Clinical Case Report

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Slipped capital femoral epiphysis in an adult with congenital hypopituitarism

A case report

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Abstract

Rationale: Slipped capital femoral epiphysis (SCFE) is a common hip problem in adolescents, usually individuals between 8 and 15 years old. Because of the frequent finding of growth abnormalities in affected children, various endocrine disturbances have been reported as the cause of the disease. However, there are few case reports of older patients in previous literature. To the best of our knowledge, congenital hypopituitarism with normal growth hormone (GH) level has not been reported.

Patient concerns: We describe a 29-year-old man who had a 3-month history of pain in the left hip with tall stature and unobvious secondary sexual characteristics. Laboratory testing showed low thyroxine, low cortisol, low follicle-stimulating hormone, low luteinizing hormone, low testosterone, but normal GH.

Diagnoses: Brain magnetic resonance imaging showed pituitary hypoplasia. An anteroposterior pelvis radiograph showed severe varus SCFE in the left hip, it was also confirmed with computed tomography scans.

Interventions: The patient was treated with levothyroxine, hydrocortisone, and testosterone replacement therapy before surgery. We performed open reduction and anatomical reduction by Dunn's procedure.

Outcome: We have followed this patient for 6 months, the left hip mobility gradually improved. No slip in the contralateral proximal femoral physis has been observed.

Lessons: When unobvious secondary sexual characteristics and body abnormalities were found in clinical practice, endocrine condition should be evaluated, since the contralateral side may prone to slip due to the lack of endocrine therapy.

Abbreviations: FT3 = free thyroxine 3, FT4 = free thyroxine 4, GH = growth hormone, MRI = magnetic resonance imaging, SCFE = slipped capital femoral epiphysis.

Keywords: adult, epiphyses, hypopituitarism, slipped

1. Introduction

Slipped capital femoral epiphysis (SCFE) is one of the most common hip disorders in adolescents, with the incidence of 0.33/100,000 to 24.58/100,000 in the population between 8 and 15 years old.[1] It is believed that the etiology is multifactorial including obesity, trauma, and, less frequently, endocrine pathologies comprising hypothyroidism, hyperparathyroidism, hypogonadism, and panhypopituitarism.[2] Only a few case reports described SCFE in adults; however, growth hormone (GH) levels of the cases are abnormal.[3,4] Here, we presented an adult patient with SCFE diagnosed as congenital hypopituitarism but had a normal GH level in this report, to share some practical information to clinician when dealing with such cases.

2. Case report

A 29-year-old man presented to our hospital with a 3-month history of pain in his left hip but without any traumatic history. The pain got worse when bearing weight on left lower limb and affected normal activity for half a month prior to presentation. The patient's family members mentioned that he usually walked clumsily and was prone to fall, and seem to be lower in height than his peers since the childhood. When he was 11 years old, he was diagnosed as hypopituitarism at the local hospital. A 2-month GH therapy was ordered. However, treatment was stopped due to the poor clinical outcomes. At the age of 19, the patient's height suddenly began to increase significantly until the age of 25, from 145 to 183 cm with an average increase of 6 cm per year. Height growth stopped in the past few years. On physical examination, he had good mental state, with fluent answering, but looked a little pale. His skin was dry and desquamative. He had normal vision, and good sense of smell. He had no ability to bear weight. The muscle strength was 5/5. He had Tanner stage I for genital and pubic hair development. He had left hip pain with the left hip held in obligatory external rotation. Left hip flexion was limited to 60°.

