Total intravenous anaesthesia with Propofol for laparoscopic gastric bypass surgery: dexmedetomidine versus fentany l.

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Abstract: Background: To compare the efficacy of dexmedetomidine versus fentanyl infusion during general anesthesia using total intravenous anesthesia with Propofol in laparoscopic bariatric surgeries. The primary outcome was to compare the recovery profile between dexmedetomidine and opioids (fentanyl), while recording any adverse outcome was the secondary outcome. **Patients and methods:** Prospective randomized study was carried out on sixty-four patients scheduled for elective laparoscopic bariatric surgeries divided to Group I (Dexmedetomidine group) which received loading dose of dexmedetomidine (0.5 ug/kg) intravenously over 10 minutes before induction of anesthesia followed by continuous infusion at a rate of (0.5 ug/ kg/ hr) after intubation and group ii (fentanyl group) which received fentanyl (1 ug/kg) was given intravenously over 10 minutes before induction of anesthesia as loading dose followed by continuous infusion at a rate of (1ug/kg/hr) after intubation. Demographic data, MAP and HR were recorded at baseline, before induction, before intubation, after tracheal intubation, at skin incision, at every 30 minutes until the end of surgery. BIS was recorded every 30 minutes, the total amount of Propofol used, urine output, postoperative pain and incidence of adverse effects, the time from reversal of anesthesia to spontaneous eye opening, follow simple commands, tracheal extubation, time of first analgesic requirement, postoperative O_2 saturation were assessed. **Results:** There was statistically significant decrease in HR in group I compared to group II at all times of measurement except before induction of anesthesia and at 150 minutes. On the other hands, MAP was significantly decrease after tracheal intubation, at skin incision, at 30 minutes, 60 min, 90 min and 120 min in group I compared to group II. There was statistically significant decrease in time to spontaneous eye opening, time to follow simple commands and time to tracheal extubation in group I compared to group II with statistically significant decrease in additional amount of Propofol (mg) required to control the blood pressure and maintain BIS < 60 in group I as compared to group II. Comparison between both groups revealed significant decrease in VAS at 2 hours postoperative in group I compared to group II and the time of the first request for rescue analgesia was statistically significant prolonged in group I in comparison to group II with statistically significant decrease of the total dose of Morphine consumption as rescue analgesia in group I compared to group II postoperative. **Conclusion:** The dexmedetomidine can be used with advantage instead of fentanyl for facilitation of anesthesia in patients receiving total intravenous anesthesia (TIVA) for laparoscopic bariatric surgeries.

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1. Introduction

Anesthetic management of morbidly obese patients poses a challenge to the anesthesiologist.(1) Prevalence of a difficult airway, risk for aspiration, pulmonary embolus and presence of concomitant disease in morbidly obese patients must be considered.(2)

The incidence of obstructive sleep apnea and decreased tissue oxygenation is high in morbidly obese patients, increasing the risk of morbidity and mortality due to inadequate postoperative ventilation.(3)

The choice of anesthetic technique for general anesthesia in morbidly obese patients remains controversial.(4) Because of concern that opioids might cause perioperative respiratory depression.(5) Several drugs, including clonidine, ketamine, magnesium, lidocaine, ketorolac, and steroids have all been shown to be analgesic.(6)

The intraoperative use of narcotics was substituted with dexmedetomidine a highly selective α2-adrenergic agonist with hypnotic, sedative, sympatholytic, and analgesic properties.(7)

The aim of the present study was to compare the efficacy of dexmedetomidine versus fentanyl infusion during general anesthesia using total intravenous anesthesia with Propofol in laparoscopic bariatric surgeries. The primary outcome was to compare the recovery profile between dexmedetomidine and

opioids (fentanyl), while recording any adverse outcome was the secondary outcome.

2. Patients and Methods

This prospective randomized study was carried out in General Surgery Department at Tanta University Hospitals from July 2016 to July 2017 after it had been accepted by the local research ethics committee (Tanta Faculty of Medicine Research Ethics Committee, approval code 30833/03/16). Sixty-four patients aged from 20 to 40 years, from both sex, ASA physical status II with BMI ≥ 35 kg/m2 scheduled for elective laparoscopic bariatric surgeries after obtaining the approval of the research ethics committee of the faculty of medicine were included in the study after a written informed consent was obtained from all patients.

Patients were excluded if they have allergy to α2 -adrenergic agonist or sulfa drugs, history of myocardial disease, clinically significant neurologic, renal, hepatic, or gastrointestinal diseases and those received opioid medication within 24 hours before the operation.

Two hours before surgery, each patient was received SC enoxaparine 0.5 mg/kg lean body weight (LBW). Immediate before surgery, premedication by intravenous 10 mg of metoclopramide, 50 mg of ranitidine, 8 mg of dexamethazone and thromboembolic prophylaxis by elastic stocks and18 G intravenous cannula was inserted and ringer's 10 ml/kg/hr was infused.

