Low second to fourth digit ratio in Dupuytren disease.

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Methods

Introduction 2D:4D ratio

The ratio of the lengths of the second and fourth digits (2D:4D) has been described as reflecting endogenous prenatal androgen exposure. In general, 2D:4D ratio is lower in men than in women. 2D:4D ratio have been implicated as a biomarker for performance in sports14 and academic ability31. Low 2D:4D ratio is a predictor5-11 for cardiovascular disease, oral and prostate cancer, alcohol dependency, and osteoarthritis.

Dupuytren Disease

Dupuytren’s disease have demonstrated a strong, unexplained predominance in men, and a predominance in the ulnar rays. But it is unclear the relationship between Dupuytren disease and 2D:4D ratio.

Purpose

The aim of the present study was to use radiographic assessment to determine whether lower 2D:4D ratio is associated with DD (Dupuytren disease).

Methods

Between 2007 and 2015 Male patients with DD were reviewed retrospectively. Male patients with CTS (Carpal Tunnel Syndrome) were included as a control group. Excluded Female patients, Affecting both hands Hand injury, Osteoarthritis, Rheumatoid arthritis 22 hands with DD 18 hands with CTS as the Control group

Results: Participant demographics

<table>
<thead>
<tr>
<th></th>
<th>DD</th>
<th>Control</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>22</td>
<td>18</td>
<td>—</td>
</tr>
<tr>
<td>Number of right hands</td>
<td>120</td>
<td>120</td>
<td>—</td>
</tr>
<tr>
<td>Age, y</td>
<td>68.1±8.5</td>
<td>73.4±7.8</td>
<td>.01</td>
</tr>
<tr>
<td>Height, cm</td>
<td>168.3±5.4</td>
<td>163.7±6.3</td>
<td>.02</td>
</tr>
<tr>
<td>Weight, kg</td>
<td>65.6±9.3</td>
<td>64.3±12.5</td>
<td>.73</td>
</tr>
<tr>
<td>BMI, kg/m²</td>
<td>23.1±2.5</td>
<td>23.9±3.8</td>
<td>.44</td>
</tr>
</tbody>
</table>

Data are expressed as mean±standard deviation.

Results: 2D:4D ratio

We found that compared with control group, the Dupuytren disease group had significantly lower phalanx and combined 2D:4D.

Discussion

In mice, 2D:4D is controlled by the balance of androgen to estrogen signaling during a narrow window of digit. The research also revealed that inactivation of androgen receptors decreases growth of the fourth digit, whereas inactivation of estrogen receptors increases growth of the fourth digit, leading to differential growth of the fourth digit in males and females.

Androgen

<table>
<thead>
<tr>
<th>2D:4D&lt;1</th>
<th>DD &gt; normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibroblasts strongly expressed androgen receptors1,2</td>
<td></td>
</tr>
</tbody>
</table>

Androgen Receptor

Collagens ↑↑
Fibronectins ↑↑
Matricellular proteins ↑↑↑

Pagnotta et al showed the presence of androgen receptors associated with Dupuytren’s disease, both in the palmar fascia (especially, in the proliferative areas) and in cell cultures. Thereafter, they also reported that Dupuytren’s disease fibroblasts strongly expressed androgen receptors and that exposure of Dupuytren’s disease fibroblasts to androgen increased myofibroblast differentiation from fibroblasts.

Limitation

The sample size was relatively small.
The control group included patients with CTS.
2D:4D ratio in Dupuytren disease was calculated from only unaffected hands.

Conclusion

Our findings suggest that endogenous prenatal androgens could contribute to the development of Dupuytren disease, leading to its characteristic clinical presentation predominantly in men and affecting the ulnar rays.

We have no conflicts of interest to declare.