



Serious Complication of *In situ* Screwing in Treatment of Slipped Capital Femoral Epiphysis: A Case Report

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Abstract

Subtrochanteric fractures after bilateral per cutaneous central femoral screwing, including preventive contralateral screwing in the treatment of instable slipped capital femoral epiphysis, are uncommon. We report the case of an obese boy aged 9 years and 4 months referred to the hospital for the treatment of high-risk unstable left proximal slipped capital femoral epiphysis. An *in situ* screwing was performed to obtain an epiphysiodesis on the left side. We carried out a contralateral preventive screwing. Six days after the operation, a fall from a height caused a bilateral subtrochanteric fracture along the epiphysiodesis screw channels. The report of this case makes it possible to balance the interest of contralateral preventive screwing in relation to the risk of bilateral subtrochanteric femoral fracture which is seldom described in the literature and is a serious complication in the case of poor compliance following *in situ* screwing to treat slipped capital femoral epiphysis. In addition, this observation reports for the first time a tip using a LCP® Large Fragment Locking Plate to treat bilateral proximal femur fracture.

Keywords: Slipped capital femoral epiphysis; *In situ* screwing; Contralateral preventive treatment; Complications; Children

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Introduction

Subtrochanteric fractures secondary to *in situ* screwing by unilateral epiphysiodesis with contralateral preventive screwing for the treatment of unilateral slipped capital femoral epiphysis have not been described in the literature [1]. Slipped capital femoral epiphysis is pathology of the obese prepubescent child that affects 0.71 to 10.8 children per 100,000. Contralateral epiphysiodesis is indicated in young patients with high growth potential and high risk of complicated contralateral slipped capital femoral epiphysis [2].

Case Presentation

We report the clinical history of a 9 years old boy sent to hospital for treatment of a slipped capital femoral epiphysis. This child was obese (BMI 37, size 142, weight 72 kg). Clinical examination revealed lameness evolving for several weeks, intense pain in the left hip with spontaneous external rotation during flexion. The initial radiograph of the left hip (Figure 1) and MRI (Figure 2, 3) showed a slipped capital femoral epiphysis with coxa vara, coxa retorsa and recurvatum of the left hip.

We retained the indication of a central *in situ* screwing by 2 cannulated screws of 6.5 mm in diameter, 80 mm and 85 mm in length on the left. The overweight, the young age of the child with open Y-shaped growth cartilage and the precariousness of his living conditions indicated preventive contralateral *in situ* screwing by a cannulated screw of diameter 6.5 mm and 85 mm in length (Figure 4). The patient was allowed to come back home one day after the surgical procedure with authorized bilateral support, protected by the use of crutches. Six days after surgery, a fall in height caused a bilateral subtrochanteric fracture following the paths of the upper femoral epiphysiodesis screws (Figure 5). The fractures were treated by osteosynthesis with LCP® large bilateral fragments locked plate. The epiphysiodesis screws were removed. Proximal epiphyseal stability was ensured by 2 unlocked cortical screws 4.5 mm in diameter (Figure 6). Support was prohibited at home. Clinical monitoring and cares were carried out in a functional rehabilitation center. Weight bearing was allowed 6 weeks after surgical. The osteosynthesis plates were removed one year after the operation; post-operative care included physiotherapy. The clinical evolution after 26 months was good. Hip



Figure 1: Initial X-ray of the left hip in front and in profile showing slippage of the capital femoral epiphysis.

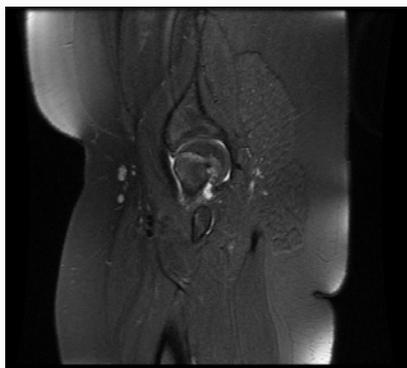


Figure 2: MRI sequence T2 of the left hip.



Figure 3: MRI sequence T1 of the left hip showing a slipped capital femoral epiphysis with coxa vara, coxa retorsa and recurvatum of the left hip.

mobility was symmetrical and painless (Figure 7). We did not find automatic external rotation in flexion. There was no femoroacetabular conflict.

