SONOGRAPHY AND JOINT PRESSURE IN SYNOVITIS OF THE ADULT HIP

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Sonography was successfully used to diagnose an effusion in the hips of three adults with septic arthritis and four with aseptic synovitis. The effusions were confirmed by aspiration. All the patients had markedly increased intracapsular pressure which, in the extended position, exceeded the systolic blood pressure and could well compromise the blood supply to the head of femur. Aspiration reduced pain and intracapsular pressure, as did flexion of the hip to 45°.

It is important that septic synovitis is excluded or diagnosed in an adult with acute pain in the hip. Neither clinical examination nor conventional radiography (Brown 1975) provide much information about hip joint effusion. The purpose of this paper is to report that sonography is a useful, non-invasive investigation in this respect and to relate the findings to the intracapsular pressure in such patients.

PATIENTS AND METHODS

We studied seven consecutive patients admitted because of acute pain in the hip. Their mean age was 50 (range 15 to 79 years); three were men.

All patients were examined clinically, and details of pain and the range of active and passive movement were recorded. Conventional anteroposterior and lateral radiographs were obtained. Sonography was performed with a real-time scanner (Diasonics DRF 12) with a 7.5 MHz transducer from the ventral aspect of the hip in the plane shown in Figure 1. Capsular distension due to synovitis and/or effusion was measured from the anterior aspect of the capsule to the anterior aspect of the neck of femur and was compared to the corresponding measurement in the opposite asymptomatic hip (Figs 2 to 4).

Aspiration of the hip was then performed under local anaesthesia. A 1.2 mm needle was introduced from the anterolateral aspect of the hip and aimed, under image intensifier control, at the anterior part of the femoral neck where capsular distension was maximal. Intracapsular pressure was recorded with the hip extended in neutral rotation, extended in medial rotation, extended in lateral rotation, and in 45° of flexion. Any effusion was then aspirated and its volume recorded. After this a new clinical examination was performed. Samples of the aspirate were sent for bacterial culture and for determination of the joint-glucose/blood-glucose ratio. Antibiotic treatment was started in patients with evidence of joint-glucose consumption.

RESULTS

The conventional radiographs were normal in all seven patients, and in all cases sonography revealed capsular distension caused by effusion. This varied from 10 to 16 mm (mean 14 ± 2 s.d.) as compared with 4 to 8 mm

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(mean 6 ± 1 s.d.) in the opposite asymptomatic hip (Figures 2 to 4). The intracapsular pressures are shown in Table I. The mean pressure standard deviation and range of pressures in extension and neutral rotation was 142 mmHg ± 116 (52–501 mmHg), in medial rotation 182 mmHg ± 160 (46–512 mmHg) and in lateral rotation 137 mmHg ± 166 (45–507 mmHg). In flexion the mean pressure was reduced to 23 mmHg ± 16 (0–43 mmHg). After the aspiration of a mean volume of 7 ml (range 2–10 ml), joint pressure fell to near zero in the neutral position in all cases, with marked relief of pain and an increase in active and passive range of movement. Bacterial cultures were negative in four patients and positive in three, in which Staphylococcus aureus was grown in two and Enterococci in one. All three infected cases had shown a joint glucose/blood-glucose ratio of under 50%, while the others had ratios between 70% and 100%. The effusion in the non-infected cases was clear, yellow and of normal viscosity with no evidence of pyrophosphate synovitis.

**DISCUSSION**

Patients with an acute onset of pain in the hip present a clinical problem since it is essential that septic synovitis of the joint is either diagnosed and given urgent treatment or is excluded. Clinical examination and conventional radiography cannot do this (Brown 1975). The usual diagnostic method has been by aspiration, but a negative finding must leave some doubt as to whether the joint capsule has been penetrated. There is also a risk of causing iatrogenic spread of infection in those cases in which osteomyelitis near to the joint cannot be excluded (Wingstrand et al. 1986). Sonography has been shown to

**Table I. Results of investigations in seven patients with hip joint synovitis**

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age (years)</th>
<th>Sex</th>
<th>Symptomatic hip</th>
<th>Opposite hip</th>
<th>Intracapsular pressure (mmHg)</th>
<th>Volume aspirated (ml)</th>
<th>Bacterial culture</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Extension + rotation</td>
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<td></td>
<td></td>
<td></td>
<td>Neutral</td>
<td>Medial</td>
<td>Lateral</td>
</tr>
<tr>
<td>1</td>
<td>68</td>
<td>M</td>
<td>13</td>
<td>6</td>
<td>97</td>
<td>128</td>
<td>116</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>M</td>
<td>16</td>
<td>7</td>
<td>52</td>
<td>68</td>
<td>45</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
<td>F</td>
<td>13</td>
<td>6</td>
<td>57</td>
<td>148</td>
<td>79</td>
</tr>
<tr>
<td>4</td>
<td>79</td>
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<td>14</td>
<td>7</td>
<td>69</td>
<td>120</td>
<td>50</td>
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<tr>
<td>5</td>
<td>60</td>
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<td>14</td>
<td>8</td>
<td>501</td>
<td>512</td>
<td>507</td>
</tr>
<tr>
<td>6</td>
<td>52</td>
<td>F</td>
<td>10</td>
<td>4</td>
<td>30</td>
<td>46</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>48</td>
<td>M</td>
<td>16</td>
<td>6</td>
<td>190</td>
<td>250</td>
<td>114</td>
</tr>
</tbody>
</table>
be an accurate diagnostic tool for the diagnosis of hip joint effusion in the child with transient synovitis or septic arthritis (Wilson, Green and MacLar

REFERENCES


Wilson DJ, Green DJ, MacLar

1. Sonography is a useful non-invasive investigation for hip synovitis in the adult.

2. The intracapsular pressure is high in these patients, and may interfere with circulation to the femoral head.

3. Such patients should be treated with the hip in 45° flexion to minimise intracapsular pressure.