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Research article

Effect of perioperative dexmedetomidine infusion on blood glucose levels in non-diabetic morbid obese patients undergoing laparoscopic bariatric surgery☆

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ABSTRACT

Background: This study was designed to assess the clinical efficacy of dexmedetomidine premedication on neuroendocrine stress response by analysis of perioperative fluctuation of blood sugar level during laparoscopic bariatric surgery. Dexmedetomidine when used as an additive to general anesthesia blocks stress response to various noxious stimuli, maintains perioperative hemodynamic stability.

Settings and design: Sixty patients undergoing laparoscopic sleeve gastrectomy were divided randomly into two groups. The dexmedetomidine group (Group D), received dexmedetomidine infusion, while the control group (Group C) received normal saline 0.9% in the same amount and rate as placebo. In group D, dexmedetomidine was given intravenously (IV) as loading dose of 1 μg/kg over 10 min prior to induction. After induction, it was given as infusion at a dose of 0.5 μg/kg/h for maintenance.

Perioperative blood sugar levels were analyzed preoperatively, at 30 min after beginning of surgery then hourly till surgery ends, and six h after surgery. Anesthetic and surgical procedures were standardized. All patients were also assessed for intraoperative hemodynamic changes at specific timings, intraoperative narcotic consumption and recovery profile.

Results: Perioperative administration of dexmedetomidine infusion had essentially weakened the stress response. In the C group there was significantly higher blood sugar values compared to group D one hour after start of surgery up to 6 h later. Also, regarding hemodynamics there was significant reduction in heart rate (HR) and mean arterial blood pressure (MAP) in D group.

Conclusions: During the laparoscopic sleeve gastrectomy, dexmedetomidine premedication has effectively regulated the neuroendocrine stress response of general anesthesia as analyzed by perioperative blood sugar variation. Also, it maintained the hemodynamic stability.

1. Introduction

The surgical procedure's stress response is a major cytokine and neuroendocrine sequel to surgical injury which lead to rapid increase in catecholamine and steroid hormones levels [1]. This has been contemplated as a physiological defense mechanism that is an important risk factor for the body's adaptation to the noxious insults [2].

Hypothalamus stimulation during stress results in adrenocorticotrophic hormone release that in turn starts sudden increase in cortisol level. The cortisol mobilizes protein and fat from the body stores, and renders them available for synthesis of glucose leading to hyperglycemia [3].

The resulting hyperglycemia can adversely affect patient outcomes by producing hazardous effects on immunity thus increasing the % of postoperative complications. Increase in mean intraoperative blood sugar readings as minimal as 20 mg/dL; have been attached to increased adverse outcomes by 30% [4].

The laparoscopic surgery has the privilege of being a low stress level surgery with fewer pulmonary complications, but still causing increased hemodynamic stress responses [5,6].

Various pharmacological agents were used to attenuate surgical stress of laparoscopic procedures to improve outcome such as nitroglycerine, beta blocker, and opioids. α-2 agonists have been also used [7].

☆ This study was done in the surgical department of Ain Shams university educational hospital, Cairo, Egypt.
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The α-2 receptor activation reduces norepinephrine surge, which can be utilized as an effective agent to induce sympatholysis [8]. Because of its sympatholytic properties, Dexmedetomidine was gradually developed as a premedication, aiming for decreasing the sympathetic response to perioperative stressful conditions as laryngoscopy and endo-tracheal intubation [9]. Therefore, monitoring blood sugar level can reflect the metabolic stress response to surgery and Dexmedetomidine role in blunting this stress response.

Dexmedetomidine additionally has an analgesic effect. Because dexmedetomidine has no depressant effects on ventilation, its analgesic effect may offer a significant advantage for morbid obese (MO) patients who might be at risk for respiratory complications [10].

The 1^{ry} goal of the current study was to record the influence of perioperative dexmedetomidine adminstration on modulation of neuroendocrine stress response during laparoscopic bariatric surgery by analyzing the variation of perioperative serial blood sugar levels. The 2^{ry} outcome measures were intraoperative hemodynamics changes and narcotic consumption in addition to postoperative adverse effects and recovery profile.