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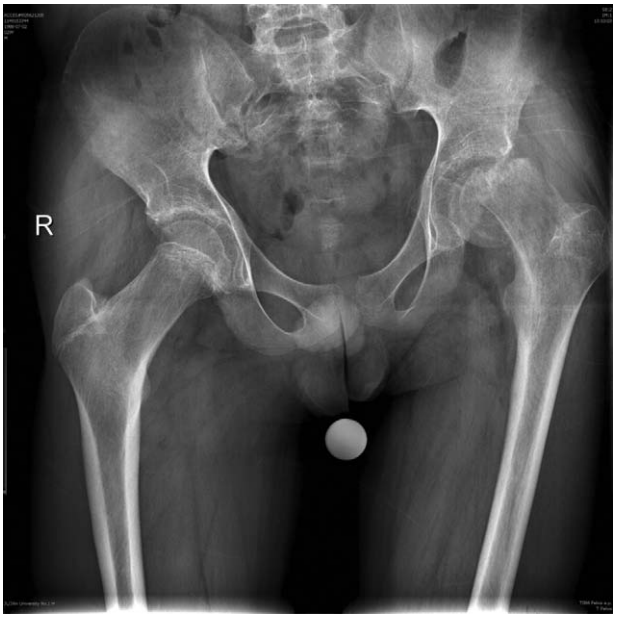

Figure 1. An anteroposterior radiograph of the pelvis showed left, severe, varus slipped capital femoral epiphysis.

An anteroposterior pelvis radiograph (Fig. 1) showed severe varus SCFE in the left hip; it was also confirmed with computed tomography scans (Fig. 2). Endocrine examination was consulted due to his abnormal height growth and delayed puberty. Laboratory testing showed low free thyroxine 4 (FT4) (7.41 pmol/L; normal 12–24), normal free thyroxine 3 (FT3) (3.5 pmol/L; normal 3.1–6.8), thyroid-stimulating hormone (3.63 μIU/mL; normal 0.27–4.20), low follicle-stimulating hormone (0.26 mIU/mL; normal 1.27–19.26), low luteinizing hormone (0.13 mIU/mL; normal 1.24–8.62), low testosterone (<0.35 nmol/L; normal 6.07–27.1), low cortisol (32.27 nmol/L at 0 AM, 47.44 nmol/L at 8 AM; normal 240–619), normal cortisol at 4 PM (33.13 nmol/L; normal <276), and normal GH (0.006 ng/mL; normal 0.003–0.971). His bone age was delayed at 13 years and 6 months (Fig. 3). Brain magnetic resonance imaging (MRI) showed pituitary hypoplasia (Fig. 4). The adrenal diseases were excluded

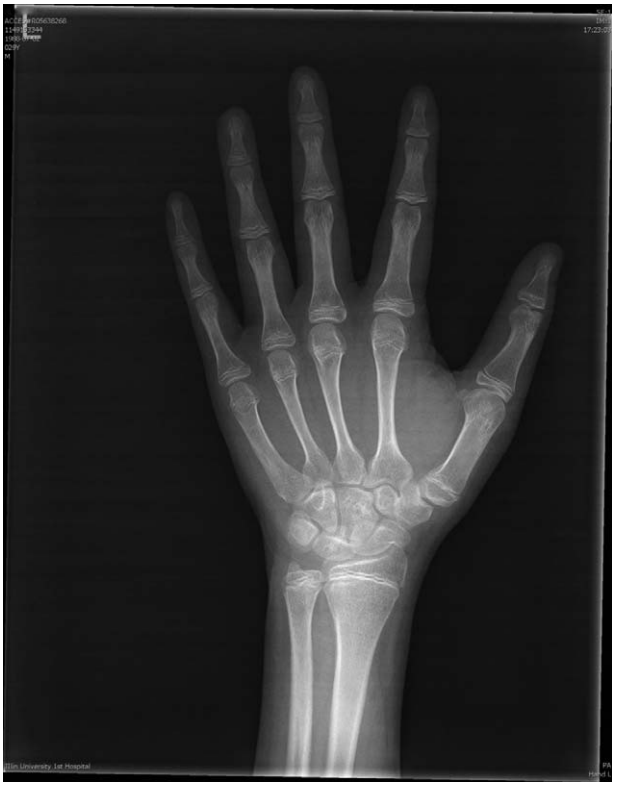

Figure 3. Anteroposterior radiograph of the left wrist prompted that his bone age was 13 years and 6 months.

