

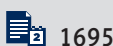
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A New Method in Laparoscopic Sleeve Gastrectomy: Reverse Trendelenburg with Right Lateral Tilt Position Prior to Trocar Entry

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3 Department of General Surgery, İstanbul School of Medicine, İstanbul University, İstanbul, Turkey**Corresponding Author:** Feza Ekiz, e-mail: fezaekiz@gmail.com**Source of support:** Departmental sources**Background:** The primary aim of this study was to evaluate the effectiveness of patient positioning prior to trocar entry in laparoscopic sleeve gastrectomy.**Material/Methods:** The records of 300 patients that had a laparoscopic sleeve gastrectomy surgery at Aydın State Hospital from January 2015 until January 2017 were analyzed retrospectively. First, 140 patients who had been placed in the surgical position after the entry of trocars (PAET) were included as the first group, and 160 patients who had been placed in the surgical position before entry of trocars (PBET) were included as the second group. A comprehensive analysis based on the comparison of age, gender, body mass index (BMI), duration of total anesthesia, and incompleteness rate of operations between the two groups was performed.**Results:** The PAET group was composed of 111 females (79.3%) and 29 males (20.7%). The averages of age, BMI, and duration of anesthesia for this group were 36.84, 46.3 kg/m², and 161.56 minutes, respectively. The PBET group was composed of 123 females (76.9%) and 37 males (23.1%). The averages of age, BMI, and duration of anesthesia of this second group were 38.8, 47.4 kg/m², and 120.8 minutes, respectively. In the PAET group, the operations for four patients (2.9%) were never completed; in the PBET group, there was no uncompleted operations ($p=0.046$).**Conclusions:** PBET is an effective method which both shortens the operation time and decreases the rate of uncompleted operations.**MeSH Keywords:** **Bariatric Surgery • Gastrectomy • Head-Down Tilt • Laparoscopy • Obesity, Abdominal****Full-text PDF:** <https://www.medscimonit.com/abstract/index/idArt/906737>

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Background

During sleeve gastrectomy operations, especially operations performed to better monitor the upper part of the stomach, the patient is placed into the reverse Trendelenburg with slight right lateral position. This process is usually carried out after the entry of the trocar and, thus, due to the changes in position of the trocar, the movements of the instruments become difficult. In the same manner, the display angle of the camera becomes deteriorated and it cannot be moved easily, especially to the fundus region of the stomach. In the literature concerning the reverse Trendelenburg position in laparoscopic operations, studies have been reported on its effects on the respiratory and the cardio-vascular systems but there have not been any studies to date about its effect on surgical techniques [1]. In this study, we aimed to assess the efficiency of the surgical position before entry of trocar (PBET) method among patients who had laparoscopic sleeve gastrectomy operations by comparing these patients to patients placed into the reverse Trendelenburg with slight right lateral tilt position after trocar entry (PAET).

Material and Methods

The records of 300 patients who had a laparoscopic sleeve gastrectomy surgery at Aydin State Hospital from January 2015 until January 2017 were obtained and analyzed. The patients were divided into two groups. The first group consisted of the patients who had been placed in PAET as the laparoscopy method that I had previous employed. In this method, after the patient's position was fixed in order to prevent them from slipping on the operation table, the patient's abdomen was inflated with CO₂ gas via inserting an optical trocar into the abdomen region. Following, other trocars were inserted. After trocar entry, the patient was placed in a 30 degree reverse Trendelenburg with nearly 10 degrees right lateral tilt position. The second group consisted of patients who underwent operations with the PBET laparoscopy method. In the second method, having been fixed in place order to prevent them from slipping on the operation table, the patient was placed in a 30 degree reverse Trendelenburg with nearly 10 degrees right lateral position. Before other trocars were inserted, the abdomen region was first inflated with CO₂ gas via optical trocar insertion.

A comparison of age, gender, BMI, duration of total anesthesia, and incomplete rate of operation between the two groups was evaluated. BMI was calculated according to the weight and height values before surgery. The time interval between the intubation and extubation of the patient indicated in the official files was regarded as the duration of the anesthesia. The abdomen regions of all patients were inflated with CO₂ gas at 13 mmHg pressure, and trocars were inserted into the same areas (Figure 1).

