

# RELATIONSHIP BETWEEN THE SEVERITY OF OBSTRUCTIVE SLEEP APNOEA, LOW-GRADE-INFLAMMATION AND HEME OXYGENASE-1 IN MORBIDLY OBESE PATIENTS, BEFORE AND AFTER BARIATRIC SURGERY

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## INTRODUCTION AND OBJECTIVES

- HO-1 is a new adipokine with a protective role against inflammation and hypoxia<sup>1</sup>. Morbidly obese (MO) patients presents with high circulating levels or adipose tissue expression of HO-1<sup>2</sup>. Obstructive sleep apnoea (OSA) presents high mRNA HO-1 levels in whole blood<sup>3</sup>. MO patients with OSA presents with high low grade inflammation (LGI)<sup>4</sup> and recurrent episodis of intermittent hypoxia<sup>5</sup>.
- Objective: to study in patients with MO and OSA the relationship between HO-1, OSA severity and LGI, and the effect of bariatric surgery on them.

## METHODS

- 66 MO with OSA, without Continuous Positive Airway Pressure (CPAP) treatment, were studied before and 1 year after bariatric surgery (BS).
- OSA diagnosis was given after an overnight conventional polysomnography (CE-Series Compumedics, Victoria, Australia).
- HO-1 (*Elisa Kit bioNova científica, s.l.Madrid*) and LGI; TNF $\alpha$ , IL-6, IL-1 $\beta$ , PCR and adiponectin (*Milliplex Catalog, Merck Millipore, Madrid*), were measured.
- BMI, waist circumference, % body fat by bioelectrical impedance (TANITA) and HOMA insulin resistance index were also assessed.
- For statistical analysis SPSS-PC-plus version 19 was used.