At arrival to operating room, automated blood pressure cuff (NIBP), electrocardiogram (ECG), pulse oximetry were applied to each patient and the baseline parameter was observed and recorded.

Randomization was performed using a computer random number generator and the assignment entered in sealed envelopes that were opened by a chief nurse who did not participate in patients' care after obtaining informed consent. All operating room personnel and anesthetist were blind to study drugs involved in patient care. Simple randomization table was used for random allocation of the patient into two groups (According to each group fentanyl or dexmedetomidine was prepared in covered syringe with 50 ml saline);

In Group I (Dexmedetomidine group):

The patient in this group received loading dose of Dexmedetomidine (0.5 ug/kg) (Precedex, Abbot Laboratories Inc., Abbot Park, IL, USA) intravenously over 10 minutes before induction of anesthesia followed by continuous infusion at a rate of (0.5 ug/ kg/ hr) after intubation.

In Group II (Fentanyl group):

Fentanyl (1 ug/kg) was given intravenously over 10 minutes before induction of anesthesia as loading dose followed by continuous infusion at a rate of (1ug/kg/hr) after intubation.

For both groups, preoxygenation with 100% O_2 was done until SPO_2 > 95% through well fitted face mask. General anesthesia was induced with lidocaine 1.5 mg/kg, Propofol 2 mg/kg and cisatracurium 0.15 mg/kg (ideal body weight). Ventilation was done for 3 minutes then intubation was done with suitable sized cuffed endotracheal tube (ETT). After intubation, a nasogastric tube was inserted to decompress stomach and urinary catheter was inserted. All pressure points were adequately padded.

Ventilation of the lung using pressure controlled mode was initiated with a peak airway pressure that provided a tidal volume of 6-8 ml/kg IBW and an upper limit of 40 cmH_2O, I:E ratio was 1:2, the patients' lungs was ventilated with a mixture of 50% air in oxygen with adjusted respiratory rate and tidal volume to maintain normocapnia ($EtCO_2$ 32-35 mmHg) and SPO_2 between 95-100%. Positive end-expiratory pressure was adjusted at 5-10 cm H_2O taking into consideration safe effect on hemodynamic parameters.

In order to control the depth of anesthesia BIS (bispectral analysis of EEG) monitoring (Covidien, Mansfield, MA, USA) also was used.

Propofol infusion at rate 10 mg /kg/ hr for the first 10 min, 8 mg/kg/hr for the next 10 min and then at 5–6 mg/kg/hr for the duration of the procedure. Which was further reduced to 2 mg/ kg/ hr at skin closure. Bolus dose of Cisatracurium (0.03 mg / kg) every 20-30 minutes. Bolus dose of Propofol (0.5 mg/ kg) was given if blood pressure, heart rate were increased 20% or more above baseline and BIS was increased more than 60 and was recorded.

At end of the surgery in both groups; the infusion was discontinued 10 minutes before the end of surgery and muscle relaxant was reversed by Neostigmine (0.05 mg/kg) and Atropine (0.02 mg/kg). The patients were extubated awake after spontaneous eye opening and followed simple command then transferred to the PACU. Patients with VAS of 4 or greater had received IV morphine in a dose of 3 mg that may be repeated considering the total dose consumption not exceeding 10 mg morphine in 12 hours postoperative. However, patients with VAS less than 4 were received 1 gm paracetamol every 6 hours.

Demographic data that include (age in years, gender, BMI in kg/m^2 and duration of surgery in minutes) were recorded in both groups.

In addition, MAP and HR were recorded at baseline, before induction, before intubation, after tracheal intubation, at skin incision, at every 30 minutes throughout the surgery until the end of surgery. Also, BIS was recorded every 30 minutes, the total amount of Propofol used (mg), urine output (ml

/hr), postoperative pain and incidence of adverse effects were recorded.

Also, the time from reversal of anesthesia to spontaneous eye opening (minutes), Follow simple commands (minutes), tracheal extubation (minutes), time of first analgesic requirement, postoperative O_2 saturation were assessed in both groups.