Discussion

The manuscript report a clinical case complied with the CARE checklist statement. The most common classification of slipped capital femoral epiphysis was acute, chronic, and acute-on-chronic.



Figure 4: X-ray of the left hip after central in situ screwing by 2 cannulated screws of the left femur and contralateral in situ screwing of the right side by a cannulated screw.



Figure 5: X-ray showing bilateral sub trochanteric fractures following the paths of the upper femoral epiphysodesis screws.



Figure 6: X-ray showing osteosynthesis of bilateral fractures by LCP® large bilateral fragments locked plate and 2 unlocked cortical screws.

It's based on the patient's medical history, physical examination, and radiography [3]. A more clinically useful classification takes into account physeal stability. It provides a prognosis at the hip for subsequent Avascular Necrosis (AVN). A stable, slipped capital femoral epiphysis is defined by the preserved ability to walk with or without crutches. On the opposite, an unstable SCFE is defined by the loss of the ability to walk with or without crutches. There was no mention of weight bearing capacity used in this definition. The classification described by Loder et al. [4] classify as unstable SCFE the patients whose were not able to bear weight. Patients who could bear weight were classified as stable SCFE.

The modified Oxford Bone Age Score is considered the best predictor of the risk of developing contralateral EPCS in patients with



Figure 7: X-ray after 26 months of evolution.

unilateral slipping. Depending on the pathology classification, this classification could help determine the indication for a contralateral preventive screw fixation. A modified Oxford bone score from 16 to 18 indicate to prophylactically treat the contralateral hip 3. In this case, we found an Oxford score of 17 indicating contralateral prophylactic screwing [2].

Bilateral subtrochanteric fractures after in situ hip screwing for the treatment of slipped capital femoral epiphysis are rare and poorly described in literature [5]. This clinical report allows us to insist on the imperative precautions to be taken to ensure the safety of the reloading. The obesity of this child, these precarious living conditions and the poor compliance with the cautions in restoring the burden on the lower limbs led to a complication that was difficult to treat.

This observation raises the question of the indication of the preventive contralateral epiphysiodesis to treat slipped capital femoral epiphysis. Perioperative findings proved the existence of fracture paths strictly following the epiphysiodesis screw paths. The screws generate brittleness under the trochantero capital, which increases the risk of fracture if the postoperative instructions are not followed. It is necessary to evaluate the balance between the benefit of treating an unformed epiphysiodesis and the risk of a complex subtrochanteric fracture affecting the patient's quality of life [2].

The main innovation in the treatment of such a fracture illustrated by this case is the use of the LCP[®] Large Fragment Locking Plate, usually designed for distal femoral fractures. It has been rotated to be suitable for osteosynthesis of a fracture of the upper end of the femur. In this particular case, unlocked 4.5 mm cortical screws were used with this plate to maintain an epiphysiodesis of the upper end of the femur. To our knowledge, this is the first time in the literature that this trick using a LCP[®] Large fragment locking plate has been described for such treatment of bilateral proximal femur fracture.

The literature is poor in information on the duration after which weight bearing could be allowed after bilateral in situ epiphysiodesis

for the treatment of slipped capital femoral epiphysis. This case shows the necessity to take into account the patient's living conditions and the parents' ability to supervise post-operative weight-bearing precautions to prevent complications [1]. Osteosynthesis techniques for subtrochanteric fracture for overweight 9-year-old children are poorly codified in emergency. The treatment of such complications must take into account the initial disease and maintain an epiphysiodesis to prevent the progression of the slip of the conjugal plate. The removal of osteosynthetic material should not interfere with the treatment of epiphysiodesis.

Incorrect screw positioning is associated with increased complications including subtrochanteric fracture by example. Measures to promote weight loss, therapeutic education and consideration of difficulties in following medical prescriptions are essential to prevent complications after slipped capital femoral epiphysis.

Conclusion

Bilateral subtrochanteric fractures after screwing to treat slipped femoral capital epiphysis are rare and difficult to treat. This case exposes the risks of allowing early weight bearing after per-cutaneous screwing. It raises the much-debated question in the literature of the benefit of preventive contralateral epiphysiodesis in relation to the risk of fractures in the event of poor compliance with postoperative instructions. Treatment of fracture must take into account the initial disease to choose the best osteosynthesis procedure. This observation reports for the first time a tip using a LCP[®] Large Fragment Locking Plate to treat bilateral proximal femur fracture.

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