The originality of this study lies in the context that it is the 1st time to explore a newly added advantage of dexmedetomidine medication in lowering blood sugar level in this specific patients' group: "morbidly obese patients" (who might be diabetic) and who would really get benefit from perioperative blood sugar level control.

2. Subjects and methods

2.1. Selection of patients and randomization

The protocol of this double-blind prospective randomized study was endorsed by the Institutional Ethical Committee, and written informed consent was gotten from all patients. Sixty morbid obese non diabetic adult patients of American society of anesthesiologists (ASA) physical status II and III of either sex, aged 20–50 years, scheduled for elective laparoscopic gastric sleeve under GA with body mass index (BMI) ranging from 35 to 55 kg/m^2 from February 2017 to April 2017 in Ain Shams University – Assembled operating theater. No patient suffered from cardiac, pulmonary, liver, kidney, or metabolic disorders, or was receiving medications that might affect sympathetic response or hormonal secretions. Also, none have other endocrinal disorders that affect blood sugar levels such as; Cushing syndrome and hyperthyroidism or were receiving drug therapy significantly affecting blood sugar level such as corticosteroid therapy. Patients allergic to Dexmedetomidine or positive pregnancy test were disbarred from the study. Also, patients with allergy to eggs or soy were disbarred. Complicated surgeries with prolonged duration > 2 h were also excluded.

All patients have undergone a detailed pre-anesthetic evaluation. All basic investigations (e.g. fasting blood sugar, serum hemoglobin, kidney function tests, liver function tests, coagulation profile, Glycated hemoglobin (HbA1c), chest x-rays and electrocardiogram (ECG) were checked. Patients with HbA1c levels ≥6.5% (indicating undiagnosed Diabetes Mellitus) were excluded.

The patients were arbitrarily distributed into two study groups of 30 patients each as per a computer-generated code.

Both groups' patients were operated by standard surgical technique during morning hours to minimize variability in the secretion of hormones.

2.2. Anesthetic technique

Once arriving to operation room; basic monitors were applied to the patient. Ringer intravenous infusion was started, followed by administration of an antiemetic. Group D patients (n = 30) were given intravenous dexmedetomidine 1 μg/kg diluted in fixed volume of normal saline (100 ml) and Group C patients (n = 30) were given normal saline with same volume as Group D, over a 10 min duration before starting anesthesia. Drug doses utilized throughout the anesthetic procedure were ascertained in view of the 100 kg weight. Lean body weight is the ideal dosing scalar for most medications used in anesthesia. So dosages were given according of a 100 kg patient and then top up doses could be given if needed [11]. After proper assessment of the airway and anticipation of difficult airway, pre-oxygenation with 100% O_2 on 8 L/min. for 3 min. via face mask is started. Induction of anesthesia was achieved with propofol 2 mg/kg IV and fentanyl 2 μg/kg IV and atracurium besylate 50 mg IV, and anesthesia maintenance was done by 2–3% sevoflurane. After oro-tracheal intubation, controlled mechanical ventilation (CMV) was started. For both groups, CMV was achieved by tidal volumes of 8–10 ml/Kg to avoid barotraumas and respiratory rates of up to 12–14 breaths/min to maintain normocapnia and Positive End Expiratory Pressure (PEEP) of 5–10 cm H_2O. Patients were then placed in the semi-lithotomy position. Operation was performed through five abdominal trocars. Intra-abdominal pressure was kept at the range of 12–15 mmHg. Supplemental boluses of Atracurium besylate 0.1 mg/kg IV were administered every 20 min to maintain muscle relaxation during surgery.

Maintenance of anesthesia was done by sevoflurane 2–3% to keep the HR and MAP within 20% of preinduction values and/or HR < 85 beats/min during surgical stimulation.