Statistical analysis

A pilot study was carried on 10 obese patients (Presented for laparoscopic bariatric surgeries were not included in the final study). They were equally and randomly allocated into either fentanyl or dexmedetomidine group. The time for extubation was significantly decreased with the use of dexmedetomidine (11.20 ± 2.406 min) than with the use of fentanyl (17.40 ± 2.074 min). So, at least 32 patients were required in each group to detect 2 minutes significant change in the time to extubation at α value of 0.05 and 90% power of the study. Results were collected, tabulated and statistically analyzed by an IBM compatible personal computer with SPSS statistical package version 20 (SPSS Inc. Released 2011. IBM SPSS statistics for windows, version 20.0, Armnok, NY: IBM Corp.). Descriptive statistics was expressed in: Number (No), percentage (%) mean ($\bar{x}$) and standard deviation (SD). Student's t-test used for comparison of quantitative variables between two groups of normally distributed data, while Mann Whitney's test was used for comparison of quantitative variables between two groups of not normally distributed data. Paired t-test was used to compare different readings of normally distributed data in the same group (ex, before and after treatment), and Wilcoxon test was used to compare different readings of not-normally distributed data in the same group. Pearson correlation was used to show correlation between two continuous normally distributed variables while Spearman correlation was used for not normally distributed ones. Chi-square test (χ^2) was used to study association between qualitative variables. Whenever any of the expected cells were less than five. P Value of < 0.05 was considered statistically significant.

3. Results

Ninety-two patients were examined to be included in the study. Twenty-eight patients were excluded; eight did not meet the inclusion criteria and twenty patients refused to participate in this study. The remaining 64 patients were allocated in the two studied groups (32 patients each) (Figure 1).

The age, BMI of the studied patients were comparable in both groups (p value > 0.05). The duration of surgery ranged between 90 -150 minutes in the two groups with mean values of 117.66 ± 19.55 minutes and 117.50 ± 17.73 minutes in group I and group II respectively with no statistically significant difference between both groups. (p value > 0.05). Male patients were 5 patients (15.6 %) and 6 patients (18.8 %) in group I and II respectively, while female patients were 27 (84.4%) patients and 26 patients (81.2%) in group I and II respectively with no statistically significant difference between both studied groups (p value > 0.05) but at the same group there was statistically significant difference between male and female as the surgery was performed more frequently in female than male (p value < 0.05) (Table 1).

There was statistically significant decrease in HR in group I compared to group II at all times of measurement (p value < 0.05) except before induction of anesthesia and at 150 minutes it was insignificantly changed (p value >0.05) (Figure 2).

On the other hands, MAP was insignificantly changed in the mean values of before induction of anesthesia, before intubation and at 150 minutes (p value >0.05), while significantly decrease after tracheal intubation, at skin incision, at 30 minutes, 60 min, 90 min and 120 min in group I compared to group II (p value< 0.05) (Figure 3).

Regarding recovery profile, there was statistically significant decrease in time to spontaneous eye opening, time to follow simple commands and time to tracheal extubation in group I compared to group II (p value < 0.05 for all) (Table 2).

The bispectral index not significantly changed between both groups at all times of measurement (p value > 0.05) (Table 3). The required additional dose of Propofol to adjust the intraoperative MAP and to maintain BIS <60 was ranged from 0-80 mg and 0-160 mg with mean values of 6.25 ± 20.60 mg and 72.50 ± 45.9 mg in group I and group II respectively with statistically significant decrease in additional amount of Propofol (mg) required to control the blood pressure and maintain BIS < 60 in group I as compared to group II (P < 0.05).

The visual analogue score (VAS) ranged from 0-4, 0-6, 1-6, 1-7, 1-6 and 1-3 at 2 hr, 4 hr, 6 hr, 8 hr, 10 hr and 12 hours in group I while it ranged from 0-5, 1-6, 1-7, 1-7, 1-7 and in group II respectively. Comparison between both groups revealed significant decrease in VAS at 2 hours postoperative in group I compared to group II (p value <0.05) and no statistically significant changes at 4hr, 6hr, 8hr, 10 hr and 12 hr postoperative between both groups (p value > 0.05) (Figure 4).

The time of the first request for rescue analgesia was statistically significant prolonged in group I (4.56± 1.46 h) in comparison to group II (3.00± 1.24) (p value < 0.05) (Figure 5). With statistically significant decrease of the total dose of Morphine consumption as rescue analgesia in group I (5.53±

1.34 mg) compared to group II (7.50± 1.70 mg) postoperative (P value < 0.05).

Eight patients (25 %) developed bradycardia in group I intraoperative during maintenance of dexmedetomidine while 2 patients (6.25 %) developed bradycardia in group II. The incidence of bradycardia was significantly increased in group I than group II (p value < 0.05). Also, the incidence of hypotension was significantly increased in group I in comparison to group II (p value <0.05) as 10 patients (31.25 %) at group I developed hypotension while only 3 patients (9.4 %) of group II developed hypotension. Moreover, the incidence of nausea and vomiting was significantly increased in group II as compared to group I (p value < 0.05) as the incidence of nausea and vomiting was 8 patients (25 %) in group II and 2 patients (6.25 %) in group I. On the other hand, the incidence of post-operative hypoxemia (SpO2< 90%) was insignificant among the two groups (p value > 0.05) and was managed successfully by mask oxygen.

