and hence stroke volume. Furthermore, the rise in abdominal venous pressure increases total peripheral resistance which increases mean arterial pressure. Peritoneal stretching also causes a vasovagal reflex, resulting in arrhythmia and asystole. Studies have demonstrated marked elevations in plasma norepinephrine, epinephrine, cortisol, vasopressin, atrial naturetic peptide, renin, and aldosterone levels.The effects of pneumoperitoneum is two fold with rise in intraabdominal pressure and hypercarbia contributing to hemodynamic changes[7].

In the present study, 60 patients scheduled for elective laparoscopic surgery were randomly divided into 2 groups, group D received dexmedetomidine 1µg/kg in 50 ml NS infused over 10mins before induction followed by infusion of 0.2µg/kg/hr and group F received fentanyl 1µg/kg in 50ml NS infused over 10 min before induction followed by infusion of 0.2µg/kg/hr, to negate the hemodynamic response to pneumoperitoneum in laparoscopic surgeries.

Dexmedetomidine also attenuates hemodynamic response to tracheal intubation, decreases plasma catecholamine concentration during anesthesia and decreases perioperative requirements of anesthetics.

In study reports with dexmedetomidine infusion rates ranging from 0.1 to 1.0 µg/kg/hr have resulted in increased incidences of adverse effects like hypotension and bradycardia.In our study, it was found that HR, SBP,DBP, MAP were significantly lower in dexmedetomidine group at the time of intubation, 15mins after pneumoperitoneum ,at extubation when compared with fentanyl.

Jaakola *et al*[8]. found decrease in BP and HR during intubation following preoperative 0.6 µg/kg bolus dexmedetomidine. After intubation, maximum heart rate was 18% (CI 3-33%, P = 0.036) and maximum IOP 27% (CI 11-43%, P = 0.005) less in dexmedetomidine group compared with patients treated with placebo , 10 min after intubation, maximum systolic and diastolic arterial pressures were also significantly (P = 0.013 and P = 0.020) lower in dexmedetomidine group. In our study, it was found that HR, SBP,DBP, MAP were significantly lower in dexmedetomidine group at the time of intubation, 15mins after pneumoperitoneum , at extubation when compared with fentanyl.

Lawrence et al[9] found that a single dose of dexmedetomidine before induction of anesthesia attenuated hemodynamic response to intubation and extubation , they used 2µg/kg of dexmedetomidine; bradycardia was observed on first and fifth minutes after administration . The mean (SD) intra-operative isoflurane concentration was lower in dexmedetomidine-treated patients than controls (0.01 (0.03)% compared to 0.1 (0.1)%; p = 0.001) although six of 25 treated patients required isoflurane at some stage. The

haemodynamic response to tracheal intubation and extubation was lower in the dexmedetomidine group as was intra-operative heart rate variability; postoperative analgesic and anti-emetic requirements and peri-operative serum catecholamine concentrations were lower in dexmedetomidine group. Hypotension and bradycardia occurred more frequently after dexmedetomidine. In our study, on comparison of dexmedetomidine 1 µg/kg versus fentanyl 1 µg/kg given slow infusion over 10 min followed by infusion at rate of 0.2 µg/kg/hr in both groups and found that HR, SBP,DBP, MAP was significantly lower in group D at 15mins, 30mins after pneumoperitoneum and in postoperative recovery period when compared with fentanyl and incidence of hypotension and bradycardia is less.

Kallio et al[10] found that hypotensive effect of dexmedetomidine reached its maximum (18%) between 60 and 120 minutes after a 75 µg bolus administration , bradycardia was noted at 0 and 15 minutes after administration of 50 and 75 µg . After a suitable infusion regimen of dexmedetomidine was determined according to hemodynamic criteria, 20 patients were included in a double-blind, randomized placebo-controlled trial (10 receiving dexmedetomidine, 10 saline solution). Dexmedetomidine infusion did not completely abolish need for isoflurane but diminished its requirement by > 90% (P = 0.02) and increase in heart rate to endotracheal intubation was significantly blunted. In our study, it was found that requirements of additional opioids and inhalational agents are more in fentanyl group than group D. Use of dexmedetomidine has reduced the use of induction , inhalational agents and analgesics in this regard.In a study,Hulya Basar et al[11] in 2008 studied effect of pre anesthetic dose of dexmedetomidine on induction, hemodynamics and cardiovascular parameters in 40 ASA physical status I and II patients, aged 20 to 60 years, who were scheduled for elective cholecystectomy .Patients were randomly divided into two groups to receive 0.5µg/kg dexmedetomidine (group D, n = 20) or saline solution (group C, n = 20). In group D, HR ,MAP significantly decreased after dexmedetomidine was given compared to placebo group.

