Prevalence of somatic dysfunctions in adult patients with cystic fibrosis – A pilot study

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INTRODUCTION

Context
- Cystic Fibrosis (CF)
- Treatments – Traditional medicine
- Treatments – Alternative medicine

Purpose
- Symptoms associated with a higher frequency of somatic dysfunctions (Snider et al, 2008)
- To our knowledge, no osteopathic studies have been published on CF
- A simple descriptive study
STUDY DESIGN

- Submitted to the local ethics committee
- Pilot observational study between two populations
- From October 1, 2007 to January 31, 2008
- Localisation
  - Study group: Adult CF care Center at Cochin Hospital in Paris
  - Control group: European Center for Higher Education in osteopathy (CEESO) in Paris
- Population study

<table>
<thead>
<tr>
<th></th>
<th>Study group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Gender (Male – Female)</td>
<td>8 / 6</td>
<td>8 / 6</td>
</tr>
<tr>
<td>Mean age (min – max) (years)</td>
<td>32.0 (18 – 53)</td>
<td>31.6 (19 – 54)</td>
</tr>
</tbody>
</table>
METHODS

- A single practitioner for the study (LS)
- Full osteopathic standard examination
- Data collection on a modified file, the « Outpatient Osteopathic SOAP Note Form »
  - 14 anatomical regions
  - Addition of 16 specific anatomical regions according to practitioner experts opinions
METHODS

- Diagnosis criteria of somatic dysfunction (SD)
  - Restriction of passive mobility
  - Pain: spontaneous or induced by palpation
  - Anatomical landmarks asymmetry during movement
  - Soft tissue changes

<table>
<thead>
<tr>
<th>Osteopathic tests</th>
<th>Criteria of presence</th>
<th>Criteria of absence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cranial</td>
<td>3 - 5 clinical manifestations found</td>
<td>0 - 2 clinical manifestations found</td>
</tr>
<tr>
<td>Neuro-musculo-skeletal</td>
<td>3 - 5 clinical manifestations found</td>
<td>0 - 2 clinical manifestations found</td>
</tr>
<tr>
<td>Visceral</td>
<td>3 - 5 clinical manifestations found</td>
<td>0 - 2 clinical manifestations found</td>
</tr>
</tbody>
</table>
METHODS – STATISTICAL ANALYSIS

- Fisher’s exact test
- α risk set at 5%
- Qualitative data were compared
- Presence or absence of clinical signs of SD among adult patients with CF and patients without chronic pain
### Results

- Prevalence of somatic dysfunctions in the two groups – Anatomical regions of « Outpatient Osteopathic SOAP Note Form »

<table>
<thead>
<tr>
<th>Anatomic Regions</th>
<th>Study group (n=14)</th>
<th>Control group (n=14)</th>
<th>Fisher’s Test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Head (CRI)</strong></td>
<td>12</td>
<td>4</td>
<td>p&lt;0.01</td>
</tr>
<tr>
<td><strong>Neck</strong></td>
<td>20</td>
<td>25</td>
<td>Ns</td>
</tr>
<tr>
<td><strong>Thoracic</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1-T4</td>
<td>25</td>
<td>24</td>
<td>Ns</td>
</tr>
<tr>
<td>T5-T9</td>
<td>38</td>
<td>28</td>
<td>Ns</td>
</tr>
<tr>
<td>T10-T12</td>
<td>22</td>
<td>18</td>
<td>Ns</td>
</tr>
<tr>
<td><strong>Lumbar</strong></td>
<td>28</td>
<td>29</td>
<td>Ns</td>
</tr>
<tr>
<td><strong>Ribs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R1-R4</td>
<td>14</td>
<td>5</td>
<td>p=0.052</td>
</tr>
<tr>
<td>R5-R9</td>
<td>9</td>
<td>4</td>
<td>Ns</td>
</tr>
<tr>
<td>R10-R12</td>
<td>1</td>
<td>0</td>
<td>Ns</td>
</tr>
<tr>
<td><strong>Sternum</strong></td>
<td>13</td>
<td>2</td>
<td>p&lt;0.0001</td>
</tr>
<tr>
<td><strong>Sacrum/pelvis</strong></td>
<td>13</td>
<td>14</td>
<td>Ns</td>
</tr>
<tr>
<td><strong>Pelvis/innominate</strong></td>
<td>6</td>
<td>7</td>
<td>Ns</td>
</tr>
<tr>
<td><strong>Upper extremity</strong></td>
<td>G</td>
<td>3</td>
<td>Ns</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>3</td>
<td>Ns</td>
</tr>
<tr>
<td><strong>Lower extremity</strong></td>
<td>G</td>
<td>3</td>
<td>Ns</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>14</td>
<td>Ns</td>
</tr>
</tbody>
</table>
RESULTS

- Prevalence of somatic dysfunctions in the two groups – Anatomical regions described by practitioner experts