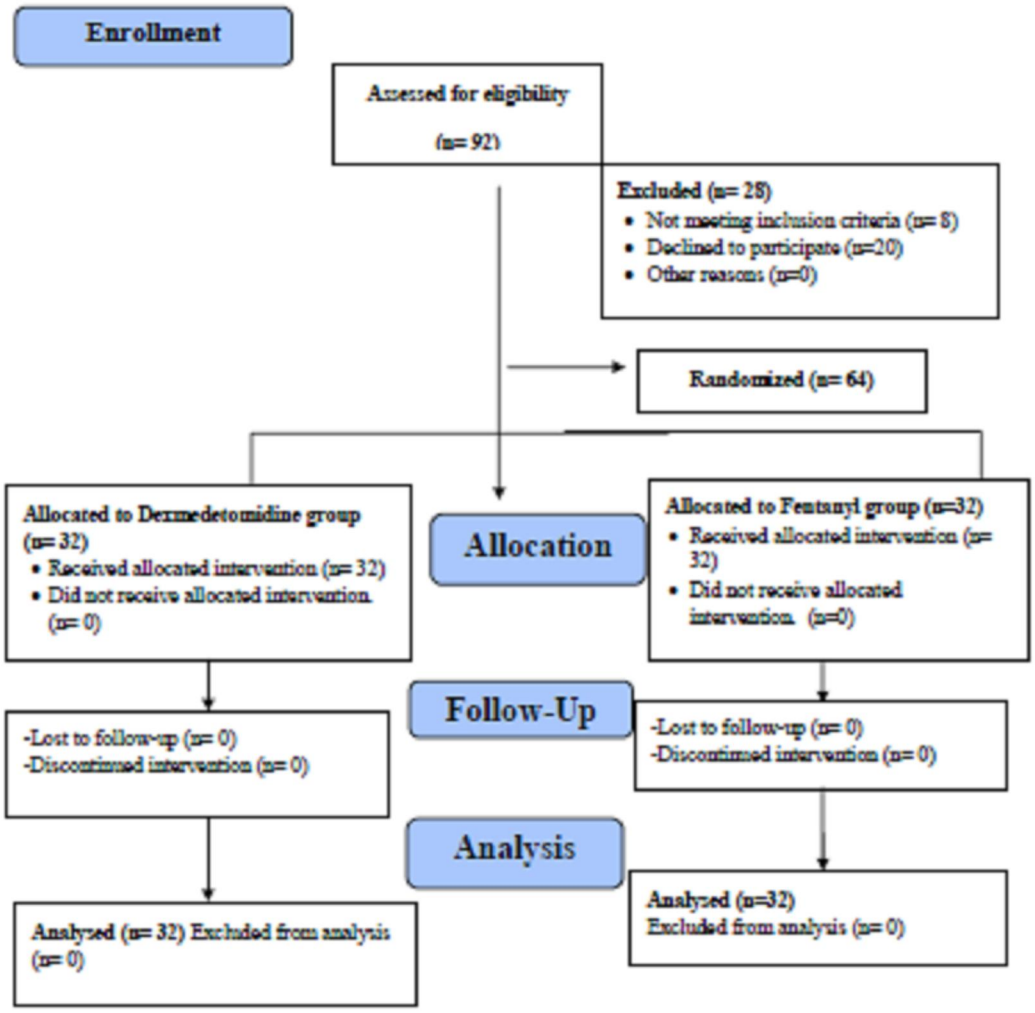

Figure 1. patient flow diagram.

