TRAUMATIC HAEMARTHROSION OF THE KNEE

P. P. CASTELEYN, F. HANDELBERG, P. OPDECAM

From the Academic Hospital of the Vrije Universiteit Brussel, Belgium

We have investigated a prospective series of 100 acute traumatic haemarthroses of the knee in a general non-athletic population. All the patients had normal radiographs and an aspiration which confirmed the haemarthrosis, before undergoing ligament testing and an arthroscopic examination under anaesthesia. Only one patient had no serious pathology; in the other 99 a total of 193 lesions were recorded. Thirty knees had only one isolated lesion, 69 had combined lesions. This study confirms the serious nature of an acute traumatic haemarthrosis of the knee, even in non-athletic patients.

An acute haemarthrosis of the knee, without gross joint laxity has, in the past, often been considered benign (Watson-Jones 1946); this opinion was based on clinical and radiological examination. Recent arthroscopic studies, however, have reported a very high number of intra-articular lesions in such cases (Gillquist, Hagberg and Oretop 1977; DeHaven 1980; Noyes, Basset et al. 1980). These findings might, of course, be atypical since the patients were almost exclusively young athletes involved in sports accidents and clinical studies of less specific patients seemed to confirm the benign nature of knee haemarthroses (Jain, Swanson and Murdoch 1983). It was to clarify this controversy that we decided to perform a consecutive, prospective arthroscopic study in a general patient population.

PATIENTS AND METHODS

The material of this study consisted of a consecutive series of 100 patients with haemarthrosis of the knee who presented at the emergency department of our hospital, and who met the following criteria: early onset of knee swelling, following a recent acute injury; confirmation of the haemarthrosis by aspiration; exclusion of gross joint laxity or patellar dislocation by routine clinical examination; and exclusion of fractures or osteochondral separations by radiographs, including skyline views or tomograms if necessary.

The series had a broad age range (12 to 61 years) although it mostly concerned young individuals, with a mean age of 24 years (Fig. 1). The sex ratio was predominantly male (80 to 20).

The causal injuries were diverse, but falls and other accidents at home (26 patients), as well as hobbies and recreational activities (54 patients) dominated; only 14 were traffic accidents and six were accidents at work. Most were low energy injuries. There were no high level athletes in the sports trauma group, since these were mostly referred direct to our orthopaedic department and are therefore not included in this study.

All the patients in our series were further evaluated by clinical examination under general or epidural anaesthesia, followed by arthroscopy; the delay between trauma and this examination was kept as short as possible, in order to avoid secondary lesions (Fig. 2). The arthroscopies, which represented about 10% of all the arthroscopic examinations carried out in our orthopaedic department during the same period, were performed by only two surgeons (PPC and FH). A standard set-up was used, with large-bore high flow irrigation, but no pump. A tourniquet and leg holder were used in most cases. Probing was always done, and the posterior cruciate ligament was visualised with a 70° arthroscope. The arthroscopic criteria for the diagnosis of a collateral ligament injury were a blood infusion in the medial or lateral gutter, and abnormally easy opening of the medial or lateral compartment.

Statistical evaluation of the data was performed by Student's t-test and the chi-square test.

RESULTS

No complications could be attributed to the examinations under general or epidural anaesthesia, or to the arthroscopies; and there were no statistically significant differences in the mean age, or sex ratio between the different trauma groups.

Clinical examination under anaesthesia revealed anterior cruciate ligament injuries in 67 cases, posterior cruciate ligament injuries in nine, and collateral ligament...
Age distribution of 100 patients with an acute haemarthrosis of the knee.

**Table 1.** Lesions found at arthroscopy in the different trauma groups

<table>
<thead>
<tr>
<th></th>
<th>Recreational</th>
<th>Home</th>
<th>Work</th>
<th>Traffic</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior cruciate</td>
<td>45</td>
<td>17</td>
<td>4</td>
<td>9</td>
<td>75</td>
</tr>
<tr>
<td>Posterior cruciate</td>
<td>–</td>
<td>1</td>
<td>–</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Collateral</td>
<td>15</td>
<td>6</td>
<td>–</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>Menisci</td>
<td>31</td>
<td>8</td>
<td>3</td>
<td>9</td>
<td>51</td>
</tr>
<tr>
<td>Capsular</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>Chondral</td>
<td>4</td>
<td>6</td>
<td>–</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>41</td>
<td>11</td>
<td>41</td>
<td>193</td>
</tr>
</tbody>
</table>

% CASES

97

83

54

< 3 DAYS  < 10 DAYS  < 3 WEEKS

Fig. 2

Delay between trauma and arthroscopy.

Isolated lesions found in 30 cases.

Fig. 3

Combined, multiple lesions found in 69 cases. MEN, meniscal; ACL, anterior cruciate ligament; PCL, posterior cruciate ligament.

Fig. 4

Venn diagram of the most frequently encountered combined lesions of ACL, menisci and collateral ligaments.

Fig. 5
injuries in 23. The most consistently positive test for anterior cruciate lesions was the Lachman sign (63 cases). The anterior drawer sign at 90° of flexion (38 cases) and the pivot shift sign (16 cases) showed lower sensitivity.

The arthroscopic technique used permitted complete visualisation of all compartments of the knee. In only one case was no important intra-articular lesion found. In the other 99 a total of 193 lesions were recorded; 30 knees presented only one isolated lesion, 69 presented multiple or combined lesions (Figs 3, 4, and 5).

Only a few statistically significant correlations were found (Table I). Almost all the posterior cruciate lesions (10 out of 11) were caused by traffic accidents, and none were sports-related. Anterior cruciate injuries, isolated or combined, were statistically more frequent in sports injuries (p < 0.005), and chondral lesions were predominantly non-sports related (p < 0.005).

The diverse nature of the injuries made precise information about the mechanism unreliable. A popping noise was mentioned by only 21 patients: 20 with anterior cruciate ligament injuries (of which there were 75 in all) and one with a meniscal injury (of which there were 51).

DISCUSSION

Although 54 of the 100 haemarthroses in this study followed recreational activities, it is important to stress that no high level athletes were included. The population studied was a broad mix of patients of different ages, with diverse types of accident, typical of those seen in a general trauma centre; this cannot be compared with the young athletic population seen in specialised sports centres. Nevertheless, our results show almost exactly the same number and distribution of intra-articular lesions as those reported from such centres.

In our study anterior cruciate lesions were somewhat more frequent in sports injuries, while posterior cruciate lesions seemed to require higher energy trauma as in traffic accidents. The low incidence of chondral injuries, compared with previous series, can be explained by our exclusion of all patients with radiologically visible lesions.

We also found that clinical examination, even when performed under anaesthesia, still underestimated the extent and the number of lesions found at arthroscopy. The combination of all our clinical tests successfully diagnosed only 89% of the anterior and 82% of the posterior cruciate lesions found arthroscopically. We have the impression that the pivot shift sign can be masked in acute injuries by soft-tissue effusion and joint distension; this could explain its low frequency in our hands.

The importance of a correct diagnosis in patients with a haemarthrosis of the knee has been emphasised in various studies (Noyes, Paulos et al. 1980; Mariani, Puddu and Ferretti 1981). These have demonstrated that undiagnosed and untreated knee injuries have a poor outcome, and Smillie (1978) has stated that: "...there are few worse errors than to enclose a recently injured knee in a plaster cast without a diagnosis...".

Our results do not imply that each lesion found arthroscopically needs to be treated surgically. We believe that in a general patient population there is a definite place for conservative management of knee injuries and that treatment needs to be tailored to the requirements of each individual patient.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

REFERENCES