<table>
<thead>
<tr>
<th>Anatomic regions</th>
<th>Study group (n=14) Number (Prevalence %)</th>
<th>Control group (n=14) Number (Prevalence %)</th>
<th>Fisher’s test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest Superior Orifice (CSO)</td>
<td>13 (93)</td>
<td>5 (36)</td>
<td>p&lt;0.01</td>
</tr>
<tr>
<td>Right sub-clavicular muscle</td>
<td>9 (64)</td>
<td>2 (14)</td>
<td>p=0.02</td>
</tr>
<tr>
<td>Left sub-clavicular muscle</td>
<td>14 (100)</td>
<td>2 (14)</td>
<td>p&lt;0.0001</td>
</tr>
<tr>
<td>Right pleural dome (ligament)</td>
<td>7 (50)</td>
<td>0 (0)</td>
<td>p&lt;0.01</td>
</tr>
<tr>
<td>Left pleural dome (ligament)</td>
<td>13 (93)</td>
<td>0 (0)</td>
<td>p&lt;0.0001</td>
</tr>
<tr>
<td>Mediastinum</td>
<td>11 (78)</td>
<td>4 (28)</td>
<td>p=0.02</td>
</tr>
<tr>
<td>Motility of the lungs</td>
<td>13 (93)</td>
<td>0 (0)</td>
<td>p&lt;0.0001</td>
</tr>
<tr>
<td>Diaphragm (right dome)</td>
<td>11 (78)</td>
<td>4 (28)</td>
<td>p=0.02</td>
</tr>
<tr>
<td>Pelvic floor (Muscles)</td>
<td>12 (86)</td>
<td>5 (36)</td>
<td>p=0.02</td>
</tr>
</tbody>
</table>
DISCUSSION

- Use of the biomechanical and neurophysiological model of somatic dysfunction as described in the WHO Benchmarks (2010) for description and interpretation of the clinical signs

- Possible associations between pathophysiology of CF and palpated signs attributed to SD
  - Somato-somatic
  - Viscero-somatic
  - Somato-visceral
  - Viscero-visceral
SOMATO-SOMATIC REFLEXES

- Chondro-costal SDs (p<0.0001)
  - Chest distension with a kyphosis and a bulging sternum (Davies et al, 2007)

- Ribs SDs (p=0.052)
  - Adaptation to chondro-costal dysfunctions?
  - Adaptation to postural changes?
**SOMATO-SOMATIC REFLEXES**

- **Diaphragm hypertonia** (p=0.02)
  - Lung distension with a distended chest at its base (Davies et al, 2007)
  - Diaphragmatic dome flattening and shortening of its muscle fibers, resulting in a decrease in strength of contraction (Perez et al, 2003)

Frontal view
**SOMATO-SOMATIC REFLEXES**

- Perineum muscle hypotonia ($p=0.02$)
  - Pulmonary distension with a diaphragmatic dome flattening (Perez et al, 2003)
  - Increased pressure on the abdominal organs, including pelvic organs?

- Decrease in the rate of cranial rhythmic impulse (CRI) and spheno-basilar SDs ($p=0.006$)
  - Patients suffering from Parkinson’s disease (Rivera-Martinez et al, 2002)
  - Related to postural changes of patients?
Viscero-somatic reflexes

- Overstressing leads to sub-clavicular muscle hypertonia (p=0.02 on the right and p<0.0001 on the left)
  - Evolution of severity of vertebral SDs due to viscera-somatic reflexes in diabetic population (Licciardone et al, 2007)

- Loss of lung expansion (p<0.0001) and decrease in pleural elasticity of the dome tissue (p=0.006 on the right and p<0.0001 on left)
  - Pathology of an organ could be associated with disturbances of its motility (Barral, 2004)
**Viscero-visceral reflexes**

- Tissue resistance to compression of the anterior-posterior mediastinum \( p=0.02 \)
  - Tissue adaptation of the mediastinum in close anatomical relationship with pulmonary cylinders?
  - Lung distension with a bulging sternum (Davies et al, 2007)

- Barral, 2004
STUDY LIMITS

- Practitioner was not blinded

- Intra-operator reliability was not assessed but recommendations for filling « Outpatient Osteopathic SOAP Note Form » were followed

- Palpation of the tissue changes
  - Some were attributable to somatic dysfunction, considered « reversible » after osteopathic manipulative treatment
  - And some were physiopathological impairments of CF, considered « irreversible »
  - A challenge to describe the place of OMT for patients suffering from CF
CONCLUSION

- To our knowledge, this study is the first one to evaluate the prevalence of somatic dysfunctions in adult patients with cystic fibrosis.

- We observed a higher frequency of signs associated with somatic dysfunctions in these patients.

- Associated with changes in their posture and the impact of disease on the respiratory system, based on the biomechanical and the neurophysiological model of somatic dysfunction.
Perspective

« Mucostéo »

Clinical Research on « Contribution of osteopathic treatment on pain of adult patients with cystic fibrosis - A pilot Study »
ACKNOWLEDGEMENTS

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