

Superior Female Epiphysiolysis: Special Features of the Sahelian Child

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Abstract

Background: Epiphysiolysis is a pathology that affects children during the peri-pubertal period. Its frequency seems to be constantly increasing. The objective of this work is to report the epidemiological, diagnostic, therapeutic and progressive aspects of EFS.

Procedure: It was a retrospective descriptive study over a period of 6 years from June 1, 2013 to May 31, 2019.

Results: The hospital incidence was 3.5 cases per year. The average age of the patients was 12.4 years with an average of 11.6 years for girls and 13.6 years for boys. The female sex was dominant with a sex ratio of 0.4. The post-traumatic context was dominant and the left side was the most affected. Pain was the main reason for consultation. Patients with normal build were the most represented. The diagnosis was confirmed in 20 patients out of 21 by standard radiography of the pelvis in front and the hips in profile. The surgical technique used mainly is in situ fixation alone with a predominance of screwing. In the postoperative period, a repeat surgery was necessary in 3 patients, we also noted 1 case of chondrolysis, 1 case of cephalic necrosis and 2 cases of contralateral EFS.

Conclusion: In our hospital practice, upper femoral epiphysiolysis mainly affects girls without signs of overweight. In-situ fixation gives good results if done correctly. Morbidity is comparable to that of northern countries.

Keywords: Upper Femoral Epiphysiolysis; Girls; Normal Build; In Situ Fixation

Introduction

Upper femoral epiphysiolysis (EFS) is defined as the non-traumatic sliding of the upper epiphysis of the femur on its metaphysis, following a disorder of the growth cartilage. This slip can be acute or progressive, going from three weeks to several months. The etiology of EFS is unknown, although mechanical and metabolic factors are sometimes implicated in its occurrence [1, 2, 3]. It is an uncommon disease yet constantly increasing. However, this incidence of EFS varies according to the country and ethnicity 4. It is a pathology that classically affects the overweight adolescent male during puberty. The diagnosis is suspected in front of a mechanical hip pain at this age and confirmed on radiological examinations. The treatment for EFS is surgical and the obsession of the surgeon remains the evolution towards necrosis of the epiphyseal nucleus. The objective of our work is to determine the epidemiological, diagnostic, therapeutic and progressive aspects of EFS in our practice.

Material and Methods

It was a retrospective descriptive study over a period of 6 years, from June 1, 2013 to May 31, 2019. It was carried out in the pediatric surgery department of the Albert Royer Children's Hospital in Dakar. It concerned all the children operated on in this service for an EFS. The non-inclusion criteria were EFS not operated on or incomplete files. The parameters studied were: frequency, age, sex, affected side, body size, symptomatology, radiological results, surgical technique, morbidity.

Results

Epidemiological

Over a period of 6 years, we have identified 21 cases of upper femoral epiphysiolysis managed. Which represent an annual incidence of 3.5 cases.

The mean age of the patients was 12.4 years with extremes of 9 and 15 years. This mean age was 11.6 years for girls with extremes of 9 and 13 years. For boys, the ages ranged from 13 to 15 with an average of 13.6 years. Our series was made up of 15 girls and 6 boys with a sex ratio of 0.4. The EFS involved the left side in 19 patients and the right side in 3 patients. All patients were right-handed.

Diagnosis

The mean consultation time was 30.2 days with extremes of 4 hours and 360 days. Almost half of the patients (12 cases) were seen in consultation within 30 days of the onset of symptoms. The context was post-traumatic in 13 patients, and spontaneous in 8 patients.

Pain was the main reason for consultation; it was present in 18 patients. It was localized at the hip in 15 patients and at the knee in 3 patients. We noted a dodge limp with a gait in external rotation in 12 patients, a limitation in external rotation in 7 patients, Drehman's sign was positive in 3 patients. An inequality in the length of the lower limbs was observed in 6 patients. Finally, in 6 other patients, we demonstrated a spontaneous attitude in external rotation with absolute functional impotence. Table I summarizes these different clinical signs.

Table 1: Different clinical signs presented by the patients

Physical examination	Data	Frequency
Lameness with external rotation walk	12	57,1%
Limitation of external rotation	7	33,3%
Drehmansignpositiv	3	14,3%
unequal length of the lower limbs	6	28,6%
Spontaneous attitude in external rotation	6	28,6%
Absolute functional impairment	6	28,6%
Pain on mobilization	6	28,6%

The mean BMI was 22.3 kg / m² with extremes of 15.5 and 39.7. The population with a BMI between 18.5 and 25, that is to say a normal corpulence, was the most represented as illustrated by figure I.

