Exploring the Relationship Between Greater Omenta Mass, Body Mass, and Stature: Insights from Cadaveric Data

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Introduction

- The Greater Omentum is a four-layered fibroadipose organ that overlies the viscera in the abdominal cavity.²
- Innovative applications: neangiogenesis, tissue regeneration, and autologous grafts⁶ (e.g., flap-based breast reconstruction¹, pancreatic islet transplantation⁴, pain model for analgesics⁵, in vivo vascular recellularization⁶, and brain recellularization for Moyamoya disease⁷).
- Despite its important applications, the anatomy of the greater omentum has not been systematically characterized since initial research in the 1980s⁸.

AIM

Validate previous relationships between sex and greater omental mass, volume, and surface area and further characterize its relationship to estimated stature, body mass, and BMI.

Methods

- Dissected greater omenta from embalmed cadavers (n = 30; 17 females, 13 males).
- Measured omental mass and volume, femoral head diameter (FHD) and maximum femoral length (MFL).
- Extrapolated omental surface area, length, and width using ImageJ version 1.54d.
- Calculated cadaveric stature (S) and body mass (BM) to act as a proxy measure for stature, body mass, and BMI decrease with increased age.
- Statistical analyses using R version 4.3.1.

Conclusions

- Omental mass, volume, and surface area area demonstrated significant differences between males and females, correlating well with the significant differences between anthropometrics between sexes.
- Omental mass and volumes were positively correlated with estimated cadaver height.
- Omental length, estimated stature, body mass, and BMI decrease with increased age.
- Potential confounding variables encompass but are not limited to:
  - Cadaveric age and fixation
  - Unknown abdominal medical or surgical history
  - Unknown living anthropometrics
  - Small sample size
  - Differing sample populations

Future Directions

- Develop a method for predicting omental parameters
- Compare live subject and cadaveric omental metrics
- Validate current findings with increased sample size
- Identify key factors involved in predicting omental parameters

Data Summary

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean ± SD</th>
<th>Range</th>
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<tbody>
<tr>
<td>Age (years)</td>
<td>40.9 ± 8.6</td>
<td>63 - 93</td>
</tr>
<tr>
<td>Omental Mass (g)</td>
<td>220.9 ± 194.8</td>
<td>33.9 - 794.9</td>
</tr>
<tr>
<td>Omental Volume (mL)</td>
<td>215 ± 160</td>
<td>30 - 640</td>
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<tr>
<td>Omental Surface Area (cm²)</td>
<td>521.8 ± 199.2</td>
<td>186 - 912</td>
</tr>
<tr>
<td>Femur Length (cm)</td>
<td>45.2 ± 3.2</td>
<td>39.6 - 51.1</td>
</tr>
<tr>
<td>Femoral Head Diameter (mm)</td>
<td>47.2 ± 4.7</td>
<td>40.2 - 55.0</td>
</tr>
<tr>
<td>Estimated Stature (cm)</td>
<td>167.0 ± 9.2</td>
<td>151.5 - 183.0</td>
</tr>
<tr>
<td>Estimated Body Mass (kg)</td>
<td>70.5 ± 10.7</td>
<td>54.6 - 88.2</td>
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<tr>
<td>Estimated BMI (kg/m²)</td>
<td>25.1 ± 1.8</td>
<td>21.8 - 29.0</td>
</tr>
</tbody>
</table>

Results

Figure 1. Greater omenta and femur bones. (a) Photograph of dissected cadaveric greater omentum with signature opera-like shape. (b) Statue (S) and body mass (BM) were calculated using maximal femoral length (MFL) and femoral head diameter (FHD), respectively.

Figure 2. Comparison of omental biometrics and calculated anthropometrics between sexes. (a) Omental mass (g). (b) Omental volume (mL). (c) Omental surface area (cm²). (d) Estimated body mass (kg). (e) Estimated stature (cm). (f) Estimated BMI (kg/m²).

Figure 3. Comparisons between omental parameters and cadaveric anthropometrics. (a) 3D scatter plot comparing age, omental mass, and estimated BMI. (b) Correlation matrix heatmap comparing age, omental biometrics, and estimated anthropometrics.

Citations & Acknowledgements

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