The prevalence of abdominal hernias in patients with symptomatic femoroacetabular impingement

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Groin pain can be caused by different etiologies (bermuda triangle of sports medicine\textsuperscript{1})

For example:

- Femoroacetabular Impingement (FAI)
- Abdominal hernia
- Sports hernia
- Tendinopathy of adductors
- Long-standing adductor-related groin pain (LSARGP)

\textsuperscript{1}Bizzini M, Br J Sports Med 2011
Background

- Accurate diagnosis can be challenging
  - Clinical evaluation is not specific
  - Different pathologies can occur simultaneously
  - Symptomatic vs. non-symptomatic pathology

- Symptomatic patients after FAI-surgery showed herniation
  - We started sonographic evaluation of the groin as part of the standard evaluation of FAI
Objectives

- To determine the prevalence of abdominal (femoral, inguinal) hernias in patients with FAI
Materials and Methods

- Retrospective cohort study (Level IV)
- Patients presenting to the office for evaluation of symptomatic FAI
- 01/2011 – 12/2012, standardized diagnostic protocol
  - Clinical examination
  - Radiographic examination
  - MRI with intraarticular gadolinium contrast
  - Ultrasound evaluation of the groin
  - Fluoroscopically guided diagnostic hip injection
- Exclusion criteria
  - Hip dysplasia (CE-angle <20°)
  - Signs of advanced osteoarthritis (Tönnis ≥2)
  - Previous hip surgery
- 86 hips (78 patients)
  - Female/male: 38/48 (44/56%)
  - Age: 29.5ys ± 10.9ys
Materials and Methods

- **Ultrasound**
  - Performed by one author (BD), board certified radiologist, specialized in ultrasound technique
  - General Electric Voluson E6 sonography system (General Electric Healthcare, Glattbrug, Switzerland), using a 7.5-10 Mhz probe
  - Evaluation for signs of
    - Herniation
    - Tendinopathy
    - Effusion in the hip joint
- **Criteria for Definition of Herniation**
  - Dynamic US evaluation during Valsalva maneuver
  - Reproducible displacement of abdominal contents (inguinal, femoral)
Materials and Methods

(A) external iliac art., (E) inferior epigastric art., (V) dilated external iliac vein, (H) inguinal hernia; (curved arrow) superior pubic ramus

Jamadar DA, Am J Roentgenol 2006
## Results

<table>
<thead>
<tr>
<th>Condition</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hips total n=86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hernia inguinal</td>
<td>27</td>
<td>31.40%</td>
</tr>
<tr>
<td>Hernia femoral</td>
<td>10</td>
<td>11.60%</td>
</tr>
<tr>
<td>Hernia combined</td>
<td>3</td>
<td>3.50%</td>
</tr>
<tr>
<td><strong>Hernia total</strong></td>
<td>34</td>
<td>39.50%</td>
</tr>
<tr>
<td>Tendinopathy adductors</td>
<td>19</td>
<td>22.10%</td>
</tr>
<tr>
<td>Effusion</td>
<td>12</td>
<td>14%</td>
</tr>
</tbody>
</table>
### Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Overall</th>
<th>With hernia</th>
<th>Without hernia</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>29.5 ± 10.9</td>
<td>32 ± 10.8</td>
<td>27.8 ± 10.8</td>
<td>0.09</td>
</tr>
<tr>
<td>Lateral center-edge angle</td>
<td>31.6° ± 5.5°</td>
<td>32.4° ± 5.8°</td>
<td>31.1° ± 5.4°</td>
<td>0.31</td>
</tr>
<tr>
<td>Neck-Shaft angle</td>
<td>133.4° ± 5.6°</td>
<td>133° ± 4.4°</td>
<td>133.8° ± 6.2°</td>
<td>0.53</td>
</tr>
<tr>
<td>Acetabular version</td>
<td>16.4° ± 5.2°</td>
<td>16.8° ± 5.4°</td>
<td>16.0° ± 5.1°</td>
<td>0.50</td>
</tr>
<tr>
<td>Acetabular index</td>
<td>5.5° ± 4.5°</td>
<td>4.6° ± 4.4°</td>
<td>6.1° ± 4.5°</td>
<td>0.14</td>
</tr>
<tr>
<td>Alpha angle</td>
<td>55.5° ± 9.1°</td>
<td>55.2° ± 9.4°</td>
<td>55.7° ± 9°</td>
<td>0.81</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th></th>
<th>performed infiltration</th>
<th>positive response</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>with herniation</td>
<td>28</td>
<td>23</td>
<td>82.1%</td>
</tr>
<tr>
<td>without herniation</td>
<td>38</td>
<td>25</td>
<td>65.8%</td>
</tr>
<tr>
<td>total</td>
<td>66</td>
<td>48</td>
<td>72.7%</td>
</tr>
</tbody>
</table>
Limitations

- Small sample size
- No control group
  - No information about the prevalence of asymptomatic herniation in general population
- No validated protocol for sonographic evaluation of groin region
Conclusions

- Hernias can be found frequently (~40%) in patients with FAI
- Ultrasound of the groin may be a useful adjunct to complete the diagnostic work-up of FAI
- This may be a feasible addition to complement ultrasound guided hip infiltration
- Further studies needed to develop standardized evaluation of the groin and assess the cost-effectiveness of these modalities
Clinical Significance

- There should be a high suspicion for abdominal hernias
- Low threshold for obtaining ultrasound of the groin
- If positive findings, referral to abdominal surgeon for further evaluation