Radiographic osteoarthritis of the knee classified by the Ahlbäck and Kellgren & Lawrence systems for the tibiofemoral joint in people aged 35–54 years with chronic knee pain

Ingemar F Petersson, Torsten Boegård, Tore Saxne, Alan J Silman, Björn Svensson

Abstract

Objectives—To determine the prevalence of tibiofemoral radiographic knee osteoarthritis (OA) in people aged 35–54 years associated with chronic (>3 months) knee pain using two different radiographic grading systems.

Methods—Population based postal survey in a random sample of inhabitants in a district in southern Sweden followed by clinical examination and plain posteroanterior, weight bearing radiographical examination. The Ahlbäck criteria (focusing on joint space narrowing) and the Kellgren & Lawrence classification for knee OA were used for diagnosing tibiofemoral OA.

Results—A questionnaire was sent to 2000 randomly selected people aged 35–54 years. The response rate was 92.6%. Fifteen per cent of these people reported chronic knee pain. This group (n=279) was subjected to a clinical and radiographic examination of the knee joint and 204 persons agreed to participate. According to the Kellgren & Lawrence classification 28 subjects had OA of the knee grade 2 or more and 16 grade 3 or more. Radiographically detected OA of the knee according to Ahlbäck was found in 20 cases. The minimum prevalence of radiological tibiofemoral knee OA with knee pain was thus 1.5% for Kellgren & Lawrence grade 2 or more, 0.9% for grade 3 or more, and 1.1% according to the Ahlbäck classification. The agreement between the Kellgren & Lawrence grades 2–3 versus Ahlbäck grade I as well as grade 3–4 versus Ahlbäck grade I–II was good (κ 0.76 and 0.78 respectively).

Conclusion—The prevalence of radiographic tibiofemoral OA combined with chronic knee pain in people aged 35–54 years was around 1% as estimated by either the Kellgren & Lawrence or the Ahlbäck classification systems.

Osteoarthritis (OA) is a common cause of pain and disability in the population and thus of great socioeconomic significance. Radiographic OA of the knee joints is believed to be the most common manifestation of pathology in this joint and different grading systems have been used, for example, the Kellgren & Lawrence system and the Ahlbäck classification. Depending on the populations studied and the epidemiological techniques used, the prevalence figures for radiographic OA of the knees (with or without symptoms) vary between 14 and 30% (over the age of 45 years).

Between 40 and 80% of subjects with radiographic OA in higher age groups are reported to have symptomatic disease. There is a correlation between the degree of radiographic changes (and thus for age) and the degree of pain and other symptoms. As most studies in the past have focused on people over 50 years, knowledge about the prevalence of radiographic OA in subjects with knee pain in younger age groups is limited. Furthermore, by identifying middle aged people with knee pain it should be possible to monitor subjects at risk of developing knee joint OA and thus be able to find stages of the disease previously difficult to study. We here describe the prevalence of symptomatic tibiofemoral OA in people aged 35–54 years defined by the Kellgren & Lawrence or the Ahlbäck classification systems.

Methods

STUDY DESIGN

A district in the southwest of Sweden with low migration rate and mixed urban and rural population was chosen to identify a group of people with longstanding knee pain. The study cohort was formed by sending a questionnaire to 2000 people (963 women and 1037 men), comprising a random sample (evenly distributed for age and sex) from the central population register (covering all inhabitants) of the 5254 persons aged 35–54 years in the district. The 2000 subjects were asked for ‘pain in any of your knees practically daily for the last three months’ and all with chronic knee pain...
Table 1  The Ahlbäck classification of radiographic knee OA of the tibiofemoral joint and the Kellgren and Lawrence grading system (adapted)* *

<table>
<thead>
<tr>
<th>Ahlbäck grade</th>
<th>Ahlbäck definition</th>
<th>Kellgren &amp; Lawrence grade</th>
<th>Kellgren &amp; Lawrence definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade I</td>
<td>Joint space narrowing (joint space ≤ 3 mm)</td>
<td>Grade 1 'Doubtful'</td>
<td>Minute osteophyte, doubtful significance</td>
</tr>
<tr>
<td>Grade II</td>
<td>Joint space obliteration</td>
<td>Grade 2 'Minimal'</td>
<td>Definite osteophyte, unimpaired joint space</td>
</tr>
<tr>
<td>Grade III</td>
<td>Minor bone attrition (0–5 mm)</td>
<td>Grade 3 'Moderate'</td>
<td>Moderate diminution of joint space</td>
</tr>
<tr>
<td>Grade IV</td>
<td>Moderate bone attrition (5–10 mm)</td>
<td>Grade 4 'Severe'</td>
<td>Joint space greatly impaired with sclerosis of subchondral bone</td>
</tr>
<tr>
<td>Grade V</td>
<td>Severe bone attrition (&gt;10 mm)</td>
<td>Grade 4 'Severe'</td>
<td>Joint space greatly impaired with sclerosis of subchondral bone</td>
</tr>
</tbody>
</table>

