Managing Legg Calve-Perthes Disease in a 12-Year-Old: A Case Study

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Research Article

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Abstract

Perthes disease, also known as Legg Calve-Perthes disease, is a rare childhood condition that affects the hip bone. It is more commonly found in boys than girls and typically occurs between the ages of 5 and 10. While the exact cause is unknown, some suggest that persistent ischemia may be a factor. Symptoms of the disease include hip pain, limping while walking, pain that radiates to the knee, and hip stiffness. Upon examination, patients may experience reduced movements and abduction, restricted internal rotation, and shortening. Radiological findings may reveal a collapsed hip head and sclerosis, as well as an increase in the space of the hip joint, and the femoral head may even come out of the acetabulum. Treatment options range from conservative measures to operative procedures such as osteotomy, which can help to revascularize the necrotic bone.

Background

Despite being discovered a century ago, the underlying cause of Legg Calve-Perthes disease remains unclear, and there are significant misunderstandings about its treatment. Perthes disease is an idiopathic, self-limiting condition that causes avascular necrosis of the femoral epiphysis due to disrupted blood circulation to the bone [1]. Blood flow to the femoral head is interrupted during one or more episodes, and complete revascularization of the affected bone occurs within 2 to 4 years without treatment [1,2]. However, therapy for Perthes disease may vary based on when the condition is identified and may include preventative, corrective, or restorative measures [3]. Disruption of blood supply to the femoral head can lead to various events both within and outside the bone, including synovitis, articular cartilage enlargement, and ligamentum teres hypertrophy. As avascular necrosis occurs, osteoclasts resorb the necrotic bone, and when the extruded femoral head is subjected to forces that cross the acetabular margin, it may undergo permanent deformation [1,2]. Recent research has shown that permanent deformation typically occurs during the late stages of fragmentation or shortly after that [3]. The goal of treatment is to prevent degenerative hip arthritis in adult life by diagnosing and treating the disease early in childhood [1]. In this case, the patient has been diagnosed with Perthes disease, a type of avascular necrosis of the hip bone. The patient has also recently been diagnosed with sickle cell anaemia, which is known to cause avascular necrosis of the hip. This overlapping of diagnoses is likely due to sickle cell anaemia's role in developing the patient's Perthes disease.

Case Presentation

A 12-year-old female patient with a history of sickle cell anaemia and who was taking hydroxyurea was referred to an orthopaedic surgeon due to experiencing right-sided hip and groin pain for six months. Upon examination, the patient had stable vital signs and was afebrile, with a blood pressure reading of 130/70 mmHg and a pulse rate of 80 beats per minute. However, there was a limited range of motion in the patient's right hip. Blood test results revealed that the patient had sickle cell anaemia and showed decreased levels of haemoglobin, red blood cell count, haematocrit, neutrophils, and lymphocytes, as well as increased mean corpuscular volume (MCV) and mean corpuscular haemoglobin (MCH). All other
parameters were normal. Additionally, plain film radiographs indicated avascular necrosis and a collapsed head of the right femur.

**Investigations**

After being referred for orthopaedic surgery, the patient underwent X-ray imaging of the right hip joint, which revealed contour irregularities, subchondral sclerosis, and cystic changes in the head of the right femur. These findings suggested a diagnosis of avascular necrosis.

**Differential Diagnosis**

The differential diagnosis, in this case, includes several conditions, such as Meyer's dysplasia, septic arthritis, juvenile idiopathic arthritis, neoplastic disorders like leukaemia, and non-accidental injury.

**Treatment**

The primary treatment objective is to prevent the femoral head from becoming deformed while the bone is in a softening state. The patient had restricted hip movements and experienced pain during movements. Therefore, her parents were advised to modify her activities and avoid high-impact activities like jumping. Revascularization occurs when the femoral head is in the acetabulum, and conservative methods can be used. However, osteotomy was performed as planned to achieve revascularization in this case. After the surgery, the patient was stable and received pain medication and antibiotics. Traction was also applied to immobilize the right foot and to separate the femoral head from the acetabulum.

**Outcome and Follow-up**

At the end of two months, the girl was free of symptoms but walked limply. She has not reported experiencing any pain.

**Discussion**

The primary objective of treating a patient with hip pain is to diagnose and exclude conditions that may require emergency treatment. Perthes disease typically occurs in children between the ages of 5 and 7 years, but earlier onset has been reported between 2 and 3 years. Meyer's dysplasia is another potential cause of hip discomfort or a limp in young children, and it can be easily confused with Perthes disease. Meyer's dysplasia typically appears around the age of 2 years, often with bilateral symptoms similar to Perthes disease, and is more common in boys than in girls. Meyer's dysplasia results in a significant delay in the development of the femoral epiphyseal nucleus on radiographs. However, it does not require treatment, and symptoms usually disappear within weeks, with radiological recovery by age six [4].

Other rare conditions of hip anomalies include multiple epiphyseal dysplasias, hypothyroidism, dyschondroplasia, and arthritis, which may or may not exhibit obvious signs and symptoms. Perthes
disease has a much better prognosis in children diagnosed at a young age. A good prognosis can be expected without surgical intervention based on limited studies. [4,5]

**Conclusion**

The diagnosis and management of hip pain in children are critical in the field of pediatric orthopaedics. Differentiating conditions such as Perthes disease and Meyer's dysplasia is crucial for accurate diagnosis and proper management. A good prognosis can be expected in children diagnosed with Perthes disease at a young age, highlighting the importance of early detection. Further research is needed to determine the most effective treatment for Perthes disease and better understand its pathogenesis. This conclusion emphasizes the significance of continued research and education in pediatric orthopaedics to improve the diagnosis and management of hip pain in children.

**Abbreviations**

MCV: mean corpuscular volume.

MCH: mean corpuscular haemoglobin.

**References**


**Declarations**

**Conflict interests**

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

**Informed Consent**

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Consent for Publication

Consent was obtained from the parents of the patient prior to the study.

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Figures
Figure 1

Radiographic image taken during the time of diagnosis.
Figure 2

Radiographic images taken after the surgery (osteotomy).