Each Group D patient received a loading dose of dexmedetomidine 1 μg/kg lean body weight (LBW) over 10 min. prior to induction, followed by an infusion rate of 0.5 μg/kg/hr using a syringe pump. The infusion was discontinued when the laparoscopy ports were removed. The chosen loading and maintenance dexmedetomidine doses can be safely administered in MO patients as documented by previous studies [12,13].

Group C patients received the same volume of 0.9% saline, followed by a saline infusion.

Upon finishing the surgery, patients were extubated after fulfilling the extubation criteria. All subjects were transferred to the post-anesthesia care unit (PACU), where they were monitored for an additional 2 h and got nasal O_2 supplementation.

Hemodynamic parameters as HR and MAP were documented preceding premedication, before induction and after intubation, followed by/5 min for 30 min, thereafter every 15 min till surgery finishes and after extubation in all patients.

Any increase or decrease of HR or blood pressure intraoperatively, was managed as required. For example, MAP rise of > 20% above baseline was treated by administering a 0.5 μg/kg iv bolus of fentanyl and raising the end-tidal sevoflurane concentration to 3.5%. MAP drop of > 20% below baseline was dealt with at first with reduction of the end-tidal sevoflurane concentration to 1% and rapid intravenous fluid bolus (250 ml crystalloids). If still hypotensive, 6 mg ephedrine was given intravenously.

Additionally, total intraoperative narcotic consumption was recorded.

Recovery profile was evaluated by measuring several specific durations: tracheal extubation time, time to eye opening and time to follow verbal commands. All measured in minutes.

After transferal to PACU, patients were observed for any respiratory depression (respiratory rate < 8 breaths/min), or emesis and managed accordingly. Blood samples were analyzed by glucometer (Abbott Optium Xceed) for blood sugar level preoperatively, at 30 min after beginning of surgery then every hour till end of surgery, and 6 h after surgery.

Assessment of postoperative pain was done with the aid of visual analogue scale (VAS) in which patients were requested to estimate their pain on vertical VAS 0–10 cm where (0) is marked as no pain and (10) is marked as the worst pain ever felt. [14]. This was recorded at specific timings: 10, 30, and 60 min and at 2, 3, 6, 12 and 24 h postoperatively. Total dose of rescue analgesics given for each patient in the first postoperative day was recorded. 30 mg ketorolac was given intravenously if VAS score was > or equal to 4 at any of the mentioned times (with a

Table 1
Observer's assessment of alertness/sedation scale, OAA/S [15].

Assessment categories				Composite score level
Responsiveness	Speech	Facial expression	Eyes	
Responds readily to name spoken in normal tone	Normal	Normal	Clear, no ptosis	5
Lethargic response to name spoken in normal tone	Mild slowing or thickening	Mild relaxation	Glazed or mild ptosis (less than half the eye)	4
Responds only after name is called loudly and/or repeatedly	Slurring or prominent slowing	Marked relaxation	Glazed and marked ptosis (half the eye or more)	3
Responds only after mild prodding or shaking	Few recognizable words			2
Does not respond to mild prodding or shaking				1

maximum total ketorolac dose of 90 mg during 24 h).

Postoperative sedation was assessed using the Observer's Assessment of Alertness/Sedation scale (OAA/S) score [15] (Table 1) at preset timings: on arrival to PACU then 1 h, 2 and 3 h after PACU transferal.

2.3. Statistical analysis used

Group sample sizes of 29 patients per group achieve 80% power to detect a difference of 30 mg/dl in blood sugar level between both groups assuming the mean blood sugar level in the control group is 120 mg/dl with estimated group standard deviations of 30 and 90 mg/dl in treatment group with 40 mg/dl SD with a significance level (alpha) of 0.05 using a two-sided two-sample *t*-test. Thirty patients were included to replace any missed data.

Data were analyzed using Statistical Package for the Social Sciences (SPSS) 18.0 for Windows (SPSS, Chicago, IL, USA). Normally distributed numerical data were compared using the Student's *t*-test and are presented as mean ± SD, non-normally distributed were compared using Mann-Whitney test and are presented as median (IQR) categorical variables were analyzed using the χ^2 test and are presented as number. All P values are two-sided. $P < 0.05$ is considered statistically significant.