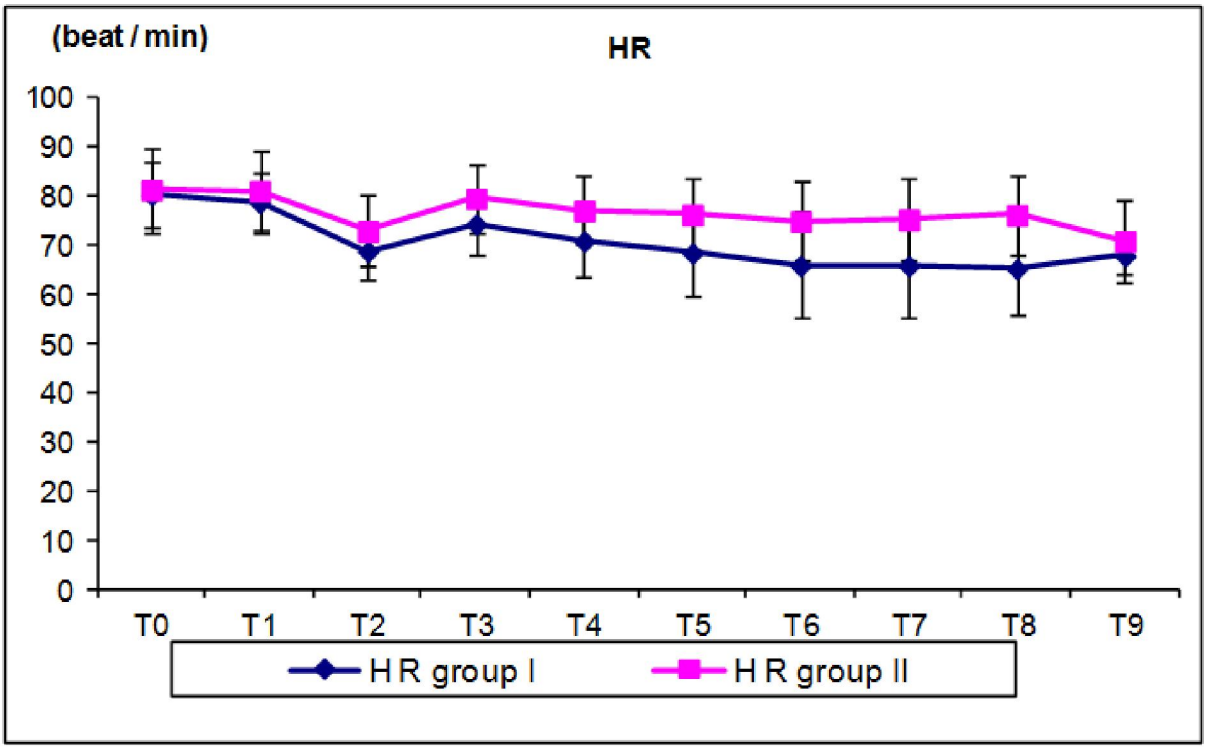

Figure 2. Comparison of HR (b / min) between group

T0 = baseline T1= before induction T2 = before intubation T3= after tracheal intubation T4= at skin incision T5= at 30 minutes T6= 60 min T7= 90 min T8=120 min T9= 150 min

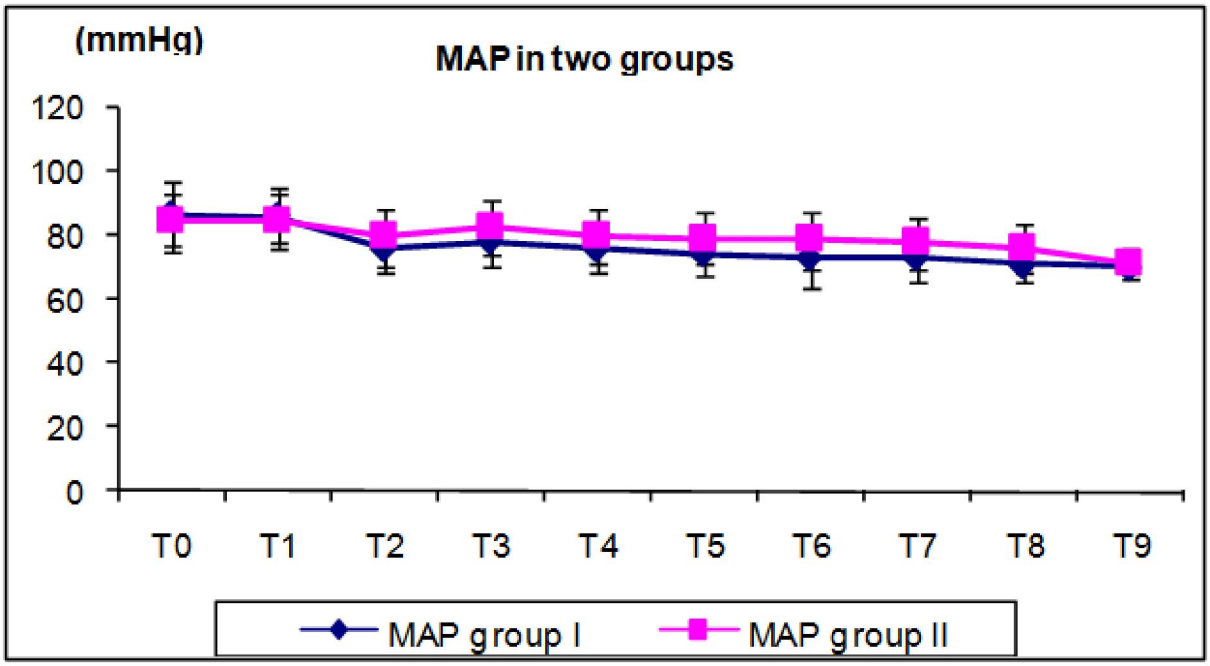

Figure 3. Comparison of mean arterial blood pressure (MAP) changes (mmHg) between groups.

