European Respiratory Society
Annual Congress 2012

Abstract Number: 2785

Publication Number: P3789

Abstract Group: 4.1. Clinical physiology and Exercise

Keyword 1: Gas exchange **Keyword 2:** Circulation **Keyword 3:** Physiology

Title: Orthodeoxia in hypoxaemic morbid obesity reverts one year after bariatric surgery

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Body: Introduction: In morbid obesity (MO), pulmonary gas exchange (GE) abnormalities are influenced by postural changes that are known to improve after bariatric surgery (BS). Objective: To unravel the determinants of GE in MO at upright (U) and supine (S) while breathing ambient air, in random order, before and one year after BS. Methods: 15 (14 females; 51±(SE)2 yrs; BMI, 47±2 Kg/m2) hypoxaemic -H- (PaO2, 73±5 mmHg) and 8 normoxaemic -N- (PaO2, 89±4 mmHg), matched for age, sex and BMI were studied before and after BS. GE measurements, including ventilation-perfusion (V'A /Q') distributions were performed. Results: Before BS, H patients at U exhibited moderate V'A /Q' imbalance (low V'A /Q' areas (<0.1), 10±2% of QT) compared to S. In addition, PaO2 (by –4.1±0.4 mmHg) and PvO2 (by –1.5±0.1 mmHg) diminished ($p \leq 0.04$, each) along with a trend to reduce QT (by –0.4±0.1 L/min) ($p=0.09$) at U. By contrast, N patients did not show GE changes. After BS, BMI decreased in both H and N patients (by 36 % - 37%), and overall PaO2 at U improved (by +15.9±0.2 mmHg), ($p \leq 0.03$, each). Moreover, H patients at U improved PaO2 (by +6.7±0.6 mmHg) compared to S and, V'A /Q' imbalance postural differences between Pre- and Post-BS also improved ($p \leq 0.02$). Conclusions: Hypoxaemic morbid obesity is associated with orthodeoxia. This novel finding may be related to a gravitational heterogeneous redistribution of pulmonary blood flow induced by systemic inflammation. Bariatric surgery reverts completely this phenomenon.
Supported by FIS (PI08031108), Esteve and CIBERES.