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# **Activity of metalloproteinases and adiponectin in obese patients—a possible factor of incisional hernias after bariatric procedures**

**Key words: Metalloproteinase, Adiponectin, Obesity, Incisional hernia**

# Baseline characteristics of the study participants

| Parameter                   | Morbidly obese patients<br>(BMI $\geq$ 35, n=40) | Non-obese patients<br>(BMI < 25, n=30) | p-value |
|-----------------------------|--|--|---------|
| • Age (years)               | 40.5 (37.5-45.5)                                 | 42 (32-47)                             | ns      |
| • Females n (%)             | 22 (55)  | 20 (67)                                | ns      |
| • Males n (%)               | 18 (45)  | 10 (33)                                | ns      |
| • BMI (kg/m <sup>2</sup> )  | 48.7 (44.3-54.8)                                 | 25.35 (23.2-26.2)                      | 0.00001 |
| • Diabetes mellitus n (%)   | 20 (50)  | 0                                      | 0.00001 |
| • Hypertension n (%)        | 21 (52)  | 6 (20)                                 | 0.00001 |
| • MMP-2 (ng/ml)             | 178.32 (164.34-205.4)                            | 161.43 (142.53-198.31)                 | 0.04    |
| • MMP-9 (ng/ml)             | 532.7 (389.0-760.9)                              | 324.60 (280.50-753.1)                  | 0.09    |
| • MMP-13 (ng/ml)            | 0.37 (0.36-0.38)                                 | 0.37 (0.37-0.39)                       | ns      |
| • Adiponectin ( $\mu$ g/ml) | 3.39 (2.62-5.17)                                 | 3.54 (2.62-4.86)                       | ns      |

Values are presented as median (25th-75th quartile).

BMI: body mass index; MMP-2: metalloproteinase 2; MMP-9: metalloproteinase 9; MMP-13: metalloproteinase 13; ns: not significant

# Method

- **The serum concentrations of MMP -2, 9 and -13 and adiponectin were biochemically assayed**
- **The outcomes were subjected to a statistical analysis, comparing the obese group to the non – obese group**

# Results

| Variable            | AUC   | SE    | 95% CI      | Cut-off value | Sensitivity | Specificity |
|---------------------|-------|-------|-------------|---------------|-------------|-------------|
| MMP-2 (ng/ml)       | 0.635 | 0.070 | 0.499-0.772 | 149.8         | 0.94        | 0.42        |
| MMP-9 (ng/ml)       | 0.666 | 0.100 | 0.470-0.862 | 405.5         | 0.73        | 0.73        |
| MMP-13 (ng/ml)      | 0.392 | 0.064 | 0.267-0.517 | 0.344         | 1.00        | 0.10        |
| Adiponectin (µg/ml) | 0.524 | 0.082 | 0.363-0.686 | 1.931         | 1.00        | 0.18        |

AUC: Area under the curve; 95% CI: 95% Confidence interval; MMP-2: metalloproteinase 2; MMP-9: metalloproteinase 9; MMP-13: metalloproteinase 13; SE: standard error

# Conclusions

- **The concentrations of the investigated MMPs secreted by the adipose tissue differed between obese and non-obese individuals. The heightened activity of MMP-2 and MMP-9 in the obese group may adversely influence wound healing, as shown in other pathologies.**
- **The elevated serum MMP-2 and -9 concentrations in obese individuals may be related to the higher incidence of incisional hernias in this population.**