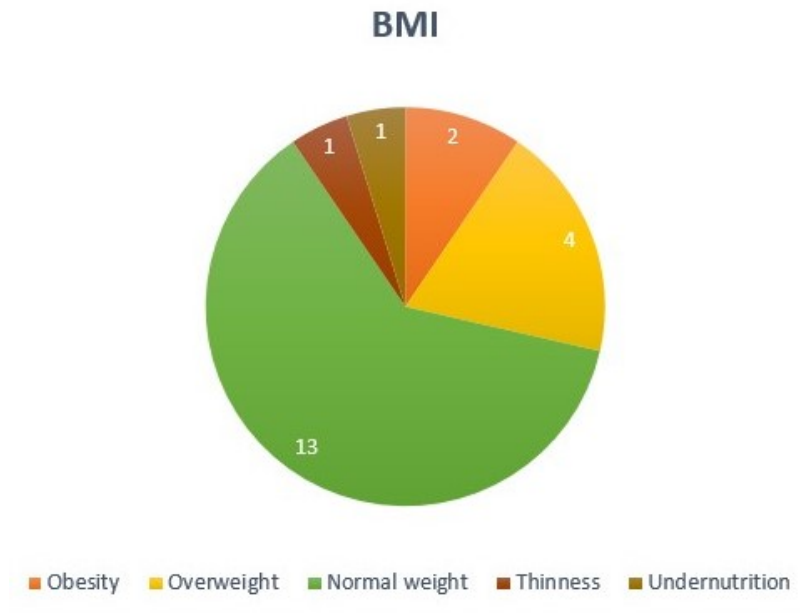


Figure 1: distribution of patients according to BMI

An X-ray of the pelvis and the affected hip in profile was performed in all patients. It made it possible to establish the diagnosis in 20 of them, by showing the slip of the epiphysis as represented by Figure II. In one patient, an MRI was required to confirm the diagnosis.

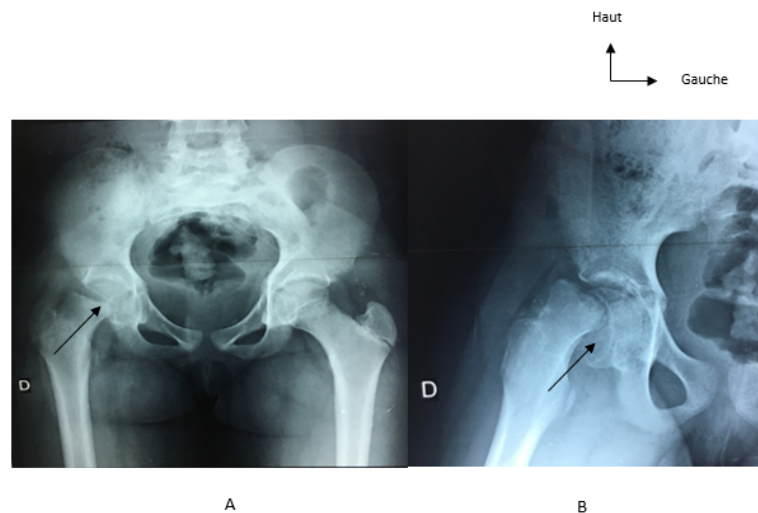


Figure 2: Right upper femoral epiphysiolysis (arrow) on a front view (A) and side view (B)

Therapeutic

We used standby treatment in all patients. This treatment was a traction stuck to the bed in 19 patients and in 2 patients, the discharge was made by the use of walking sticks. The mean duration of this treatment was 11 days with extremes of 2 and 21 days. The mean time for surgery was 21 days (range 5 days and 8 months). We performed an open surgery for 11 patients. The surgical technique consisted of fixation in 20 cases (95.2%), and a Dunn's osteotomy in 1 case (4.7%). Prior reduction was necessary in 3 patients before fixation. This fixation was a screwing in 15 cases (75%), a plugging in 5 cases (25%) and in 1 case (5%) we used a combination of 2 pins and a screw. Figure III shows a radiological check after screwing.

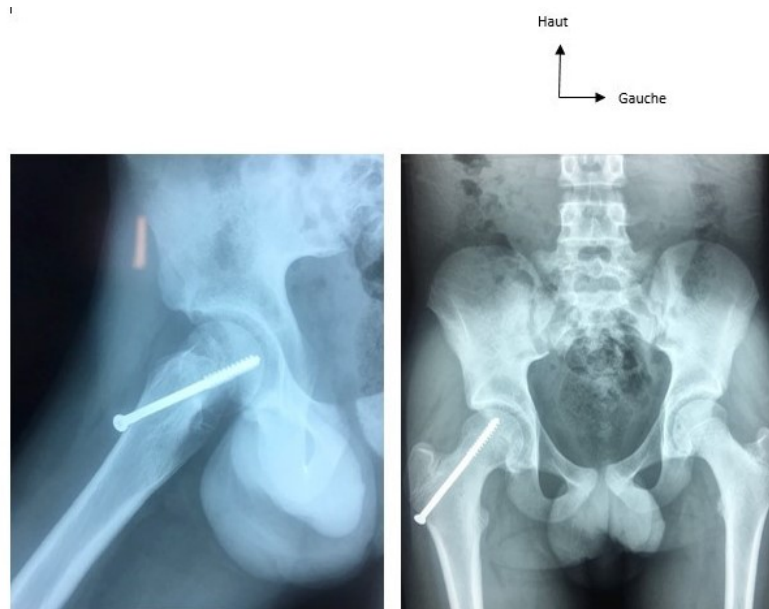


Figure 3: Radiological control after screwing in a straight EFGS

Evolution

The postoperative follow-up was simple in 18 patients (85.7%), the morbidity concerned 3 patients (14.3). It was represented by a significant persistence of the slip in 2 patients and by a malposition of the screw in one patient detected on the control radiographs. These patients evolved well after surgery.