In our study, on comparison of dexmedetomidine 1µg/kg given over 10 min and fentanyl 1µg/kg given over 10 min and both were given infusions at rate of 0.2µg/kg/hr respectively and it was found that HR, SBP, DBP, MAP were significantly lower in dexmedetomidine group at the time of intubation, 15mins after pneumoperitoneum ,at time of extubation when compared with fentanyl.

Sukminder jit singh bajwa et al[12] in 2012, in their randomized study on attenuation of pressor response and dose sparing of opioids anesthetics with pre operative dexmedetomidine in 100 patients with 50 in each group and 1mcg/kg of dexmedetomidine , 2mcg/kg fentanyl was given pre operatively respectiveley. The demographic profile was comparable. The pressor response to laryngoscopy, intubation, surgery and extubation were effectively decreased by dexmedetomidine, and were highly significant on comparison (*P*<0.001). The mean dose of fentanyl and isoflurane were also decreased significantly (>50%) by the administration of dexmedetomidine. The mean recovery time was also shorter in group D as compared with group F (*P*=0.014).In our study, it was found that requirements of additional opioids and inhalational agents are more in group F when compared to group D. Ghodki et al[13] 2012,in their observational study on 30 patients belonging to ASA grade I and II , aged between 18 to 50 years of either gender used dexmedetomidine as an anesthetic adjuvant in laparoscopic surgeries under general anesthesia . Loading dose infusion of dexmedetomidine was started 1 mcg/kg for 15 minutes and patients were premedicated. Routine induction with propofol and fentanyl was carried out, and maintenance infusion of dexmedetomidine 0.2 mcg/kg/hr was given. Patients were monitored with standard monitoring, and in addition, entropy was used for monitoring depth of anesthesia . Mean HR on starting was 85(17) which fell to lowest mean of 72(13); *P* = 0.0001 . There was a significant fall in HR at beginning of infusion. HR was however sustained for entire duration of infusion. Patients had sinus bradycardia (HR < 60) at start; but none required any therapy for bradycardia. This reduction although statistically significant was not clinically relevant as no intervention was required. Mean systolic blood pressure (SBP) decrease from 125(22) to 113(20) with loading dose of Dexmedetomidine (*P* = 0.009). After that minimal change was observed for entire duration of infusion. Similar observations were made at peritoneal insufflation diastolic blood pressure (DBP) decreased from 68(12) to 56(10). There was good control over sympathoadrenal response during laryngoscopy, with minimal or no change in BP with pneumoperitoneum. None of 30 patients needed either metoprolol or nitroglycerine to counter hypertensive response to pneumoperitoneum.In our study, baseline HR in two groups 77.3±7.25 and 80.0±5.30 which is statistically insignificant which changed to 72.07±5.39 and 86.0±5.40 after infusion of dexmedetomidine and fentanyl respectively at intubation. Statistical significance difference was observed at intubation, 15min after PNP(group D 71±4.72,group F 86±4.2) 30 min after PNP(group D 75.3±5.63,group F 78.2±5.09) and at extubation(group D 76.1±3.78, group F 85.9±5.44).

In this study, SBP remained lower in group D compared to group F which was significant at time of intubation [group D122.7±10.41,group F 130±8.13] p=0.003 ,15 min after pneumoperitoneum [group D 123.7±7.16,group F 133±6.81] p=0.0001 and at time of extubation[group D 132.5±3.73,group F 134.6±4.81] p=0.022 while pre op values were not significant (p <0.05).

DBP also showed statistically significant values at time of intubation[group D 78.9±8.32, group F 86.2±4.56] p=0.0001, 15 mins after pneumoperitoneum [group D 80.2±6.69, group F 85.0±4.80]p=0.0023 and at extubation [group D 80±4.26, group F 83.6±4.91] p=0.003 which is statistically significant.

Amar Prakash kataria et al[14] in 2016,in their prospective randomized double blind trial to evaluate efficacy of dexmedetomidine and fentanyl in attenuation of pressor responses to laryngoscopy,intubation and pneumoperitoneum in laparoscopic cholecystectomy which included 60 patients divided into two groups 30 each and given loading dose of 1mcg/kg over 15mins followed by maintenance dose of 0.2mcg/kg/hr. Induction was done 15 min after start of loading infusion with propofol (2 mg/kg).

Baseline HR (bpm) was comparable in both groups, which was 78.01 ± 7.16 and 80.73 ± 9.23, respectively, in both the groups. After start of infusion of dexmedetomidine, HR decreased to 72.53 ± 4.89, 15 bpm in Group I. After induction, further decreased (67.43 ± 4.23) but it increased to 77.83 ± 6.57 after intubation. There was significant increase during PNP (80.18 ± 6.62), which returned to baseline at around 30 to 45 min after creation of PNP. In Group II, after start of infusion of fentanyl, HR decreased to 77.46 ± 1.65 beats/min.

