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# **Automated oxygen administration vs manual oxygen therapy after major abdominal or thoracic surgery. An international multicenter randomized controlled study**

COPD - management, Hypoxia, Oxygen therapy

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## **Background**

Hypoxemia and hyperoxia may occur after surgery with related complications. Automated oxygen titration and weaning (FreeO<sub>2</sub>) may improve oxygenation and outcome.

## **Aims and objectives**

To evaluate the impact of FreeO<sub>2</sub> vs conventional O<sub>2</sub> after surgeries at risk of desaturation.

## **Methods**

This study is a prospective, multicenter, randomized, controlled, open trial. After thoracic or abdominal surgery, patients were randomly assigned to the manual O<sub>2</sub> administration or automated O<sub>2</sub> administration (FreeO<sub>2</sub>).

Primary outcome was the percentage of time spent in the target zone of oxygen SpO<sub>2</sub>, during a 3-days time frame.

Secondary outcomes were the nursing workload, the time spent with severe desaturation (SpO<sub>2</sub><85%), with severe hyperoxemia (SpO<sub>2</sub>>98%); the O<sub>2</sub> consumption, the duration of O<sub>2</sub> administration during hospitalization, the frequency of use of ventilation (invasive or noninvasive) the hospitalization length of stay and the survival rate.

## **Results**

200 patients were enrolled and 180 randomized and analyzed. There was no significant difference in baseline characteristics. Primary outcome data are presented in the table.

	Post-Operative Short Term <i>(Recovery room - 3 hours)</i>			Post-Operative Long Term <i>(Surgical ward – up to 3 days)</i>		
	<i>Automated</i>	<i>Manual</i>	<i>P</i>	<i>Automated</i>	<i>Manual</i>	<i>P</i>
<b>SpO<sub>2</sub> value (%)</b>	94.7 ± 4.2	95.7 ± 3.9	0.6	95.1 ± 1.4	94.7 ± 2.1	<0.001
<b>O<sub>2</sub> flow (L/min)</b>	0.9 ± 1.4	2.8 ± 1.4	0.85	1.0 ± 1.3	1.2 ± 1.0	0.03
<b>O<sub>2</sub> flow variations</b>	10290 ± 1352	2 ± 1	<0.001	174030 ± 69484	6 ± 3	<0.001
<b>O<sub>2</sub> weaning <i>n patients (%)</i></b>	49 (60.5)	18 (21.7)	0.65	36 (44.4)	49 (59.0)	0.06
<b>Time within SpO<sub>2</sub> range</b>						
Time ( <i>min</i> )	156.5 ± 31.1	69.1 ± 62.4	<0.001	2698.6 ± 1146.8	1974.5 ± 1041.6	0.38
%	<b>86.3 ± 16.2</b>	<b>37.9 ± 34.2</b>	<b>&lt;0.001</b>	<b>86.0 ± 15.4</b>	<b>55.9 ± 23.2</b>	<b>&lt;0.001</b>
<b>Severe Hypoxemia (SpO<sub>2</sub>&lt;85%)</b>						
Time ( <i>min</i> )	0.1 ± 0.3	0.3 ± 1.1	<0.001	2.2 ± 5.3	9.9 ± 27.7	<0.001
%	0.06 ± 0.2	0.2 ± 0.6	<0.001	0.06 ± 0.1	0.3 ± 0.7	<0.001
<b>Severe Hyperoxia (SpO<sub>2</sub>&gt;98%)</b>						
Time ( <i>min</i> )	0.9 ± 3.2	46.7 ± 58.1	<0.001	5.1 ± 10.9	177.9 ± 277.2	<0.001
%	6.5 ± 12.6	52.4 ± 37.3	<0.001	0.1 ± 0.3	5.5 ± 8.3	<0.001

## Conclusion

Automated oxygen titration and weaning significantly improves oxygenation parameters, decrease both severe hypoxemia and severe hyperoxemia after major surgery.