3. Results

There were no statistically remarkable differences between the 2 groups as regards patients characteristics: age, sex, BMI and length of surgery. The duration of anesthesia was somewhat longer on Group D yet with no significance as shown in Table 2.

Baseline values of HR and MAP were comparable in both groups. Intraoperatively, there was noteworthy reduction in HR and less decrease in MAP in D group, which is a known pharmacological action of the drug. Moreover there was a highly notable difference in both HR and MAP between both groups; with D groups showing lower values (No patients had persistent or severe hypotension). Starting 15 mins for HR ($p = 0.03$) and towards the end at 120 min ($p < 0.001$) (Fig. 1).

Table 2
Patients characteristics in the two study groups.

	Dexmedetomidine group (n = 30)	Control group (n = 30)	p-value
Age (year)	30.77 ± 6.9	29.9 ± 6.78	0.627
Gender (male, female)	Male: 11 (36.7%) Female: 19 (63.3%)	Male: 13 (43.3%) Female: 17 (56.7%)	0.792
Body mass index	41.37 ± 6.96	39.93 ± 5.83	0.391
Duration of surgery	91.33 ± 57.64	85.07 ± 12.4	0. 079
Duration of Anesthesia	108.67 ± 14.1	101.9 ± 15.69	0.084

Values are mean ± SD, number of patients.
$P > 0.05$ was considered statistically non-significant.

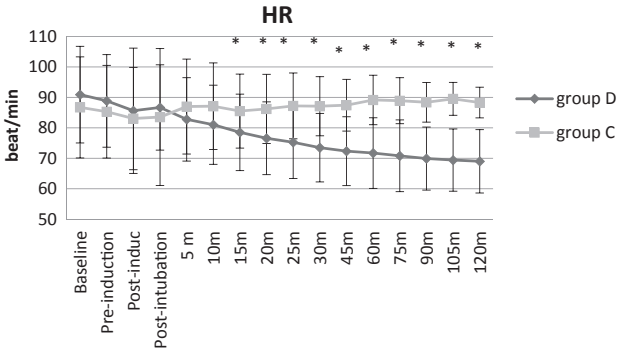


Fig. 1. Comparison of heart rate (HR) between dexmedetomidine group (Group D) and control Group (Group C). M = minutes. Lines are mean values and error bars are SD. * $P < 0.05$ is considered statistically significant.

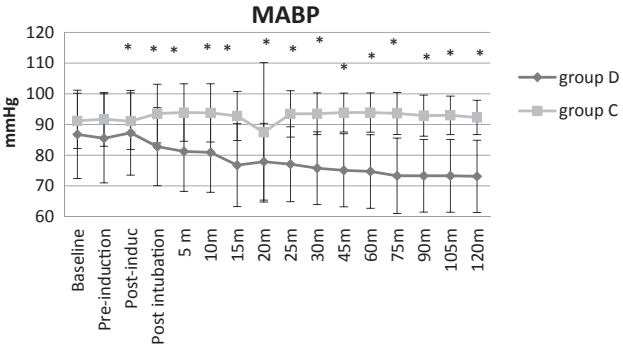


Fig. 2. Comparison of Mean Arterial Blood Pressure (MABP) between dexmedetomidine group (Group D) and control Group (Group C). * $P < 0.05$ is considered statistically significant.

For MAP it started postintubation ($p < 0.001$) till 120 mins ($p < 0.001$) (Fig. 2).

There was no statistically notable difference between the two groups as regards the basal level of blood glucose. Intraoperatively, in group C there was remarkably higher blood sugar readings compared to group D 1 h after start of surgery up to 6 h later ($p < 0.001$) as demonstrated in Table 3.

Regarding intraoperative fentanyl utilization, it was significantly less in dexmedetomidine group relative to control group ($p < 0.001$) (Table 4).

