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Case Report

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Rare Presentation of Developmental Dysplasia of the Hip with a Left Femoral Neck and Head Fracture Through the Iliac Crest

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Abstract

A 53-year-old gentleman presented to our institution with acute left hip pain following an altercation. Examination revealed reduced range of movement, with an obvious deformity to the limb. Imaging demonstrated a left femoral neck, and head fracture, a crowe 4 developmental dysplasia of the hip, a pseudo acetabulum that penetrated the iliac crest, and protrusion of the femoral head into the pelvic cavity. The patient was managed conservatively, was pain free, mobilizing unaided, and had a harris hip score of 40.6. We present a case of a trans cervical femoral neck fracture with an associated Crowe 4 DDH, and femoral acetabulum protrusion.

Keywords: Developmental dysplasia in the hip; DDH; Hip fracture; Femoral neck fracture; Femoral head fracture; Neglected DDH

Introduction

Developmental dysplasia of the hip (DDH) is a common musculoskeletal condition with an incidence of up to 20 per 1,000 live births [1]. The etiology is thought to be a combination of genetic, hormonal and environmental factors, however it is believed that the primary cause is restriction of the movement of the fetus or hyper elasticity of the joint capsule of the hip [2]. Hip dysplasia compromises the patency of the poster superior acetabulum. Subsequently, hypertrophy is seen in the fatty tissue, the ligamentum teres and the transverse acetabular ligament; eventually deformation of the inferior hip capsule occurs and disrupts later reduction [1]. As a result, delayed ossification occurs in the femoral head, with contractures developing in the adductors and iliopsoas [1]. Persistent dislocation causes abnormal acetabular development, with reduced depth to width ratio, and progressive obliquity; inadequate cover of the femoral head allows progressive elevation and lateralization [1]. Cases of neglected DDH can present in adults with various degrees of progression. This can result in degenerative changes in the hip joint, resulting in reduced range of movement and pain [3]. In addition, patients with neglected DDH can suffer from associated lumbar spine back symptoms and knee

pathology, including scoliosis, and knee deformity [3]. The main aim in managing neglected DDH is to reduce pain and improve function through obtaining a concentric reduced, stable hip [4]. However, this can be technically demanding due to the adaptive shortening of the surrounding soft tissues, acetabular dysplasia, angulation, and rotation of the proximal femur [5]. In this paper we present a rare complication in a 53-year-old gentleman with a crowe 4 DDH who presented to our emergency department with acute left hip pain.

Case Presentation

We present a 53-year-old gentleman who presented to our institution with acute left sided hip pain following an altercation. Upon examination there was shortening of the left lower limb of approximately 2 cm compared to the contralateral side with a degree of external rotation, and reduced range of motion due to pain. Examination did not reveal any obvious neurovascular deficit. A CT scan (Figure 1) confirmed the presence of bilateral neglected DDH, an associated fracture of the left iliac bone, with a left femoral protrusion into the pelvic cavity, and a left femoral neck fracture. The CT scan (Figure 1) demonstrated a trans cervical femoral neck facture with protrusion of the femoral head through the pseudo acetabulum extending beyond the iliac crest. The contralateral side also revealed a crowe 4 DDH, with degenerative changes noted.

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Figure 1: CT scan with 3 dimensional reconstruction showing left femoral protrusio into the pelvic cavity.

The patient was subsequently admitted to the hospital and was allowed to mobilize non-weight bearing on the affected side for a period of 6 weeks. The patient was discharged after 48 hours and was followed up at 2 weeks, 6 weeks, 3 and 6 months. Repeat radiographs did not reveal any progression of the femoral protrusion and the patient then progressed to full weight bearing as tolerated at 6 weeks, and had a harris hip score of 40.6 at 6 months. In addition, there was no further shortening at 6 months follow up.

Discussion

Hip dysplasia is more common in females than males with a two-four times increased relative risk [6]. The incidence reported in the general population ranges from 1.7 to 20 %, with majority of the literature documenting the incidence between 3 and 5 % [6].

The Crowe classification [7] is based on the assumption that the normal ratio of the diameter of the femoral head to the height of the pelvis is 1:5 and that any proximal migration of the femoral head can be expressed either as a percentage of the height of the pelvis or of the height of the femoral head-neck junction. L (%) = D/(H/5). D: tear drop head-neck distance; H: height of the pelvis. Crowe I: L < 50%; Crowe II: L=50-70%; Crowe III: L=75-100%; Crowe IV: L > 100%.

DDH is thought to be due to multiple factors including genetic component, intrauterine positioning such as breech presentation, female gender, first born child, and positive family history (12% to 33%) [2,6]. When present, breech presentation carries a relative risk factor of 3.75 to 6.3 times the normal [6]. A family history of hip dysplasia increases the relative risk of DDH by up to 1.4-1.7%, in addition it was noted in previous studies that more than 50% of patients with DDH had a positive family history of hip disease [6]. The leading causes of hip dysplasia in the young adult are residual childhood DDH and adolescent onset acetabular

dysplasia, in addition, cases of neglected DDH are still present in adults due to inadequate screening and early detection [3,6].

Neglected DDH patients usually present with hip, or activity related groin pain and loss of function [6]. Also, there will be marked leg length discrepancy, impaired hip range of motion, and an obvious limp during walking (48%) [6]. In addition, patients experience ipsilateral knee and lower back pain from the compensatory gait mechanics, and 97% of the patients will have a positive anterior impingement test [6].

In childhood DDH is diagnosed commonly in the first few months after birth through physical examination special tests such us Ortolani test and Barlow test, and ultrasound screening [6]. The purpose of managing DDH is to improve pain and range of motion by achieving concentric reduction, and normal mechanical forces within the dysplastic hip in order to provide a stable hip joint [4,6].

There is no definitive management protocol in patients of advanced age or in delayed or failed cases [4]. However, there are several surgical procedures for the management of DDH, these depend on the age, severity of dislocation, and surgeon experience [5]. All surgical options conclude that a good head coverage center edge (CE) angle >20°, and acetabular inclination (AI) angle of 43° result in a good function of the affected hip [8]. If detected early, developmental hip dysplasia can be treated with conservative approaches [4].

Surgical procedures include open reduction, per acetabular osteotomy (PAO), femoral osteotomies, combined procedures [5-6]. Complications related to the various treatment options include femoral head avascular necrosis with a prevalence rate ranging from 6-48%, re-dislocation, joint stiffness, graft fracture, and graft or pin displacements [4-5]. Less frequently pin migration, superficial and deep wound infections, heterotopic ossification, and rotational deformity [5].

Undetected or inadequately treated DDH can lead to chronic disabilities, that is why current guidelines recommend clinical screening of all infants and ultrasound screening of infants with risk factors and those with clinical signs of hip instability [6]. We present a rare complication of neglected crowe 4 DDH in a 53-year-old gentleman.

Conclusion

This case report highlights a rare complication of neglected DDH. We present a case of a femoral neck fracture in a Crowe 4 DDH with an associated femoral head fracture through the lilac crest. This is the first reported case in the current literature with this complication. The case highlights the importance of maintaining a high degree of vigilance and awareness in managing patients with neglected DDH, particularly those with a high hip center and a pseudo acetabulum as they can present with an associated fracture as presented in this report.

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