## RESULTS

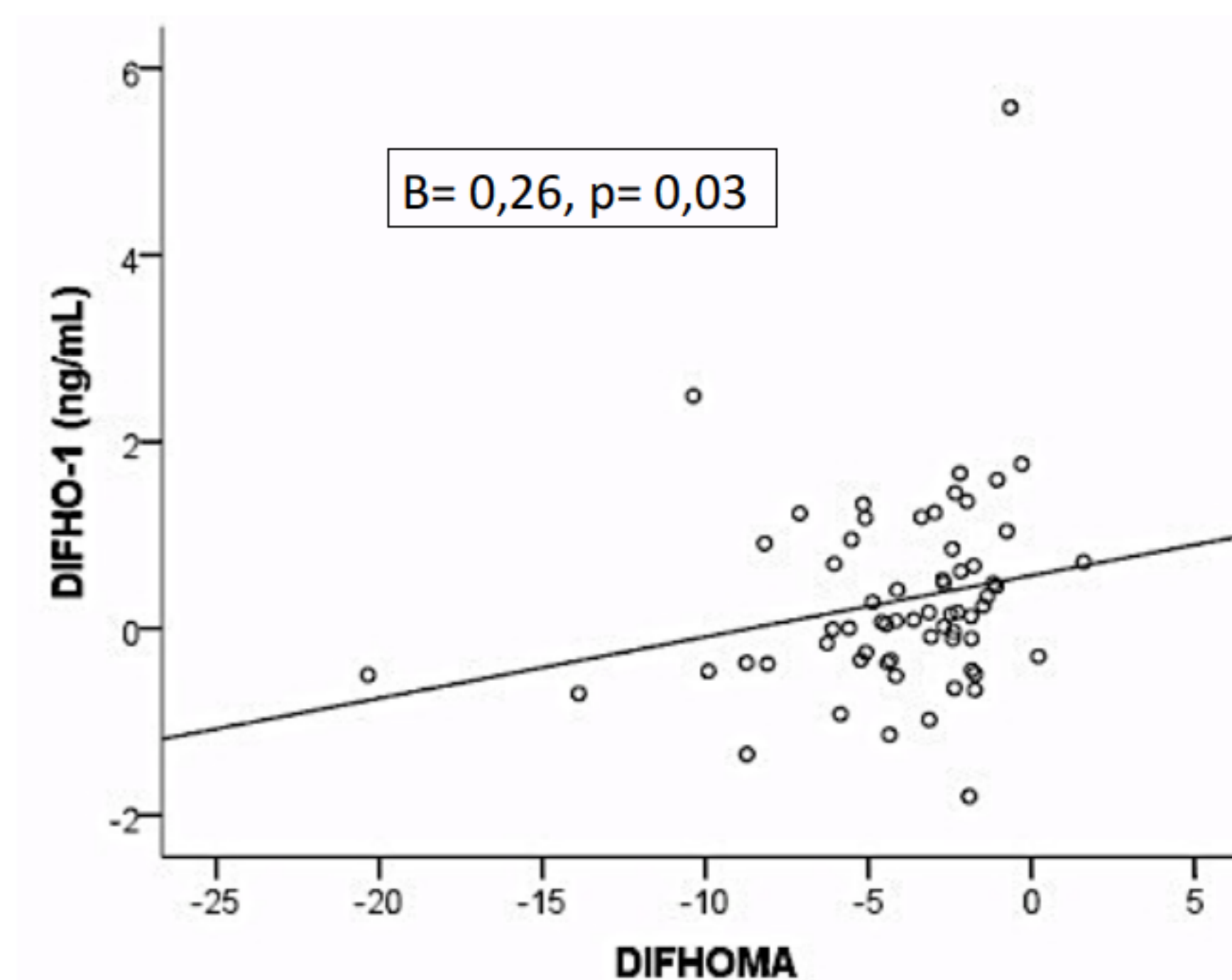
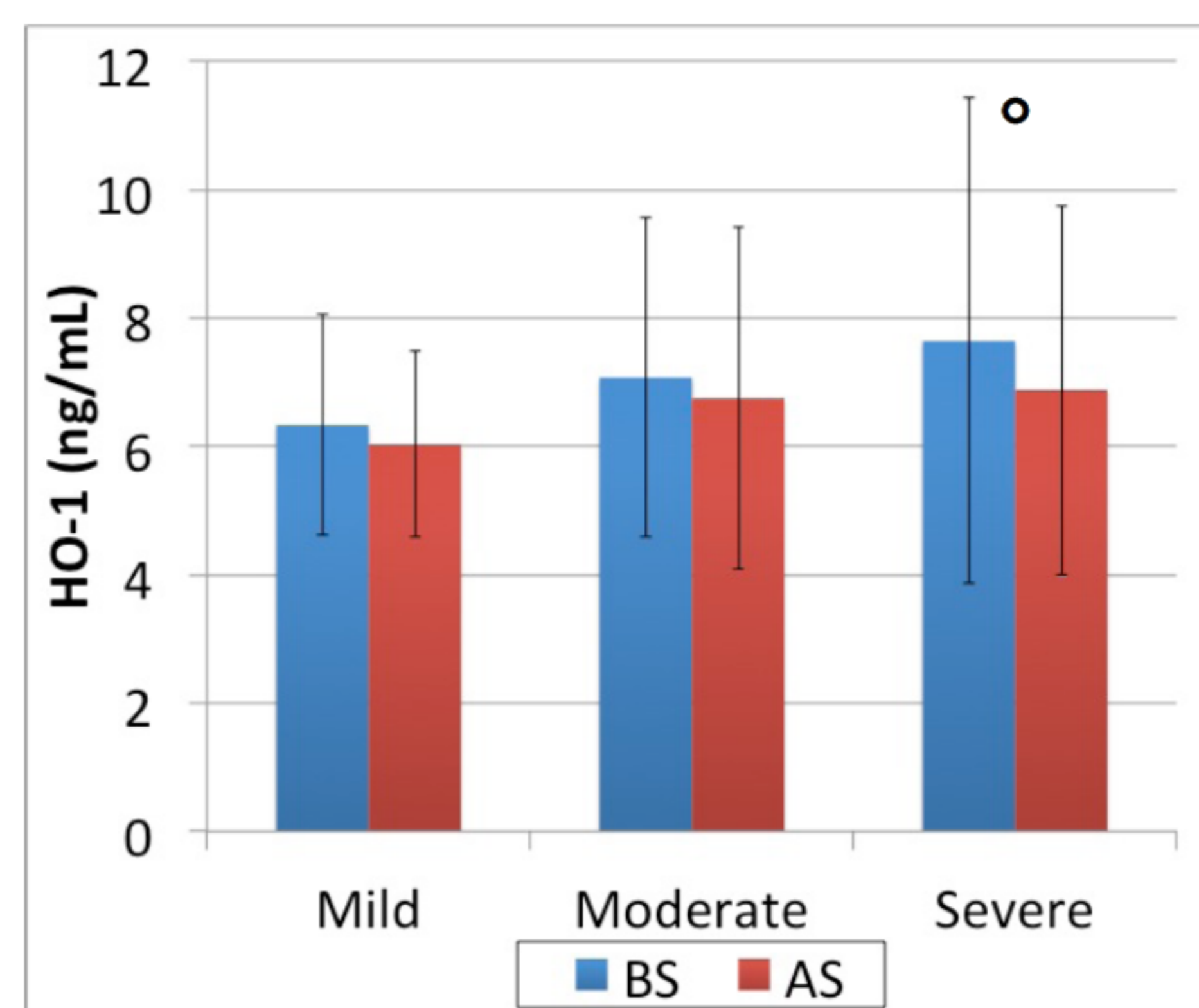
- We studied 12 male and 28 female, 42,3  $\pm$  10,2 years old. Twenty (30%) had mild OSA, 16 (24%) moderate and 30 (46%) severe. Forty-nine underwent Roux-en-Y gastric bypass and 17 sleeve gastrectomy, according to the local protocol. Excess weight loss was 69,98  $\pm$  13,30% .
- Plasma HO-1 did not differ between OSA groups (6,33  $\pm$  1,72 ng/mL mild vs 7,07  $\pm$  2,49 ng/mL moderate vs 7,64  $\pm$  3,78 ng/mL severe, p=0,32) . After surgery, HO-1 levels decreased significantly, however, this effect was only observed in those patients who had severe OSA. The decrease in HO-1 levels (DIFHO-1) correlated with HOMA improvement (DIFHOMA) but not with the improvement of the other adipokines.