After an mean follow-up of 26.3 months with extremes of 6 months and 67 months, 2 patients aged 10 years and 13 years presented a contralateral EFS. We also recorded during follow-up, 1 case of chondrolysis and 1 case of necrosis of the femoral head. The osteosynthesis material was removed in 7 patients in our series with an mean delay of 11 months with extremes of 6 months and 18 months.

Discussion

The frequency of slipping of the upper femoral epiphysis varies from region to region. It's incidence is 10 cases per 100,000 children in the United States 5 and 2 cases per 100,000 cases in France 6. Furthermore, we note that this frequency is increasing over the years 7. In our series, we identify an incidence of 3.5 cases per year.

According to most of the data in the literature, the mean age of onset of epiphysiolysis varies between 12 years and 13 years 6 months 8,9. In our study, we find an average age of 12.4 years, which corroborates these data. This age of diagnosis or onset corresponds to the time of the pre-pubertal growth peak which is a period of great fragility of the cartilage of superior femoral growth. In our series and in the literature, the mean age of diagnosis is lower in girls than in boys [10, 11], linked to earlier maturity in girls. A predominance of men was found by most of the authors [12, 13]. However, in our study we note a female predominance with a sex ratio of 0.3. This predominance was also found in the Ivorian series [10] with a sex ratio identical to ours. Thus, we can assume that this pathology is more common in white boys and black girls. As in our study, the predominance of involvement of the left side has been reported by many authors [4, 8]. This is due to the fact that the left limb is, in the right-handed person, the member of the main support and the impulse at start-up.

There are generally 2 contexts revealing an EFS. A post-traumatic context is often found in our regions 10, while in the countries of the North, the EFS is usually spontaneous [13, 14]. The symptomatology in the EFS is generally constituted by pain, lameness and functional impotence. In our series, pain is the main reason for consultation. The predominance of this symptom is also noted in the majority of authors [10-12]. This pain, mechanical in nature, most often occurs at the hip and can also be found at the level of the homolateral inguinal fold or the knee. Lameness is the second reason for consultation. It is a limp dodge with external rotation approach which means the evolution towards chronicity. Functional helplessness is the prerogative of an acute evolution.

In the literature, there is a predominance of obesity in patients with EFS 3,15. However, in our series, as in another Senegalese study, there is a predominance of normal build. We can say that, in our regions, subjects with a normal build of the Sahelian type (slender and thin) are more likely to develop EFS.

The front pelvis and profil hip radiography remains the key examination to confirm the diagnosis of upper femoral epiphysiolysis. In our series, it is performed in all our patients and has made it possible to make the diagnosis in almost all cases. Authors have made the same observation by establishing the diagnosis by a simple radiography, minimally invasive and above all at lower cost [11, 12]. The diagnosis is made by highlighting the slip with measurement of the slip angle which is the pathognomonic sign. The surgical treatment of an upper femoral epiphysiolysis is essentially based on two main techniques, namely osteotomy with its different types and fixation, which may or may not be preceded by reduction.

Table II illustrates the different surgical techniques used according to the series. The predominance of fixation is probably related to the predominance of the stable form. Also, it is the most used method because of the simplicity of the gesture. It must be done under scopic control to ensure the correct positioning of the equipment but also with a closed approach to avoid the risks of complications, especially infectious. The most used material in our series was the screws, there is no consensus even if it is predominant in almost all the series 8, 15. Thus, it is reported a low rate of complications with screwing, in particular by fixing with a single cannulated screw with distal thread [8,1].

Table 2: Surgical techniques according to the different series

Authors	Fixation	Réduction followed by fixation	Ostéotomie
Lakhdar (Morocco)[35]	66,7%	22,2%	11,1%
Zang (Japan)[49]	69,2%	0%	30,8%
Ait Sliman (Morocco)[1]	58%	42%	0%
Herngren (Sweden)[28]	90%	0%	10%
Our Study (Senegal)	85,7%	14,3%	4,7%

In the short term, we note 3 cases of slip persistence. It may be due to the unavailability of adequate equipment but also to the absence of scopic control to ensure a good correction of the slip. During follow-up, we noted a case of chondrolysis and a case of necrosis of the femoral head. The incidence of osteonecrosis is variable depending on the series, but two parameters influence this incidence, the stability of the physical body and the operating technique. In case of fixation in situ, the rate of necrosis is low, generally zero, whereas in the case of osteotomy, the rate becomes higher [16,17]. This vitality of the femoral head can be sought in high-risk cases by scintigraphy [18, 19].

Conclusion

In our hospital practice, upper femoral epiphysiolysis mainly affects girls in the pre-pubertal period without any sign of overweight. It often occurs in a post-traumatic context. In-situ fixation gives good results if done correctly. Morbidity is comparable to that of northern countries.

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