Recovery profile (which was assessed by specific 3 timings) was longer in dexmedetomidine group in respect to control group yet with no notably significant difference between both groups as appeared in Table 5.

One can notice that the time from turning off of Sevoflurane to tracheal extubation was considered as time for extubation and it was 5.83 ± 1.39 min. in group D, compared to 5 ± 1.73 min in group C.

In the present study, dexmedetomidine provides sedation without

Table 3
Comparison of random blood sugar (RBS).

Random blood sugar	Dexmedetomidine group (n = 30)	Control group (n = 30)	p-value
Baseline	92. 73 ± 16.9	8 9.7 ± 15.33	0.47
30 min after beginning of surgery	88.77 ± 14.46	95.3 ± 14.2	0.083
1 h	84.27 ± 20.1	101.3 ± 14.6	* < 0.001
2 h	81.57 ± 19.3	103.6 ± 14.36	* < 0.001
6 h	82.53 ± 12.95	106.97 ± 15.2	* < 0.001

Data are presented as mean ± SD.
* P < 0.05 is considered statistically significant.

Table 4
Perioperative analgesic consumption.

	Dexmedetomidine group (n = 30)	Control Group (n = 30)	p-value
Intraoperative Fentanyl in μg	178.33 ± 25.2	217.24 ± 27.6	* < 0.001
Postoperative Ketorolac consumption in mg (1st 24 h)	43 ± 15.12	75.5 ± 15.26	* < 0.001

Data are presented as mean ± SD.
* P < 0.05 is considered statistically significant.

delayed recovery.

Significantly less Postoperative pain score was noticed in dexmedetomidine group at: 10, 30 and 60 min postoperatively. During the other postoperative study periods, the pain scores were less in group D but with no notable difference between the 2 groups as shown in Fig. 3.

Postoperative ketorolac requirement during 1st postoperative day was significantly less in dexmedetomidine group relative to that in control group as shown in Table 4.

OAA/S score was used for sedation level assessment. Sedation level was deeper in MO patients, and significantly more patients accomplished an OAA/S score of 3. That was statistically significant (That was during 1st two postoperative hours). At the 3rd hour postoperatively, all patients in the 2 groups had a score of 5 and were fully conscious (Fig. 4).

On admission to PACU, there was no difference in respiratory complications in both groups. Zero patients out of 30 patients showed respiratory rate < 8 breaths per minute in both groups. Additionally, none of the patients in both groups required airway assistance.

For postoperative nausea and vomiting, there was no distinction between both groups (Table 6).

4. Discussion

Neuroendocrinal response, in other words, stress response to surgery is a well addressed problem that can have significant effect on patient outcome. Indirect indicators such as blood sugar are measured to reflect the neuroendocrinal response during surgery, so that the anesthetic technique could be modulated accordingly. Measurement of stress hormones such as cortisol level and catecholamines intraoperatively is non-practical and cumbersome [16].

Blood sugar increases after surgical stimulation with good correlation between the magnitude of rise in blood sugar and the extent of surgical injury to the tissues [17].

This study was directed to test the usefulness of dexmedetomidine as an additive to GA on the stress response during laparoscopic sleeve gastrectomy, which has a some degree of tissue injury.

Sixty patients undergoing laparoscopic sleeve gastrectomy were divided haphazardly into 2 groups: dexmedetomidine group (Group D) and control group (Group C). In group D, dexmedetomidine was given IV as an initial loading dose of 1 μg/kg over 10 min prior to induction. After induction, it was given as an infusion with a dose of 0.5 μg/kg/h till end of surgical procedure.

The perioperative period is marked by decrease in insulin level and noteworthy increase in insulin resistance prompting hyperglycemia. In this study, baseline level of blood glucose was comparable. Intraoperatively, in group C there was significantly higher blood glucose readings compared to group D one hour after beginning of surgery up to 6 h later.