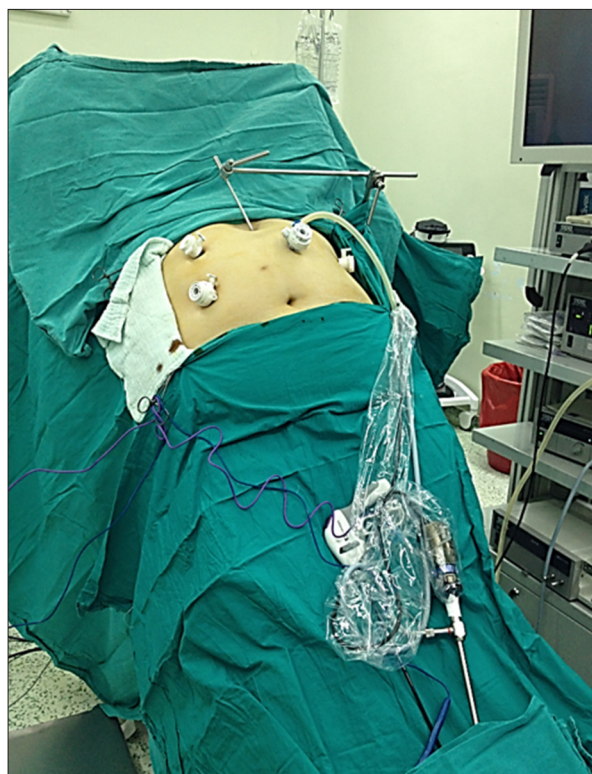


Figure 1. Trocar entry points in reverse Trendelenburg with right lateral tilt position

Statistical analysis

For the evaluation of the data, statistical package program SPSS 20 (IBM Corp. released 2011. IBM SPSS Statistics for Windows, Version 20.0, Armonk, NY, USA) was used. All numerical values were expressed as mean \pm standard deviation and median (maximum-minimum) percent and frequency. In addition, the homogeneity of the variances, which is one of the prerequisites of the parametric tests, was checked via the "Levene" test. The normality assumption was examined via the "Shapiro-Wilk" test. In order to evaluate the differences between to two groups, the Student *t*-test was used for normally distributed parametric data and the Mann-Whitney U test was employed to compare the means of continuous data with non-parametric distribution. In performing categorical data analysis, the Fisher's Exact Test statistical value was calculated. In cases where the expected cells were less than 20%, the values for these cells were recalculated by "Monte Carlo Simulation Method" in order to include these cells into the analysis. A *p* value below 0.01 and 0.05 was considered significant.

Results

In our Department, for sleeve gastrectomy operations, PAET method was employed in the first 140 study patients, and as

a change in the method, the PBET method was applied in the next study 160 patients. Among the 140 patients in the PAET group, there were 111 females (79.3%) and 29 males (20.7%). The averages of age, BMI, and duration of anesthesia of the group were 36.84, 46.3 kg/m², and 161.56 minutes, respectively. Among the 160 patients in the PBET group there were 123 females (76.9%) and 37 males (23.1%). The averages of age, BMI, and duration of anesthesia of this second group were 38.8, 47.4 kg/m², and 120.8 minutes, respectively. Even though the operations of four patients (2.9%) were never completed in the PAET group, there were no uncompleted operations in PBET group, thus the rate of uncompleted operations was reduced to 0% in PBET group ($p=0.046$). The BMI of the four patients that failed to undergo a completed operation were 52.2 kg/m², 56.6 kg/m², 62.9 kg/m², and 46.6 kg/m². The patient with the 46.6 kg/m² BMI had advanced central fattening. Due to the lack of adequate space in the abdomen region, and thus not being able to properly monitor the upper part of the stomach, open surgery was preferred on this patient and the patient underwent sleeve gastrectomy operation accordingly. Concerning the other three patients, the operation was aborted in one of them due to liver left lobe enlargement and in the remaining two patients the operation was aborted due to the lack of adequate space in the abdomen region, a situation that prevented properly monitoring the upper part of the stomach. Upon loss of weight, two of the three aforementioned patients were scheduled for re-operation. At that time, laparoscopic sleeve gastrectomy operations were performed via the PBET method. Only one of the patients could not undergo re-operation. Both groups were evaluated congruently in terms of age, gender, and BMI distribution. The data are displayed in Tables 1–3.

Discussion

During abdomen operations, reverse Trendelenburg position is recommended for better monitoring of the upper parts [2–4]. Apart from providing better monitoring, this position increases the lung compliance and functional residual capacity [1]. In our study, the reverse Trendelenburg position was applied to all patients. The timing of the positioning was the only difference between the two groups.