T0 = baseline T1= before induction T2 = before intubation T3= after tracheal intubation T4= at skin incision T5= at 30 minutes T6= 60 min T7= 90 min T8=120 min T9= 150 min

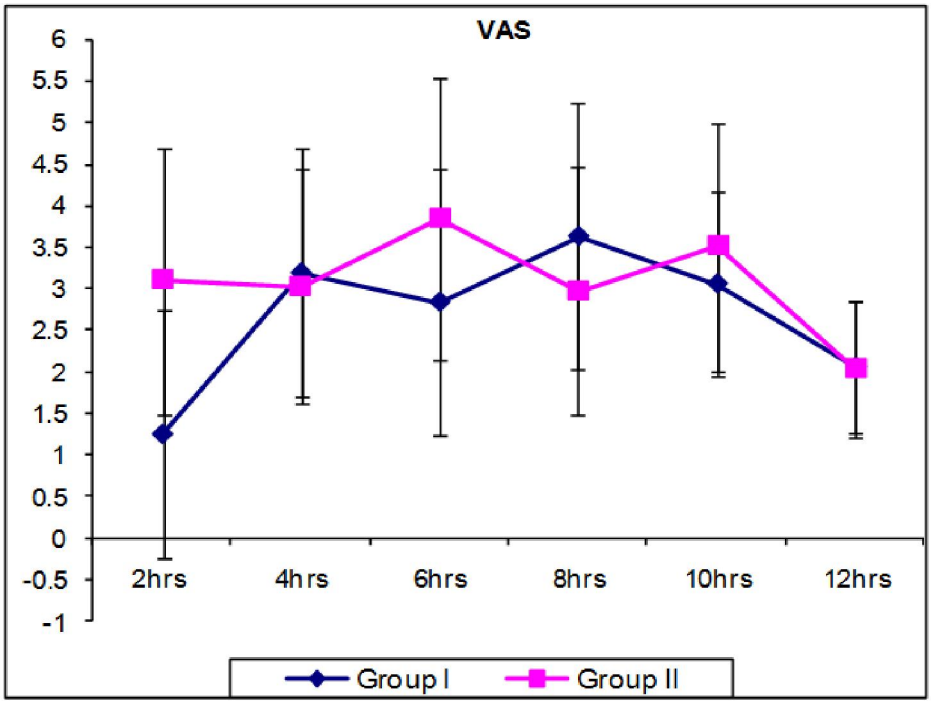

Figure 4. comparison of visual analogue score between groups.

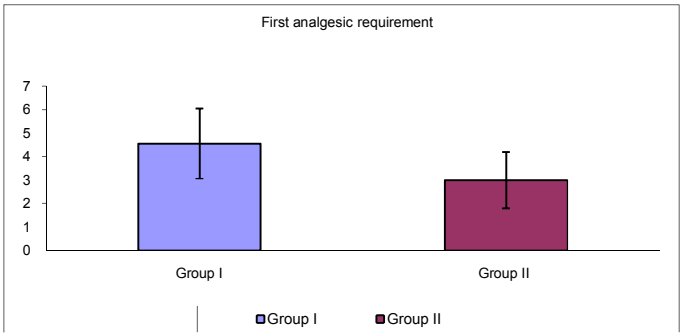

Figure 5. Time of first analgesic requirement (hr) in both groups.

Table 1: Comparison of demographic data between groups:

		Group I	Group II	t. test	p. value
Age	**Range**	20 – 40	20 – 40	0.111	**0.740**
	Mean ± SD	30.66 ± 5.55	30.19 ± 5.69		
BMI	**Range**	35 – 49	35 – 49	0.894	**0.348**
	Mean ± SD	41.88 ± 4.35	42.84 ± 3.84		
Duration of surgery	**Range**	90 – 150	90 – 150	0.001	**0.973**
	Mean ± SD	117.66 ± 19.55	117.50 ± 17.73		
Sex	**Male**	5 (15.6%)	6 (18.8%)	0.112	**0.740**
	female	27 (84.4%)	26 (81.2%)		

Table 2: comparison of the recovery profile between groups:

Recovery		Range			Mean	±	S. D	t. test	p. value
T1	**Group I**	1	–	8	3.50	±	1.61	71.745	**0.001***
	Group II	4	–	13	7.59	±	2.21		
T2	**Group I**	3	–	12	5.41	±	2.27	60.732	**0.001***
	Group II	5	–	17	10.28	±	2.71		
T3	**Group I**	4	–	16	7.25	±	2.87	68.649	**0.001***
	Group II	7	–	20	13.03	±	2.71		

*: statistically significant ($p<0.05$), T1: time to spontaneous eye opening (minutes), T2: time to follow simple commands (minutes), T3: time to tracheal extubation (minutes).