In Shamim study [18], when dexmedetomidine groups were compared to control group, blood glucose levels were less after intubation, during extubation, and 2 h postextubation. Also, in agreement with the present study, Uyar et al. [19] found that a single bolus dose of dexmedetomidine (1 μg/kg) before induction of anesthesia attenuated the neuroendocrinal responses in patients undergoing craniotomy and there was a notable increase in plasma cortisol and glucose level in the placebo group, than in the dexmedetomidine group. Also, Mukhtar et al. [20] demonstrated that the use of dexmedetomidine in pediatric cardiac surgery with a loading dose of 0.5 μg/kg and a maintenance dose of 0.5 μg/kg results in reduction in markers of stress response as cortisol, catecholamines, and blood glucose levels.

Interestingly, intramuscular dexmedetomidine in dosage of 1 μg/kg, resulted in no significant differences between the placebo and dexmedetomidine groups regarding blood sugar level [21]. Also, in a previous investigation done by Sarpkaya and his fellows [22], they showed no remarkable difference in blood glucose levels and insulin levels. However, one study showed significant difference in blood glucose levels only during first postoperative hour while there was no noteworthy difference during 1st 30 min after intubation and 6 h postoperatively [23].

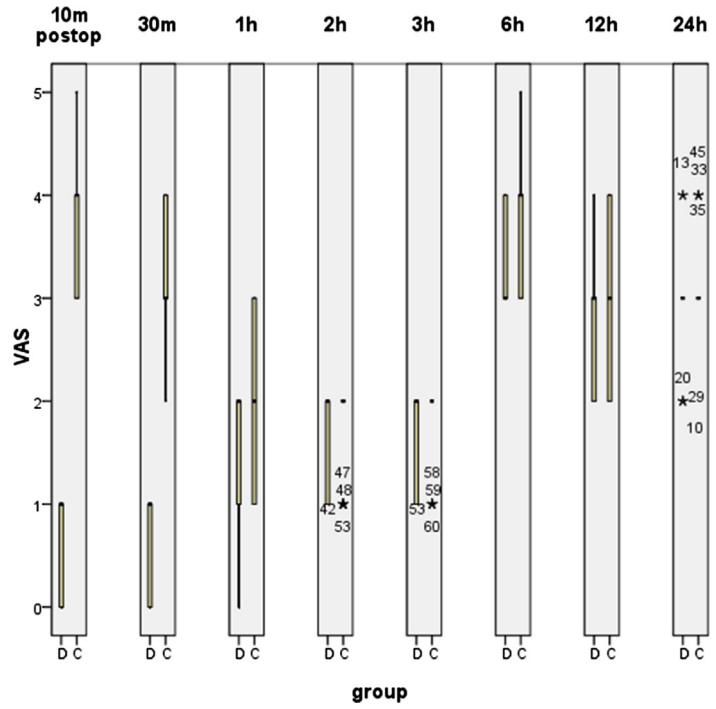
Regarding intraoperative fentanyl consumption, dexmedetomidine group consumed significantly less doses relative to control group. Bhagat et al. [24] and Gupta et al. [25] had shown in their studies significant less intraoperative fentanyl & isoflurane consumption in the dexmedetomidine group and this goes with this study.

Regarding hemodynamic data, in this study dexmedetomidine infusion controlled the hemodynamic stress response in patients undergoing laparoscopic surgery. Previous researchers mostly used dexmedetomidine in laparoscopic cholecystectomy, laparoscopic hysterectomy, or laparoscopic nephrectomy [26]. No study was found comparing hemodynamic responses by perioperative utilization of dexmedetomidine in laparoscopic bariatric surgeries which have particular surgical characteristic. Due to associated comorbidities in these patients, the function of organs involved in drug elimination

Table 5
Comparison of recovery profile between the 2 groups.