In our study, baseline HR in two groups 77.3±7.25 and 80.0±5.30 which decreased to statistically significant levels after infusion of dexmedetomidine and fentanyl respectively at time of intubation, 15min after PNP, 30 min after PNP and extubation. Neil et al[15] in (2017) in their randomized study in laparoscopic surgeries allocated 30 patients in each group D and F. Patients were given 0.5mcg/kg of fentanyl and dexmedetomidine as a loading dose followed by infusion of 0.2 -0.7 mcg/kg/hr as maintenance dose. Systolic Blood Pressure (SBP) fell by 9% in Group-D as compared to no fall in Group F during intubation. After intubation, 9% increase is seen in Group D v/s 19% in Group F. During the period of pneumoperitoneum upto 5 minutes post extubation, the SBP in Group D was significantly lower as compared to Group F rest duration, the difference was not significant between both groups. Heart Rate (HR) remained stable throughout the study except at laryngoscopy when it rose. Heart rate was similar in both groups at intubation, decreased by 3.51% in Group D as compare to 11.11% rise in Group F. Post intubate on, heart rate fell by 2% in Group D versus 15% rise in Group F. Diastolic Blood Pressure (DBP) remained higher than baseline throughout the study.

In the present study HR between the two groups found significance (p<0.05) at the time of intubation(p=0.0001),15 min after PNP(p=0.0001),30min after PNP(p=0.04) and at the time of extubation(p=0.0001) though there is no statistical significance in the pre operative period group D 77.3±7.25 and group F

80.0±5.30(p=0.105). SBP remained lower in the group D compared to group F through out the study but it is significant at the time of intubation [group D122.7±10.41,group F 130±8.13] p=0.003 ,15 min after pneumoperitoneum [group D 123.7±7.16,group F 133±6.81] p=0.0001 and at the time of extubation[group D 132.5±3.73,group F 134.6±4.81] p=0.022 while the pre op values are not significant between the two groups(p <0.05). DBP showed significance at the time of intubation, 15 min after pneumoperitoneum and at the time of extubation.Panchgar et al[16] in 2017 in their study on effectiveness of IV dexmedetomidine on perioperative hemodynamics,analgesia requirement and side effects in patients undergoing laparoscopic surgery under general anesthesia.

In the present, it was observed that the analgesic requirements and inhalational requirements in the cases receiving dexmedetomidine are lesser than the cases receiving fentanyl in this regard.Jayshree P Vaswani et al[17] 2017 in their study compared the effect of dexmedetomidine vs fentanyl on hemodynamic response in patients undergoing laparoscopic surgery. Study conducted in 60 patients randomly divided into 2 groups, group D and group F.

Dexmedetomidine significantly attenuates stress response at intubation with lesser increase in HR (5% Vs 18%), SBP (9% Vs 19%) and DBP (3% Vs 15%), MAP (2% Vs 15%) as compared to fentanyl (p<0.05). Throughout intraoperative period of pneumoperitoneum Group D showed significant fall in HR, SBP, DBP, MAP from baseline value at all points of time intervals whereas it remained constantly high above baseline value in Group F (p-value <0.05).In the present study HR between the two groups found significance (p<0.05) at the time of intubation(p=0.0001),15 min after PNP(p=0.0001),30min after PNP(p=0.04) and at the time of extubation(p=0.0001) though there is no statistical significance in the pre operative period group D 77.3±7.25 and group F 80.0±5.30(p=0.105). SBP remained lower in the group D compared to group F through out the study but it is significant at the time of intubation [group D122.7±10.41,group F 130±8.13] p=0.003 ,15 min after pneumoperitoneum [group D 123.7±7.16,group F 133±6.81] p=0.0001 and at the time of extubation[group D 132.5±3.73,group F 134.6±4.81] p=0.022 while the pre op values are not significant between the two groups(p <0.05). DBP also showed statistically significant values at the time of intubation[group D 78.9±8.32, group F 86.2±4.56] p=0.0001 which is statistically significant, 15 mins after pneumoperitoneum [group D 80.2±6.69, group F 85.0±4.80]p=0.0023 considered extremely statistical significance and at the time of extubation [group D 80±4.26, group F 83.6±4.91] p=0.003 which is statistically significant while it remains elevated in both the groups during the study but not statistically significant.

Conclusion

The randomized controlled trial was designed to compare the efficacy of intravenous dexmedetomidine and fentanyl for attenuation of hemodynamic response to pneumoperitoneum in elective laparoscopic surgeries and incidence of adverse effects. The patient group received dexmedetomidine significantly lowered the HR,SBP,DBP and MAP and also reduced analgesic requirements and inhalational agents intra operatively than fentanyl group. The incidence of side effects like hypotension and bradycardia was minimal with dexmedetomidine. The incidence of pruritus and bradycardia were also minimal with the fentanyl.Dexmedetomidine effectively attenuates stress response following pneumoperitoneum than fentanyl resulting in greater reduction of HR,SBP,DBP and MAP, causing better hemodynamic stability in patients undergoing elective laparoscopic surgeries.

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