Table 3. Comparison of bispectral index changes between groups:

		Range	Mean ± S. D	t. test	p. value
BIS 30 min.	**Group I**	43–57	48.91±3.88	1.063	**0.307**
	Group II	44–60	49.91±3.88		
BIS 60 min.	**Group I**	43–60	49.56±3.69	0.012	**0.915**
	Group II	43–60	49.47±3.27		
BIS 90 min.	**Group I**	44–58	49.66±3.44	1.055	**0.308**
	Group II	45–60	50.63±4.08		

Table 4. comparison of the recovery profile between groups:

Recovery		Range	Mean ± S. D	t. test	p. value
T1	**Group I**	1–8	3.50±1.61	71.745	**0.001***
	Group II	4–13	7.59±2.21		
T2	**Group I**	3–12	5.41±2.27	60.732	**0.001***
	Group II	5–17	10.28±2.71		
T3	**Group I**	4–16	7.25±2.87	68.649	**0.001***
	Group II	7–20	13.03±2.71		

*: statistically significant ($p<0.05$), T1: time to spontaneous eye opening (minutes), T2: time to follow simple commands (minutes), T3: time to tracheal extubation (minutes).

4. Discussion

The current study hypothesized that the use of dexmedetomidine for facilitation of anesthesia in patients receiving total intravenous anesthesia (TIVA) for laparoscopic bariatric surgeries had offered intraoperative control of blood pressure and heart rate, decreased the total amount of Propofol required to maintain anesthesia more than fentanyl. The primary outcome was to evaluate the recovery profile while the secondary outcome was recording any adverse events.

The use of dexmedetomidine in total intravenous anesthesia in comparison to the use of fentanyl significantly decreased the HR and the MAP. As dexmedetomidine is a pharmacologically active dextroisomer of medetomidine that displays specific and selective α2- adrenoceptor agonism. Activation of the receptors in the brain and spinal cord inhibits neuronal firing causing hypotension, bradycardia, sedation, and analgesia. In general, presynaptic activation of the α2 adrenoceptor inhibits the release of norepinephrine, terminating the propagation of pain signals. Postsynaptic activation of α2 adrenoceptors in the central nervous system (CNS) inhibits sympathetic activity and thus can decrease blood pressure and heart rate. The present study confirmed that dexmedetomidine decreased blood pressure and heart rate compared with fentanyl infusion.(8)

In agreement with the present study, Bakhamees et al., in their study on laparoscopic Roux-en-Y gastric bypass surgery evaluated the effect of dexmedetomidine versus placebo on hemodynamic profile. They found that heart rate and mean arterial blood pressure were decreased in dexmedetomidine group when compared with placebo. (9)

Also, similar finding was reported by Feld et al., who evaluated whether dexmedetomidine infusion could replace fentanyl for facilitation of open gastric bypass surgery randomized to receive either fentanyl or dexmedetomidine for intraoperative analgesia, they showed that dexmedetomidine by its sympatholytic activity attenuates various stress responses during surgery and maintains hemodynamic stability.(10)

Against the current study, Turgut et al., who evaluated the effects of dexmedetomidine infusion

versus fentanyl on perioperative hemodynamics when used for general anesthesia during spinal laminectomy who randomized into two groups. They concluded that, MAP values in dexmetomidine group were significantly higher than in fentanyl group only after intubation and there was no statistical difference in heart rate between both groups. Increased MAP after intubation can be explained by the peripheral α2-adrenoceptor stimulation of vascular smooth muscle and can be attenuated by a slow infusion over 10 minutes or more.(8)

As regard to anesthetic requirements, dexmedetomidine decreased the additional required dose of propofol to adjust MAP and BIS significantly. As α2-adrenergic mechanisms are involved in the modulation of nociception at the level of spinal noradrenergic systems. There is clear evidence that α2-adrenoceptors are located on the dorsal horn neurons of the spinal cord and might release endogenous opiate compounds. Thus, the α2-adrenoceptor agonists may offer interesting new possibilities in the treatment of pain and may help to reduce intraoperative opioids requirements.

In agreement with the present study, Kamal, who conducted a study on eighty bariatric patients allocated to either received Fentanyl infusion as intra-operative analgesia and group received Dexmedetomidine infusion. They showed that the total amount of propofol required to maintain the target BIS level was significantly lower in the dexmedetomidine group compared with the fentanyl group and dexmedetomidine significantly maintain the hemodynamic stability as compared with the other group. (11)

Moreover, Le Guen et al., in their study compared between dexmedetomidine or comparable volumes of saline as a placebo. They found that patients given dexmedetomidine required significantly less Propofol and remifentanil for anesthetic induction.(12)

Also, the recovery profile, it was improved by dexmedetomidine significantly as it was decreased the time to spontaneous eye opening, the time to follow commands and the time to tracheal extubation as compared to fentanyl. This could be attributed to absence of opioid and less amounts of intraoperative Propofol required to maintain anesthesia in this group of patients.

