Comparison of the 3 different levels of PEEP on haemodynamics, respiration and arterial oxygenation; which is the best PEEP for sleeve gastrectomy under general anaesthesia?

Huseyinoglu K., Goksu S., Bakan N.

Health Science University of Umraniye Training and Education Hospital
Istanbul, Turkey

Background: In this prospective randomised study, our goal is to compare the effects of 3 different PEEP levels (0 – 5 -10 cm H₂O) on hemodynamic parameters in order to evaluate their effects on respiration and arterial oxygenation in patients undergoing laparoscopic bariatric surgery of obese patient (sleeve gastrectomy) under general anesthesia.

Methods: After approval of local ethics committee and patient consent, 60 adult patients with a body mass index (BMI) of > 40 with American Society of Anesthesiologists group I-II were randomised into three groups according to applied PEEP level: Group I; zero PEEP, Group II; 5cmH₂O PEEP and Group III; 10 cmH₂O PEEP.

All other variables (e.g., anesthetic and surgical techniques and ventilatory settings) were the same for all patients. Duration time, heart rate, invasive arterial blood pressures, arterial blood gases (ABG), Ppeak, Pplateau, SpO₂ and ETCO₂ were measured intraoperatively and postoperatively in the postanesthesia care unit (PACU). IBM SPSS statistics 22 (IBM SPSS Turkey), Shapiro Wilks test, One-way anova test, Tukey HSD, Tamhane's T2 test, Kruskal Wallis, Mann Whitney U, paired sample t and chi-square tests were used for statistical analyses. A value of p<0.05 was considered to be significant.

Results;

The study conducted 60 patient

(11.7% males and 88.3% females and mean age of 37.8±10.81, BMI ranged between 41,58 - 51.7 kg/m²). There was no difference between groups with respect of the demographic data, operation time, ABG,

Ppeak and

Hemodynamic measurements.

At all groups significant increases were detected in PPlateau at all times compared to initial value and among groups Group III values were always higher than other groups (p<0.01)(Figure I).

The static compliances of group II and group III were significantly higher than group I at all times (p<0.01)(Figure II).

After intubation, after position and before extubation values, Group I's pO₂ values was significantly lower than other groups, after extubation returned to normal (p<0.01) (Table 1).

Conclusion; We suggest that 5 cm H₂O PEEP is optimal PEEP in sleeve gastrectomy cases among this 3 different PEEP level in this study, because it causes a significant increase in compliance without affecting P peak and slightly increase in P Plateau.

Figure I; Distribution of Mean P Plateau values among groups, p< 0.01
Group I, Group II, Group III

Figure II; Distribution of mean static compliance values among groups, p< 0.01
Group I, Group II, Group III

Figure 1; Arterial blood sample results. One-Way Anova **p<0.01

		Grup I	Grup II	Grup III	ap
		Mean±Sd	Mean±Sd	Mean±Sd	
pH	After Intubation	7.43±0.04	7.41±0.06	7.43±0.05	0.358
	After Position	7.40±0.04	7.40±0.05	7.40±0.05	0.980
	Before Ekstubation	7.37±0.03	7.36±0.05	7.37±0.05	0.676
	30min. after procedure	7.36±0.04	7.34±0.05	7.35±0.05	0.348
pO ₂	After Intubation	181.49±39.25	246.01±52.44	254.42±43.07	0,001 ^{††}
	After Position	191.70±29.47	235.36±66.68	234.78±35.22	0.006 ^{††}
	Before Ekstubation	216.30±55.98	262.09±74.31	246.07±49.92	0.042 [†]
	30min. after procedure	228.99±126.58	271.61±54.32	260.43±70.50	0.415
pCO ₂	After Intubation	35.34±3.65	33.73±5.09	33.30±3.60	0.281
	After Position	36.17±4.47	33.67±5.0	35.92±4.08	0.129
	Before Ekstubation	37.96±3.45	37.38±4.27	37.42±4.57	0.885
	30min. after procedure	38.31±3.72	37.81±4.41	37.42±4.50	0.803
SPO ₂	After Intubation	98.99±0.95	98.97±1.93	99.05±0.44	0.425
	After Position	98.85±0.98	99.06±0.87	98.99±0.90	0.756
	Before Ekstubation	99.02±0.70	99.13±0.59	98.76±1.35	0.435
	30min. after procedure	98.09±2.37	98.50±1.56	99.36±0.83	0.155