### Parameters evaluated before vs after surgery

| Parameters                | BS               | AS                           |
|---------------------------|------------------|------------------------------|
| BMI (Kg/m <sup>2</sup> )  | 45,6 $\pm$ 6,19  | 29,0 $\pm$ 3,69*             |
| Waist circumference (cm)  | 133,1 $\pm$ 12,5 | 100,9 $\pm$ 10,6*            |
| Body fat (%)              | 49,5 $\pm$ 5,59  | 31,8 $\pm$ 8,74*             |
| HOMA                      | 4,14 $\pm$ 2,14  | 1,36 $\pm$ 0,95*             |
| HO-1 (ng/mL)              | 7,11 $\pm$ 2,99  | 6,59 $\pm$ 2,47 <sup>o</sup> |
| TNF- $\alpha$ (pg/mL)     | 2,62 $\pm$ 1,53  | 2,13 $\pm$ 1,24 <sup>o</sup> |
| IL-6 (pg/mL)              | 0,64 $\pm$ 0,69  | 0,39 $\pm$ 0,58*             |
| IL-1 $\beta$ (pg/mL)      | 0,67 $\pm$ 0,61  | 0,46 $\pm$ 0,47 <sup>o</sup> |
| PCR (mg/dL)               | 1,38 $\pm$ 3,10  | 0,19 $\pm$ 0,26 <sup>o</sup> |
| Adiponectin ( $\mu$ g/mL) | 12,3 $\pm$ 8,93  | 26,2 $\pm$ 15,3*             |
| AHI (events/h)            | 33,8 $\pm$ 26,1  | 9,14 $\pm$ 9,71*             |
| CT90 (%)                  | 9,82 $\pm$ 16,4  | 1,14 $\pm$ 3,94*             |
| Arousal index (events/h)  | 20,0 $\pm$ 16,9  | 14,1 $\pm$ 8,44*             |

AHI: Apnoea Hypopnoea index; CT90: time percentage with SpO<sub>2</sub> <90%. Data are mean  $\pm$  ED. <sup>o</sup>p < 0,05, \*p < 0.001, vs before surgery (BS).

### HO-1 levels BS vs AS in mild, moderate and severe OSA, <sup>o</sup>p < 0.05



## CONCLUSION

Improvement of plasma HO-1 in MO patients after bariatric surgery is related to the severity of OSA and the degree of insulin resistance but not to LGI.

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