In agreement with the current study, Nunes and Cavalcante, where 40 females submitted to gynecological laparoscopy under general anesthesia maintained with sevoflurane were randomly divided in to group I (without dexmedetomidine) and group II (with dexmedetomidine). They concluded that dexmedetomidine has decreased sevoflurane end-expiratory concentration and time for emergence in groups II as compared to group I.(13)

Also Bakhamees et al., support the present study results when eighty adult patients were randomly assigned to group D received dexmedetomidine in loading and maintenance dose and group P received normal saline in the same volume and rate, they found that dexmedetomidine group show rapid recovery than placebo group.(9)

Against the current study results, Ohtani et al., sought to determine the effects of co-administration of dexmedetomidine on the recovery profiles from sevoflurane and propofol. They concluded when co-administered with dexmedetomidine, sevoflurane produced a shorter time to eye opening than propofol. These results suggest dexmedetomidine may delay recovery when given as an adjuvant to propofol during total IV anesthesia but the difference between this study and the present one that they compared different technique as they used inhalational anesthesia which we didn't use. (14)

The initial request for analgesia was significantly delayed in patients who delivered dexmedetomidine, with decreased the consumption of morphine as rescue analgesia significantly in comparison to fentanyl during the first 12 hour after surgery. The most obvious explanation for prolonged analgesia, as suggested by Arain et al., that dexmedetomidine has a half-life of approximately 2 hours and thus remained pharmacologically active well after the infusion was terminated at the end of anesthesia. (15)

This may be due to, the dexmedetomidine may be the anxiolytic and thymoanaleptic properties of α2-agonists, which act on the emotional component of postoperative pain. The decrease in postoperative opioids use in dexmedetomidine treated patients may be important for attenuating the risk of narcotic induced postoperative respiratory depression and hypoxemia in patients after laparoscopic bariatric surgery.

In agreement with the present study, Le Guen et al., found that patients given dexmedetomidine required significantly less propofol and remifentanil for anesthetic induction. The first postoperative request for morphine analgesia was significantly delayed in patients given dexmedetomidine. (12)

In addition, Hofer et al., reported the narcotic sparing effects of dexmedetomidine were evident both intraoperatively (low isoflurane requirements) and postoperatively (lower total dose of self-administered PCA morphine). (16)

However, against the current study, McQueen-Shadfar et al., assessed the impact of intraoperative dexmedetomidine infusion on postoperative analgesia in women undergoing major open and laparoscopic gynecologic surgery under general anesthesia, there

was no opioid sparing effect intraoperatively or in PACU. The duration of PACU stay was longer in patients having laparoscopic surgery who received dexmedetomidine. Patients who received dexmedetomidine had a significantly lower heart rate and MAP in PACU. While this did not appear to be clinically significant, it might have contributed to the longer PACU stay seen in patients undergoing laparoscopic surgery. This study used dexmedetomidine in a different method from our study as they used infusion rate in the range of 0.2- 0.7 mic/kg/hr without bolus dose and was started 19 min after induction of anesthesia and stopped 23 min before end of surgery. (17)

According to adverse events, the use of dexmedetomidine significantly increased the incidence of bradycardia and hypotension as compared to fentanyl but fentanyl increased the incidence of postoperative nausea and vomiting. Patients after bariatric surgery are at high risk of postoperative nausea and vomiting (PONV). Opioid-free TIVA was able to reduce PONV and its severity compared with inhalation anesthesia or opioids in patients undergoing bariatric operations.

In consistent with the present study, Turgut et al., they concluded that Propofol-fentanyl medication requires a higher dosage of postoperative analgesics and causes frequent postoperative nausea and vomiting compared with Propofol- dexmedetomidine for patients undergoing elective spinal laminectomy.(8)

However, against that, in Bakhamees et al., found that there was no difference in the incidence of postoperative nausea and vomiting between both groups either received dexmetomidine or fentanyl. However, the difference between this study and our one that they had different sample size and different technique as they used opioids in both groups. (9)

We had many limitation, absent of using inhalational anesthesia, the present study didn't compare the effect of different doses of dexmedetomidine and Sample size was small and may need further studies with increasing sample size.

The concurrent study recommends using dexmedetomidine in bariatric surgery, with further studies to evaluate the effect of Dexmedetomidine infusion in dose of 0.2 mic/ kg/hr instead of 0.5 mic/kg/hr to avoid incidence of hypotension and bradycardia. Also, further studies using dexmedetomidine with maintenance dose without loading one are recommended.

It can be concluded from the present study that dexmedetomidine can be used with advantage instead of fentanyl for facilitation of anesthesia in patients receiving total intravenous anesthesia (TIVA) for laparoscopic bariatric surgeries.

Conflicts of interest

"The authors declare no competing interests."

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