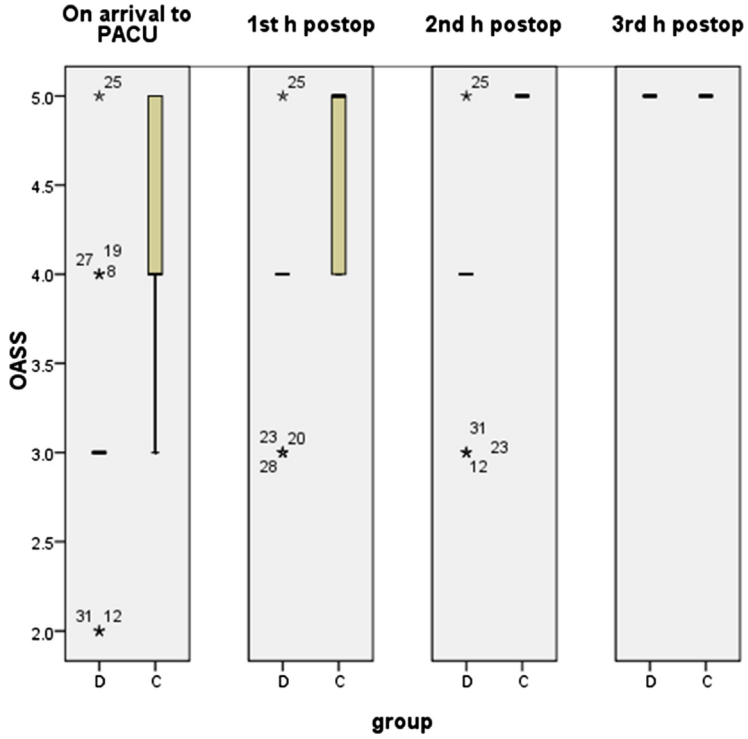
	Dexmedetomidine group (n = 30)	Control group (n = 30)	p-value
Tracheal extubation time after sevofurane vaporizer closure in minutes	5.83 ± 1.39	5 ± 1.73	0.056
Time to eye opening after sevofurane vaporizer closure in minutes	5.87 ± 1.3	5.1 ± 1.7	0.079
Time to following verbal commands after sevofurane vaporizer closure in minutes	6.57 ± 1.4	5.17 ± 2.1	0.085

Data are presented as mean ± SD, median (IQR) or number of patients.
* P < 0.05 is considered statistically significant.



The middle black solid line represent the median , the upper & lower margins of each box are IQR , the whiskers represent the maximum & minimum values and dote and asterixes represent data with outlier values

Fig. 3. Comparison of Postoperative pain score using visual analogue scale (VAS) score between dexmedetomidine group (Group D) and control Group (Group C).



The middle black solid line represent the median , the upper & lower margins of each box are IQR , the whiskers represent the maximum & minimum values and dote and asterixes represent data with outlier values

Fig. 4. Comparison of sedation level using Observer's Assessment of Alertness/Sedation scale (OAA/S) scale between dexmedetomidine group (Group D) and control Group (Group C).

Table 6
Comparison of postoperative nausea and vomiting between the 2 groups.

	Dexmedetomidine group (n = 30)	Control group (n = 30)	p-value
– No nausea and vomiting	26	20	0.206
– Nausea	4	7	
– N&V	0	2	
– Vomiting	0	1	

Data are presented as mean ± SD, median (IQR) or number of patients.
* $P < 0.05$ is considered statistically significant.

(e.g. kidney and liver) can be affected making pharmacokinetics more difficult and complex.

Many studies go with the hemodynamic findings in this study. A study by Shamim and his colleagues [18] on laparoscopic pyeloplasty patients compared 2 different doses of dexmedetomidine with placebo. Dexmedetomidine groups showed decrease in HR and BP when compared to placebo.

Another study done by Ghodki and his collegues [27] showed that in laparoscopic surgery, when dexmedetomidine is given with a loading dose of 1 μg/kg and maintenance of 0.2 μg/kg/h showed decrease in BP and HR when compared with placebo. Many other studies also proved the same finding regarding hemodynamics [28–30].

It might be speculated that dexmedetomidine on account of its sedative effect, can delay patients' response to verbal orders prompting prolongation of extubation time. Ohtani et al. [31] found that sevoflurane produced a lesser time to eye opening than propofol when coadministered with dexmedetomidine, suggesting that dexmedetomidine may delay recovery when given as an adjunct to propofol amid total i.v. anesthesia.

