Cystic Change in the Head of the Fibula in Osteoarthritis

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We report eight patients with prominent cystic changes in the head of the fibula. Seven of these had osteoarthritis of the adjacent knee, and five had evidence of local deposition of calcium pyrophosphate dihydrate crystals.

A radiographic survey of 470 knees in 254 patients with osteoarthritis suggested that such cysts are rare, but should be considered in the differential diagnosis of such changes before expensive or invasive investigations are performed.


The superior tibiofibular joint communicates with the knee in up to 10% of adults (Resnick et al 1978; Resnick and Niwayama 1981). Abnormalities of this joint, or of the head of the fibula are uncommon and are usually either mechanical in origin, such as dislocation or instability (Ogden 1974; Hohl and Larson 1975; Veth, Kingma and Nielsen 1984) or neoplastic. Arthropathy is rare, although rheumatoid or septic arthritis may cause joint-space narrowing, erosions and osteopenia, usually as a result of extension from primary involvement of the knee (Resnick et al 1978). 'Degenerative' changes may develop after trauma or sepsis (Veth et al 1984).

We describe eight patients with osteoarthritis of large joints and marked cystic change in the head of the fibula. Five showed calcium pyrophosphate dihydrate (CPPD) crystals in the adjacent cyst or knee. These findings led us to undertake a radiographic survey of 254 patients with osteoarthritis of the knee, with or without associated CPPD deposition.

Patients and Methods

Case histories. The clinical and radiological features of the eight index patients are shown in Table I. Five were male, three were female, and their mean age at presentation was 69 years (50 to 85). Seven had presented with symptomatic osteoarthritis of the knee and two of these also had a swelling over the lateral aspect of the head of the fibula. The eighth patient had apatite-associated destructive arthropathy of the hip and had radiographs of the knee which were otherwise normal.

Table I. Details of eight index cases with cystic change in the proximal fibula

<table>
<thead>
<tr>
<th>Case</th>
<th>Sex</th>
<th>Age (yr)</th>
<th>Fibular cysts</th>
<th>Knee OA</th>
<th>Chondrocalcinosis</th>
<th>CPPD crystals</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M</td>
<td>63</td>
<td>Unilateral</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>64</td>
<td>Bilateral</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>M</td>
<td>66</td>
<td>Unilateral</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>4</td>
<td>M</td>
<td>71</td>
<td>*</td>
<td>+</td>
<td>-</td>
<td>+ (cyst)</td>
</tr>
<tr>
<td>5</td>
<td>M</td>
<td>81</td>
<td>Unilateral</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>F</td>
<td>50</td>
<td>Unilateral</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>F</td>
<td>73</td>
<td>*</td>
<td>+</td>
<td>+</td>
<td>+ (cyst)</td>
</tr>
<tr>
<td>8</td>
<td>F</td>
<td>85</td>
<td>*</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

* contralateral side not radiographed

There were prominent radiolucent regions within the fibular heads in all cases (Figs 1 to 3), bilateral in one patient and unilateral in four. One of the other three patients had undergone arthroplasty of the contralateral knee and two had only unilateral radiographs. Seven showed radiological signs of osteoarthritis and also had small associated cysts in the tibia.

Four patients had moderate knee effusions; CPPD crystals were isolated from the synovial fluid in three of these. There was radiographic chondrocalcinosis (Fig. 3) in two cases. No patient with CPPD and/or chondrocalcinosis had a recognised predisposing metabolic disease.
Case 2. Cysts in both fibular heads, and in the upper tibia on the left (arrow).

Figure 2a, 2b – Case 4. Cysts in the fibular head and neck, and in the upper tibia (arrow). Figure 3 – Case 7. There is a cyst in the fibular head (lowest arrow). Chondrocalcinosis (white arrow) and an osteophyte (middle arrow) are seen in the lateral compartment of the tibiofemoral joint.
such as haemochromatosis, hyperparathyroidism, hypomagnesaemia or hypophosphatasia.

The two patients who presented with swellings were investigated as possibly having neoplasms. Case 4 had scintigraphy, cystography, CT and MRI (Fig. 4); case 7 had ultrasonography, cystography (Fig. 5) and MRI (Fig. 6). In both the cysts were aspirated and CPPD crystals were detected.

**Radiographic survey.** We studied the plain radiographs (AP standing, and lateral in 20° flexion) of 254 patients (470 knees) with symptomatic osteoarthritis of Kellgren grade 2 or more (Kellgren and Lawrence 1957) in at least one compartment of the knee. All had been referred to our rheumatology clinic; 161 were female, and their mean and median age was 70 years (34 to 91).

Chondrocalcinosis was seen on 33% of the radiographs (51 women, 32 men) and CPPD crystals were identified in the synovial fluid of an additional 10%. Cystic change in the head of the fibula was seen in only four patients (2%); of these three had CPPD crystals in their synovial fluid and one had chondrocalcinosis.

**DISCUSSION**

Our patients all had benign cystic changes, but two (cases 4 and 7) had had extensive investigations to exclude a neoplasm. These included cystography, CT scans and MRI.

Our radiographic survey of patients with symptomatic osteoarthritis of the knee confirmed that abnormalities of the head of the fibula and superior tibiofibular joint are uncommon. There appears to be an association with osteoarthritis, which may reflect an increase in mechanical stress caused by altered load transmission in the knee or hip. Another explanation may be a wider than usual 'field-change' response at the knee, mediated by local chemical, vascular or mechanical signals.

Subchondral cyst formation is an important hall-

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**Fig. 4**

Case 4. MRI (0.5T GE max; gradient echo sequence TR 740, TE 30; flip angle 25°). Cysts in the tibia and fibula are seen as areas of high signal (long thin arrows) and are related to the superior tibiofibular joint (broad arrow). There is also a cyst in the soft tissues (lowest arrow).

**Fig. 5**

Case 7. Cystogram. The cyst has been punctured and outlined by contrast (broad arrow), which passes into subcutaneous tissues (thin arrows).

**Fig. 6**

Case 7. MRI (Picho 15T; STIR sequence TR 2000 ms, T1 100 ms). The small arrows mark the tibia and fibula. The soft-tissue cyst (curved open arrow) is shown as a localised high-signal area, and there is a diffuse high-signal region (broad arrow) anteriorly and in the anterior compartment.
mark of CPPD-associated arthropathy (Resnick et al 1977; Martel et al 1981; Halverson and McCarty 1986), but changes in the superior tibiofibular joint and fibula have not previously been reported, despite the very high frequency of knee involvement and the occurrence of large cysts within the femur and tibia (Resnick and Niwayama 1981b). The higher incidence of chondrocalcinosis and CPPD crystals in our eight index cases than in our survey of 254 patients suggests that these may be associated with benign cystic changes at this unusual site.

Subchondral cysts about the superior tibiofibular joint may present diagnostic problems. An association with osteoarthritis and CPPD-associated arthropathy is common and should be considered before expensive or invasive investigations are undertaken.

We are grateful to Roussel Laboratories Ltd (UK) for sponsoring J. L. as a Roussel Osteoarthritis Research Fellow, and Mr I. W. Forster and Mr J. S. Hopkins for allowing us to report their cases.

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


