Slipped capital femoral epiphysis

A report of 4 cases occurring in one family

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Summary. We describe slipped capital femoral epiphysis in 4 members of a black, obese family, who were all first-degree relatives. The aetiology of slipped capital femoral epiphysis is unknown, although it is thought to be multifactorial. Genetic predisposition and environmental factors have been associated with the condition. A familial incidence with at least two cases in the same family has been reported. In epidemiological studies, this incidence ranges from 3% to 35%. Our cases were investigated in an attempt to find a possible aetiological genetic factor. A genetic predisposition with an autosomal dominant pattern of transmission is suggested, although environmental variables must be considered as provocative factors.

Resumé. L’etiologie de l’épiphysiolyse fémorale supérieure (EFS) n’est pas connue, mais, en tous cas, elle paraît multifactorielle. La prédisposition génétique et les conditions environnementales ont été associées avec l’EFS. L’incidence familiale avec au moins deux cas dans la même famille a été rapportée dans la littérature de 3% à 35%. Un cas d’EFS chez 4 sujets d’une famille de race noire, tous obèses, a été étudié de façon à montrer un éventuel facteur génétique étiologique. On suggère une prédisposition génétique avec un élément dominant autosomique sans oublier les différents facteurs environnementaux comme facteurs prédisposants.

Introduction

Familial incidence of slipped capital femoral epiphysis (SCFE), with at least two cases in the same family, has been reported by a number of authors with an incidence of from 3% to 35% [1, 2, 6, 8, 10–15, 19, 20, 23, 26, 27, 29, 31–35, 37–39, 42]. Oschner described a family with SCFE in 10 members [27]. Since many cases of SCGE do not have symptoms the figures may be underestimated, with the true familial incidence being higher [15, 28, 30, 31].

The familial clustering suggests either a predisposing hereditary trait [15, 27, 31] or a provocative environmental factor common to the family [15, 21, 31], or both. The incidence of SCFE has been found to be higher in blacks than whites [22, 24, 42] and among males than females [6, 16–18, 20, 22, 24, 28, 38, 42]. This increased incidence further suggests a genetic factor in SCFE, although interactive environmental factors might also be involved [9, 16, 21, 25]. A different male:female ratio in the familial group (1:2/1) against the nonfamilial group (4:1) is typical of a condition showing a genetic effect [31].

The form of inheritance in some families appears to be an autosomal dominant with variable penetrance [15, 27, 30, 31]. However, some authors consider that familial inheritance is of no aetiological significance, and that environmental factors play the major role [36, 38]. Some familial cases of SCFE could be due to environmental factors affecting the whole family [21], such as a rural life, where heavy work may lead to repeated or violent trauma of the epiphysis [15, 16, 31].

The occurrence of SCFE in several, or all, of the siblings of one parent is less often reported and strongly suggests a familial vulnerability. Cases of SCFE in a black family, as in the present report, has only been described once [37], although the increased incidence of slipped epiphysis in blacks has been recognised.
Case reports

Case 1

A boy, 12 years of age, of black race (from the Cape Verde Islands) complained of pain in the right hip and limping for a month with no apparent cause. He had limited and painful internal rotation and abduction. The patient was admitted to hospital in May 1995. Radiographs showed bilateral SCFE (Fig. 1). He was obviously obese with some signs of puberty (genitalia slightly enlarged, lightly pigmented downy pubic hair).

Case 2

A girl, 11 years of age, black and the sister of case 1, developed symptoms 8 months later. She was admitted in February 1996. Radiographs showed SCFE in the right hip (Fig. 2). She was obese with no signs of puberty (prepubertal breasts, infantile genitalia, no pigmented pubic hair).

Case 3

A girl, 6 years of age, black and a half-sister to cases 1 and 2, with the same father but a different mother, had experienced chronic pain in both hips with limited internal rotation, but had never sought medical attention. She was extremely obese and sexually mature. Radiographs revealed bilateral old SCFE (Fig. 3).

Case 4

A man, 40 years of age, and father of the cases 1, 2, and 3, had never had hip symptoms or functional limitation, but radio-

Fig. 1. Anteroposterior radiograph of the pelvis of case 1 showing bilateral grade I SCFE

Fig. 2. Lateral radiographs of the upper femora of case 2 showing grade I SCFE of the right hip

Fig. 3. Anteroposterior radiograph of the pelvis of case 3 showing bilateral old SCFE

Fig. 4. Anteroposterior radiograph of the pelvis of case 4 showing minimal old SCFE on the right side

Table 1. Hormonal imbalances found in the three siblings

<table>
<thead>
<tr>
<th>Identification: Hormone levels (serum)</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
<th>Mother of cases 1 and 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hormone levels</td>
<td>male, 12 y.</td>
<td>female, 11 y.</td>
<td>female, 16 y.</td>
<td>(father)</td>
</tr>
<tr>
<td>Results</td>
<td>Refer. values</td>
<td>Results</td>
<td>Refer. values</td>
<td>Results</td>
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<td>----------------------------------------</td>
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<tr>
<td>Insulin (mU/ml)</td>
<td>29.6</td>
<td>3–17</td>
<td>20.4</td>
<td>3–17</td>
<td>20.4</td>
</tr>
</tbody>
</table>

Reference values for sex, age and sexual development: P: pre-pubertal values; A: adult values; SHBG: sex hormone bind globulin.