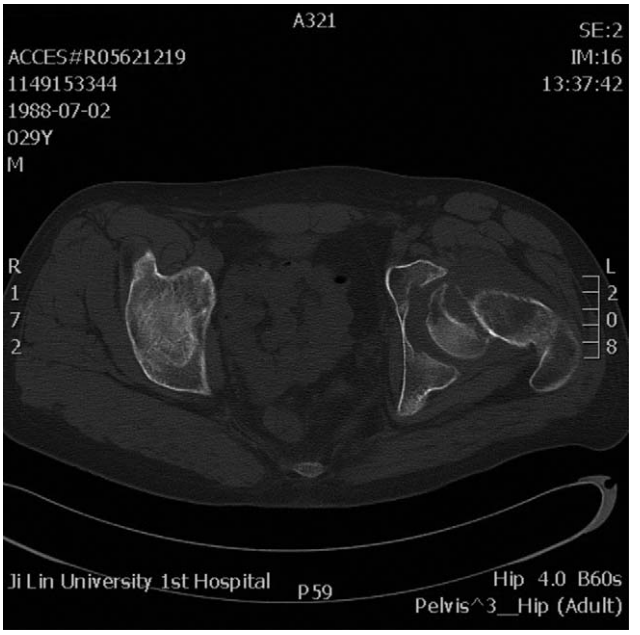

Figure 2. Transverse computed tomography scans confirm left proximal femoral physeal union.

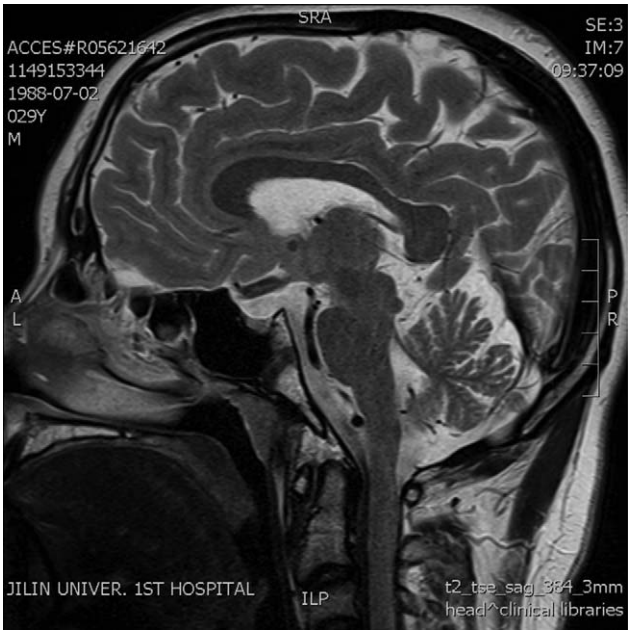

Figure 4. Brain magnetic resonance imaging showed pituitary hypoplasia.

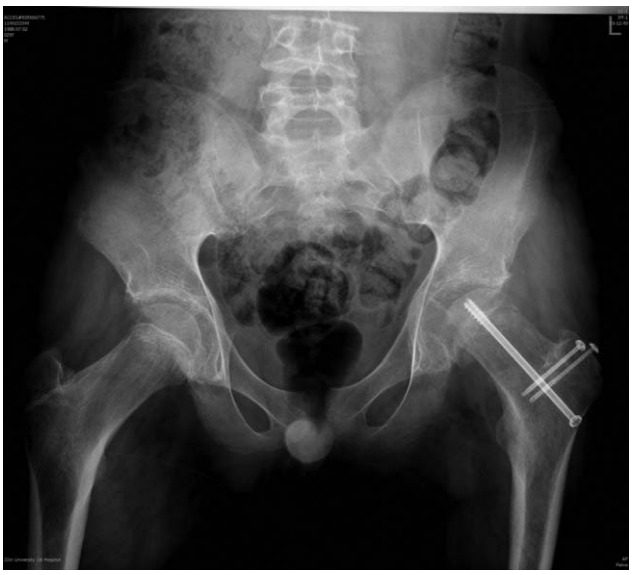

Figure 5. The postoperative anteroposterior radiograph of the pelvis showed good rehabilitation.

since adrenal MRI showed normal. Karyotype analysis showed 46, XY. Finally, with laboratory results, pituitary MRI, and patient's medical history, endocrinologists diagnosed the patient with congenital pituitary hypoplasia.

