Alveolar-arterial gradient and risk of hypoxemia in morbidly obese patients the day after laparoscopic bypass surgery: sustained effect of Boussignac CPAP?

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BACKGROUND AND GOAL OF STUDY

Morbidly obese patients develop more atelectasis during anesthesia which frequently persist twenty four hours after surgery. There's an increased risk of desaturation in this period.

Our purpose: to evaluate the impact of immediate post extubation use of Boussignac Continuous Positive Airway Pressure (CPAP) on alveolar-arterial gradient (A-a gradient) and the prevalence of post-operative hypoxemia (PaO2<60mmHg) 24h after Roux-en-Y laparoscopic gastric bypass.

MATERIALS AND METHODS

- **Prospective study**
- Health Ethics Committee Approval; Written informed consent.
- **Inclusion criteria:** body mass index>35Kg/m², age 18-65 years, ASA 1-3.
- **Exclusion criteria:** preexisting lung parenchyma disease, chronic obstructive pulmonary disease, moderate to severe asthma, congestive heart failure (NYHA>II), [Hb]<7g/dl or if there were language barriers or severe psychiatric disorder.
- **The same anesthetic and analgesic protocols.**
- Attending anaesthesiologist blinded to the study groups until the end of surgery.
- Patients **randomly assigned** to receive Boussignac CPAP or venturi mask immediately after extubation in the operating room. Intervention for 2 hours in recovery room.
- **Blood gas analysis (PaO2, A-a gradient):** preoperative period - **T0** (FiO2 0.21), 1h - **T1** (FiO2 0.5) and 24h - **T24** (FiO2 0.21) after extubation.
- **Statistics:** student's t and chi-squared tests. p-value< 0.05

RESULTS

- 11 patients in each group.
- No differences in demographic and preoperative data (Tables 1 and 2)

Variables	Boussignac group	Venturi group
Age (years)	41.82 ± 6.98	44.75 ± 12.28
Gender (M/F)	1/10	2/9
BMI (Kg/m²)	43.35 ± 5.56	43.49 ± 6.49
ASA classification (2/3)	10/1	11/0

Data are presented as frequency or mean ± SD.

TABLE 1 – Patients baseline characteristics

Variables		Boussignac group	Venturi group	p value
T0	PaO2 <60mmHg	0 (0)	0 (0)	
	PaO2	86.62 ± 13.43	82.64 ± 16.45	>0.05
	A-a Gradient	26.06 ± 10.02	27.13 ± 13.53	>0.05
T1	PaO2 <60mmHg	0 (0)	0 (0)	
	PaO2	149.75 ± 62.71	91.98 ± 25.76	0.014
	A-a Gradient	148.96 ± 75.98	211.42 ± 18.05	0.04
T24	PaO2 <60mmHg	0 (0)	4 (36)	
	PaO2	79.64 ± 9.18	64.88 ± 6.05	<0.001
	A-a Gradient	27.79 ± 7.93	37.67 ± 6.45	0.006

Data are presented as frequency (percentage) or mean ± SD

TABLE 2 – Perioperative data

- No PaO2 values <60mmHg at T0 and T1 in both groups. At T24 no patient in the Boussignac group and 36% of patients in the venturi group had a PaO2 <60mmHg.
- After extubation A-a gradient was significantly lower in the Boussignac group at T1 and T24.

DISCUSSION

In line with our study results it seems that Venturi group patients are more prone to have hypoxemia.

A lower A-a gradient after extubation in the Boussignac group may be an indicator of a better ventilation/perfusion matching and suggests a positive effect of CPAP in the prevention of additional atelectasias after surgery.