The Ottawa Knee Rules accurately identified fractures in children with knee injuries


Q In children presenting to the emergency department (ED) with a knee injury, how accurate are the Ottawa Knee Rules (OKR) in identifying knee fractures?

METHODS

Design: blinded comparison of the OKR with knee x rays.

Setting: 5 urban academic paediatric EDs in Canada.

Patients: 750 children aged 2–16 years (mean age 12 y, 59% boys) who presented to the ED with an acute injury to the knee sustained in the preceding 7 days and had evidence of bony injury to the knee on physical examination. Exclusion criteria: isolated injuries to the skin, altered level of consciousness, multiple distracting injuries, metabolic bone disease, underlying disease with sensory abnormalities, referral from outside the hospital with a diagnosed fracture, or return for reassessment of the same knee injury.

Description of test: trained emergency physicians assessed the following variables of the OKR: tenderness at the head of the fibula, isolated tenderness of the patella, inability to flex 90 degrees, and inability to bear weight (4 steps) immediately and in the ED.

Diagnostic standard: knee x rays were ordered at the physician’s discretion (n = 670 children). A negative outcome was defined as no fracture on x ray (interpreted by a radiologist who was blinded to the OKR results). Children who did not receive x rays (n = 80) had telephone follow up by nurse research assistants (who were blinded to the OKR results) using structured interview questions (proxy outcome). Children without an x ray who were asymptomatic after 14 days were considered to have a negative outcome (no fracture).

Outcomes: sensitivity, specificity, and positive and negative likelihood ratios of the OKR for identifying knee fractures in children are displayed in the table according to age.

MAIN RESULTS

70 children (9%) had fractures. Sensitivity, specificity, and positive and negative likelihood ratios of the OKR for identifying knee fractures in children are displayed in the table according to age.

CONCLUSION

The Ottawa Knee Rules accurately identified fractures in children presenting to the emergency department with a knee injury.

Operating characteristics of the Ottawa Knee Rules for identifying knee fractures in children according to age*

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Sensitivity (95% CI)</th>
<th>Specificity (CI)</th>
<th>+LR</th>
<th>–LR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2–5 y (n = 45)</td>
<td>100% (48 to 100)</td>
<td>60% (43 to 75)</td>
<td>2.5</td>
<td>0</td>
</tr>
<tr>
<td>6–12 y (n = 375)</td>
<td>100% (89 to 100)</td>
<td>47% (42 to 52)</td>
<td>1.9</td>
<td>0</td>
</tr>
<tr>
<td>13–16 y (n = 330)</td>
<td>100% (90 to 100)</td>
<td>36% (30 to 41)</td>
<td>1.6</td>
<td>0</td>
</tr>
<tr>
<td>All children (n = 750)</td>
<td>100% (95 to 100)</td>
<td>43% (39 to 47)</td>
<td>1.7</td>
<td>0</td>
</tr>
</tbody>
</table>

*LR = likelihood ratio. Diagnostic terms defined in glossary. –LRs calculated from data in article.