The prevalence of current chronic knee pain was 15% (279 of 1853) (95% CI=13.38, 16.62). A total of 204 of 279 accepted further examination. The age and sex distribution in this subgroup did not differ significantly from the initial population.

Table 2  Prevalence 1 assuming none of the non-attenders with pain (n=75 of 279) had OA, prevalence 2 assuming that the prevalence of OA was the same in those with pain not attending (75 of 279) as in the group examined (n=204)

<table>
<thead>
<tr>
<th>Diagnostic group</th>
<th>Number of people with radiographic tibiofemoral OA</th>
<th>Prevalence 1 (%)</th>
<th>Prevalence 2 (%)</th>
<th>Sex (female/male)</th>
<th>Age median (range)</th>
<th>BMI median (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahlbäck ≥ grade 1</td>
<td>20</td>
<td>1.1 (0.63–1.57)</td>
<td>1.4 (0.87–1.93)</td>
<td>10/10</td>
<td>50.0 (38–54)</td>
<td>26.0 (20.3–32.7)</td>
</tr>
<tr>
<td>KL ≥ grade 2</td>
<td>28</td>
<td>1.5 (0.95–2.05)</td>
<td>2.1 (1.45–2.75)</td>
<td>13/15</td>
<td>49.5 (35–54)</td>
<td>26.0 (20.3–37.5)</td>
</tr>
<tr>
<td>KL ≥ grade 3</td>
<td>16</td>
<td>0.9 (0.44–1.28)</td>
<td>1.2 (0.71–1.69)</td>
<td>6/10</td>
<td>45.5 (35–54)</td>
<td>25.7 (18.3–28.9)</td>
</tr>
</tbody>
</table>

The figures in parentheses in the prevalence columns denote the 95% CI. KL= Kellgren & Lawrence. The age was significantly higher in the groups with radiographic OA (without any differences between the different groups) according to Ahlbäck and Kellgren & Lawrence grade 3 or more (p<0.05) compared with those without radiographic OA. The BMI values did not differ significantly between any of the groups.
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3+) and 1.1% (Ahlbäck grade 1.5/0.9% (Kellgren & Lawrence grade 2+ and knee OA (weight bearing radiographs) of where we found a prevalence of symptomatic compared with the higher figures of this study (grade 2+ and 3+) respectively. This should be considered also below the age of 45.

The response rate in our study was high (92.6%), but the frequency of participation in the clinical and radiographic examination was lower (73.1% of the initial subjects having knee pain). The method used for estimating minimum prevalence is based on the assumption that those with chronic knee pain not attending x-ray examination (75 of 279) had no radiographic OA. However, one main reason for not participating in the examination might be an already diagnosed and treated OA, which would indicate even higher true prevalence figures. If we assume that the prevalence of radiographic OA according to Kellgren & Lawrence (grade 2 or more) is the same in the whole population with chronic knee pain (n=279) as in the group examined (n=28 of 204), the prevalence of OA combined with chronic knee pain would be 2.1% (table 2).

The radiographic criteria selected for the diagnosis of OA in this study focus on the tibiofemoral joint and no attempt was made to study the patellofemoral joint. Inclusion also of this joint has been advocated recently and in subsequent studies of this cohort, this joint will also be examined. If, however, patellofemoral changes had been included, the prevalence figures of symptomatic knee OA would conceivably have been higher.

Knee pain without radiographic changes could be interpreted as a possible sign of early OA. Prospective follow up of cohorts like the one described, particularly of the people with negative radiographs should offer possibilities to study early phases of developing OA by using novel sensitive techniques such as magnetic resonance imaging, bone scintigraphy, and biochemical markers of cartilage and bone turnover.

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13 Schouten JSMG. A twelve year follow-up study on osteoarthritis of the knee in the general population. Rotterdam: Erasmus University, 1990.
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