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Potentially Misleading Radiograph: Neglected Developmental Dysplasia of the Hip

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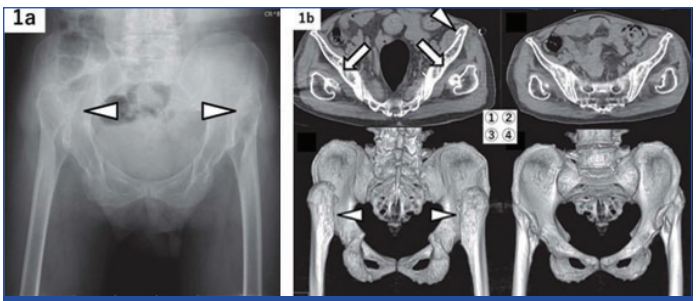
A 66-year-old man was admitted in the Emergency Centre who was hit by a car. At initial presentation immediately after the accident, the patient was alert and complained of chest pain, dyspnoea, lumbar pain, and left elbow pain, but no pain of the hip joints. His vital signs were haemodynamically stable, with a respiratory rate of 24 breaths/min and percutaneous oxygen saturation of 100%. There was no notable asymmetry with regards to the patient's hip and gluteal region. Neurological tests showed a glasgow coma scale score of 15 with no neurologic localising signs. Ultrasonographic examination did not detect intra-abdominal bleeding. Laboratory data were white blood cells was 11,330/μL; haemoglobin was 9.9 g/dL; platelets was 282,000/μL; serum creatinine was 0.66 mg/dL; aspartate transaminase was 124 IU/L; alanine aminotransferase was 31 IU/L; and prothrombin time was 10.9 sec. Chest radiography and Computed Tomography (CT) revealed multiple rib fractures causing flail chest and lung contusion. The patient was treated with chest tube insertion and endotracheal intubation/mechanical ventilation under positive airway pressure. Anteroposterior pelvic radiography demonstrated bilateral flat and irregular femur heads, dysplastic acetabula, and high dislocations of the bilateral femoral heads [Table/Fig-1a]. The CT scan of the pelvic bone demonstrated articulation of both femoral heads with false acetabula in the ilium, indicated by white arrows [Table/Fig-1b]. When collecting an in-depth orthopaedic history, the patient reported that his parents were advised to use a harness when the patient was one-year-old; however, the patient had not received any treatment for Developmental Dysplasia of Hip (DDH) for as long as he remembered. Since, his childhood, he moved all four extremities without restriction. Our emergency clinicians made the final diagnosis of neglected DDH. The patient was discharged to the rehabilitation hospital on day 18 without gait disturbance and was followed-up as an outpatient thereafter. Gait analysis of patient demonstrated normal cadence, normal stride/step length and normal walking speed.



[Table/Fig-1a,b]: a) Routine anteroposterior radiograph of the hip revealed flat and irregular femur heads on both sides as indicated by the white arrowheads. b) CT of the pelvic bone demonstrated articulation of both femoral heads with false acetabulum in the ilium indicated by white arrows (①). Bone fractures were noted in the left iliac crest (①, ②, indicated by arrowhead). Three-dimensional rear view (③) and frontal view (④) are also shown.

Developmental Dysplasia of Hip (DDH) is a common congenital musculoskeletal deformity with an incidence of 2-4% and has serious morphologic repercussions, with distorted soft tissue contractures and bony anatomy around the hip. Hip luxation is its severe form, which occurs in 0.4-0.7% of all cases [1]. The condition may be present at birth or from early in life, increasing the chances of joint dislocation [2]. The condition's aetiology is unknown; however, racial background and heredity are some factors that can account for congenital hip dislocation.

The DDH can be associated with other conditions, including acetabular dysplasia, an abnormality of the cap-shaped hip socket, and connective tissue disorders. A shortened limb with internal rotation, adduction, and flexion of the hip joint is how posterior hip dislocation typically presents in trauma patients. The condition can be unilateral or bilateral. Only one joint is deformed with unilateral dysplasia, and resulting effects may show on the contralateral side [3]. In most unilateral cases, the dysplasia is in the left hip. If the condition affects both hip joints as with our patient, some diagnostic signs like leg length inequality and asymmetric folds don't apply. Clinical presentation of bilateral cases like our patient may be less severe due to proportional length of the lower limbs despite overt instability.

Radiographic X-ray and CT imaging have shown a significantly hypoplastic bony anatomy characterised by shallow acetabula, insufficient coverage of the femoral head, deficient anterior acetabular wall, and excessive anteversion. Anteroposterior pelvic radiography is the primary imaging method used to diagnose DDH [3]. The patient had a pelvic inclination due to high lumbar lordosis in the presence or absence of scoliosis, which is significant for acetabular component anteversion.

The treatment strategy for DDH depends on each patient's age and condition severity. Residual DDH in adulthood has been often associated with a history of pain and early development of osteoarthritis [3], which was unlikely in this patient. In terms of management, closed reduction is the gold standard treatment in patients under six-month-old. This treatment strategy is controversial, because worse outcomes are noted with hip open reductions in those over eight-year-old [2]. In cases of untreated DDH in adults, total hip arthroplasty may be proposed; however, this is often challenging. If the hip remains dislocated for a long time as in our patient, the fatty tissue in the depth of the acetabula ligamentum teres thickens and elongates and the capsule becomes stretched and very loose. Gradually, the acetabular cavity flattens and the medial wall thickens. A subluxated hip consistently leads to symptomatic hip disease.

Traumatic hip dislocation, accounting for 2-5% of all joint dislocations, is considered an orthopaedic emergency that can potentially cause significant complications and long-term morbidity in patients [4,5]. Traumatic hip dislocation is still a therapeutic challenge for trauma surgeons and should be reduced as soon as possible to decrease complications. Asymptomatic hip dislocation may be difficult to diagnose, particularly in an elderly patient with dementia or an unconscious patient. Although the patient did not report a past medical history of hip joint dislocation, DDH should

be presumed, and careful radiologic testing is imperative to avoid misdiagnosis. Emergency physicians should familiarise themselves with the unique characteristics of DDH in medical imaging to avoid unnecessary work up.

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