The patient was referred to an endocrinologist and was treated with levothyroxine 50 μg/d, hydrocortisone 10 mg at 8 AM and 5 mg at 2 PM per day, and testosterone 40 mg/d before surgery. We improved the position of the femoral heads in relation to the necks and hold them in position by Dunn's procedure (Fig. 5). Postoperatively the herringbone brace was used for immobilizing the hip and making the left hip moderate abduction, and weight bearing was deferred until 3 months later. Lifetime usage of hormone replacement was required. We have followed this patient for 6 months, the left hip mobility gradually improved. At 6-month follow-up, physical examination of the patient was performed, left hip flexion to 90°, extension to 0°, adduction to 20°, abduction to 45°, internal rotation to 30°, and external rotation to 15°. No slip in the contralateral proximal femoral physis has been observed.

2.1. Institutional review board statement

The study complied with the Declaration of Helsinki and was approved by the Institutional Review Board of the First Hospital of Jilin University. Informed consent was obtained from the patient.

3. Discussion

Recent research indicated that obesity is more likely to be associated with SCFE in patients aged <10 years.[5] In previous reports about adolescents and young adults with SCFE, endocrine disorders, such as hypothyroidism, hyperparathyroidism, hypogonadism, and panhypopituitarism, have been mentioned as contributory factors.[3,6–9] This is the first report of SCFE in an adult who was diagnosed with congenital hypopituitarism due to pituitary hypoplasia but had a normal GH level. The specialty about this case is that this patient showed slow growth and development before the age of 19 years. After the age of 19, the height of the patient began to show a significant increase and continued until the age of 25. The endocrine examination showed hypothyroidism, hypogonadism, low level of serum cortisol, but normal level of GH. We supposed that the absolute lack of GH in this patient before the age of 19 has been manifested as GH deficiency which led to a short stature. After the age of 19, delayed puberty arrived and the second growth and development peak began, which have caused the secretion of GH. However, due to the absolute lack of thyroid hormones and sex hormones, the femoral epiphyses have not closed and the height has continued to increase.

Loder et al reviewed 85 patients with endocrine disorders and SCFE. The disorders were hypothyroidism (40%), GH deficiency (25%), and others (35%), such as panhypopituitarism and hyperparathyroidism.[7] Therefore, when unobvious secondary sexual characteristics and body abnormalities were found in clinical practice, endocrine condition should be evaluated, since the contralateral side may prone to slip due to the lack of endocrine therapy.[10,11] During the perioperative period, we should fully evaluate the patient's endocrine conditions to prevent adrenal crisis during and after surgery. The necessary endocrine therapy can also reduce the risk of slip on the other side of the patient. The patient had a medical history of hypopituitarism, unobvious secondary sexual characteristics, and body abnormalities that led us to perform endocrine examinations. Then the patient was given endocrine therapy under the guidance of endocrinologists. After a period of endocrine therapy, he received surgery. We have followed this patient for 6 months, no slip in the contralateral proximal femoral physis has been observed. Therefore, we suggested perioperative endocrine therapy and surgery can achieve a good prognosis for adult SCFE patient with normal GH levels. Continuous endocrine replacement therapy which promotes the closure of the epiphysis to prevent SCFE from occurring on the contralateral side was required.

Author contributions

Formal analysis: Jian-Guo Liu.
Investigation: Li-Shen Wang, Shi Zhang, Yu-Hang Gao.
Validation: Xin Qi.
Writing – original draft: Yi-Fan Huang.
Writing – review & editing: Yi-Fan Huang.

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