In the literature, the duration of the sleeve gastrectomy operations is indicated at an interval of 50–103 minutes on average [5–9]. This period is measured as between the beginning of the surgeon's skin incision and the covering of the skin incision places. On the other hand, in our study, the durations of the anesthesia were regarded as the durations of the sleeve gastrectomy operations, since in the patient files only the durations of the anesthesia were recorded. This duration was 161.55 minutes in the PAET group and it was 120.8 minutes in

the PBET group ($p=0.001$). It can be argued that the duration of the anesthesia of the patients, which is exactly the duration between intubation and extubation, is close to the actual duration of the operation, even if it is not exactly the same. On this basis, we concluded that the PBET method definitely shortened the duration of anesthesia and therefore shortened the duration of the surgery. The PBET method provided easier movements of instruments and better monitoring of the surgery area. Therefore, it shortened the duration of the surgery by accelerating the phases of separating the omentum from the stomach and the incision of stomach via stapler.

During the laparoscopic sleeve gastrectomy operation, for different reasons, the operation may become technically difficult and sometimes impossible to continue. In the study of Rebibo et al., the ratio of patients whose operations could not be completed was reported as 1.2% [10]. In our study, this rate was calculated as 2.9% in the PAET group, 0% in the PBET group, and 1.3% overall. Even though the overall result for the average failure rate in our study was similar to that of Rebibo et al., the failure rate was much lower in the PBET group, a clear indication of the success for the PBET method.

Rebibo et al. claimed that left liver lobe growth (58.3%) and lack of enough space in abdomen region (41.7%) were the main technical reasons that made the operation difficult and sometimes even impossible [10]. In our study, the operations were not concluded in one of the four patients due to liver left lobe enlargement (25%) and in the remaining three cases (75%) due to the lack of adequate space in the abdomen region because of advanced fattening that prevented properly monitoring of the fundus part of the stomach. All of the patients whose operations were left uncompleted were in the PAET group. Three main reasons can be concluded to explain why there were no failures in the PBET group. 1) It provides better liver excretion due to the more proper fit of the location for the trocar inserted for the excretion of the liver, as the direct result of the positioning being realized before trocar entry. 2) The surgical field is better viewed due to the more appropriate camera angle as the camera port does not change position towards the downward angle, whereas the camera changing position happens regularly for patients placed in the surgical position after trocar insertion. 3) More comfortable movements within the ports that the instruments enter and correspondingly the formation of a wider working area in the upper part of the abdomen region allows for more proper excretion of the omentum and the stomach.

In cases where laparoscopic procedures fail, open surgeries are generally performed. In the study conducted by Rebibo et al., the patients whose operations had previously been uncomplete were re-operated on after some weight loss and it was reported that successful results were achieved [10]. In our

Table 1. Gender distribution.

			Gender		Total
			Male	Female	
Method	PAET method	N	29	111	140
		%	20.7%	79.3%	100.0%
	PBET method	N	37	123	160
		%	23.1%	76.9%	100.0%
Total	N	66	234	300	
	%	22.0%	78.0%	100.0%	

Table 2. Comparison of age, BMI and duration of operation between the two groups.

	Method	N	Mean	Std. deviation	Std. error mean	P
Age	PAET method	140	36.836	9.921	0.838	0.116
	PBET method	160	38.838	11.792	0.932	
BMI pre op	PAET method	140	46.356	6.522	0.551	0.18
	PBET method	160	47.431	7.244	0.573	
OP duration (min)	PAET method	140	161.557	52.546	4.441	0.001**
	PBET method	160	120.800	31.458	2.487	

* p<0.05.

Table 3. Failure rates in the two groups.

			Success		Total	P
			Failure	Successful		
Method	PAET method	N	4	136	140	0.046*
		%	2.9%	97.1%	100.0%	
	PBET method	N	0	160	160	
		%	0.0%	100.0%	100.0%	
Total	N	4	296	300		
	%	1.3%	98.7%	100.0%		

* p<0.05.

study, one in four failed patients had open surgery, whereas two of the remaining patients were re-operated on and underwent laparoscopic sleeve gastrectomy after weight loss. In the second operations, the PBET method was performed for these two patients. However, it was not possible to assess whether the success of the second operation was dependent on the weight loss or the new method employed.

Conclusions

Reverse Trendelenburg with right lateral tilt position prior to trocar entry is an effective method in laparoscopic sleeve gastrectomy operations for both reducing the rate of uncompleted operations and shortening the operation duration.

Conflict of interest

None.

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