This likewise can be noted in this study's results that demonstrated the recovery profile parameters were prolonged in group D in respect to group C however with no statistically remarkable difference between both groups. This could be attributed to the study population (MO patients) examined in this study that known to have altered pharmacokinetics especially with the dose used.

However, in a research done by Khare and his colleagues [32] on non-MO patients, a significant less recovery time besides extubation time were found in dexmedetomidine group. This could be related to some degree by the lesser propofol requirement with the use dexmedetomidine as an adjunct medication. It likewise possibly is a result of the ability of dexmedetomidine to provide sedation without influencing respiratory function. Afanador et al. [33] and Bajwa et al. [34] additionally, in their studies, observed significant reduced extubation time in patients who were given dexmedetomidine. Bhattacharjee et al. [24] and Kang et al. [35] found that dexmedetomidine didn't affect response to verbal orders and extubation time; however, the extubation time in dexmedetomidine group was less than in placebo in both studies. This could be explained by the sedative effect of dexmedetomidine, which could allow inducing hypnosis with a reduction in anesthetic drug dosages.

In the present study, Postoperative pain scores were remarkably less in dexmedetomidine group relative to control group during 10, 30 and 60 min postoperatively. Also, Postoperative ketorolac requirement during 1st 24 postoperative hours was remarkably less in group D relative to that in group C. The analgesic, sedative/hypnotic and anxiolytic properties of dexmedetomidine make this drug potentially very beneficial in painful surgical procedures [35].

In a clinical research done by Gupta and his colleagues [24], postoperative pain was significantly diminished in the dexmedetomidine group when compared with the control group. In accordance with the present study, Gurbet et al. [36] found that continuous infusion of dexmedetomidine during abdominal surgery significantly lessens the amount of patient controlled analgesia with morphine with no impact on extubation time. Dholakia et al. [37] found that patients in the dexmedetomidine group were administered less narcotics during their hospital stay with earlier home discharge than patients in the control group. In a study done by Yacout and his colleagues [38], VAS for pain score was less in dexmedetomidine group relative to placebo group and postoperative ketorolac requirement was significantly reduced in dexmedetomidine group relative to that in placebo group.

In the current study, sedation level was deeper in MO patients, and significantly more patients achieved an OAA/S score of 3 in dexmedetomidine group during 1st two postoperative hours. At the 3rd hour postoperatively, all patients in both groups were fully awake. In agreement with this study, Yacout et al [38] showed that dexmedetomidine provides sedation without delaying recovery from anesthesia. Basar et al [39] presumed that a single dose of 0.5 μg/kg dexmedetomidine given preoperatively led to remarkable sedation with no change in recovery scores.

Nausea, vomiting, sedation, hypotension, and bradycardia are commonly known adverse effects of dexmedetomidine. In the current study, perioperative adverse effects % were not significantly different between both groups. And this goes with an investigation done by Lee and his partners [40].

Inlight of this study's results, intraoperative administration of dexmedetomidine could give different beneficial outcomes without noteworthy side effects in patients undergoing bariatric surgery.

The disadvantage in this current study is the use of hemodynamic end points as a reflection of depth of anesthesia, which could be untrustworthy sometimes. Other studies used bispectral index or entropy to monitor this. Secondly, the study was not conducted on diabetic patients, in whom the glycemic control perioperatively would me more useful regarding better results and lower rates of medical and surgical complications. Another study on diabetics in bariatric surgery would be helpful.

5. Conclusion

During the laparoscopic sleeve gastrectomy, dexmedetomidine premedication has been a viable approach for modulation of stress response during GA as assessed by analysis of perioperative blood sugar variation.

Additionally, dexmedetomidine lessens various stress responses during surgery and maintains the hemodynamic stability when used as an adjuvant in general anesthesia.

Conflicts of interest

There was no conflicts of interest.

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