

developmental hip dysplasia

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Pediatric Clinical Clips presented by Dayton Children's Advanced Practice Professionals provides quick reviews of common pediatric conditions.

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case study

Baby Girl is a 10-day-old female referred to the orthopedic clinic by her pediatrician for evaluation of her hips. She is brought in by her mother and father. She is their first child. She was born full-term, via uneventful C-section due to breech positioning. Mom reports no complications during delivery. Baby girl is breastfed and gaining weight well with no other reported health concerns. Mom states they were referred for “instability” in the hips. Mom reports that maternal grandfather, great uncle and a cousin were braced as children for “congenital hip problems.”

On physical exam, Baby Girl is an appropriately interactive newborn. She has mild flatness to the right side of her head and stiffness with right lateral motion of the neck with palpable tightness in the sternocleidomastoid on the left side. She has normal upper extremities. Her spine is straight with a hairy patch and sacral dimple. She has a positive Galeazzi sign on the left side with positive Barlow and Ortolani maneuvers. The right hip feels subluxable, but is stable. Normal thigh folds. She has active quadriceps muscle function bilaterally. She has a normal lateral border of both feet.

What is her diagnosis and the next most important step in treatment?



case discussion

Developmental Hip Dysplasia (DDH) is a common childhood orthopedic diagnosis with an incidence of 1/100 infants with complete dislocation in 1/1000 infants. DDH describes a wide spectrum of abnormality varying from a mildly shallow acetabulum to complete dislocation of the hip. Mild hip dysplasia is cited as a main cause of adult degenerative arthritis. The most devastating complication of hip dysplasia is femoral head avascular necrosis (AVN).

The etiology of DDH is multifactorial. Major risk factors include first born, female, frank breech, and family history. Other contributors can include oligohydramnios and swaddling.

Early diagnosis is extremely important in order to affect the natural history of the condition. Careful physical exam directed to the age of the patient is appropriate. Initially, Barlow and

Ortolani maneuvers can indicate instability. A dislocatable hip can be displaced posteriorly out of socket with the Barlow maneuver and may be reduced (“clunk”) with the Ortolani abduction elevation maneuver. Later in infancy, limited wide hip abduction becomes more indicative of a dysplastic hip due to soft tissue changes in and around the hip capsule. A positive Galeazzi sign can indicate a limb length difference due to a posteriorly dislocated hip. Hip “clicks” and asymmetric thigh folds can be common in normal infants and are not exclusive to hip dysplasia.

It is important to evaluate for associated conditions. The specific genetic relationship and etiology of these conditions is further being researched, but (just as in our case study) congenital muscular torticollis is found in 20 percent of DDH patients. Also evaluate for metatarsus adductus, club feet and congenital knee dislocation.

Imaging is also guided by the age of the patient with ultrasound indicated for infants ages 6 weeks to 6 months and an AP pelvis radiograph indicated for older infants and children. Screening ultrasounds are not indicated prior to 6 weeks of age without exam findings of instability. Ultrasound allows a dynamic screen of non-ossified structures and stability of the hip. The α -angle measures the osseous coverage of the femoral head by the acetabulum, normal is greater than 60 degrees. The percent coverage is also measured on the coronal view with normal coverage expected to be greater than 50 percent. The α -angle measures cartilaginous coverage of the femoral head, with an angle greater than 55 degrees indicating an increasing degree of subluxation/dislocation.

After the femoral head begins to ossify the AP pelvis radiograph is superior. Several measures can be identified, the most important of which is the acetabular index (AI), the angle formed by triradiate cartilage and the lateral margin of the acetabulum. The AI should progressively decrease with age. Further imaging modalities, MR arthrogram, CT and MRI can be necessary during treatment to further evaluate soft tissue parameters of dysplasia and to confirm reduction.

Treatment non-operative and operative is aimed at maintaining reduction of the hip until improvement in the acetabulum is measured. Treatment becomes increasingly challenging as the patient ages. Younger than 6 months of age the primary treatment is with a Pavlik harness. The harness holds the hips in dynamic abduction limiting adduction and maintaining hip flexion. The success of the harness is dependent on the degree of initial dysplasia. Studies have reports 65-100% success rates dependent on the initial dysplasia and reducibility. The Pavlik harness usually is worn for 6 weeks ranging from full-time to weaning part-time wear. It is typically tolerated well. Complications with harness use are rare, but infants should be closely monitored by parents and at every visit for transient nerve palsy. It usually occurs within the first week and recovery usually occurs once the harness is discontinued.

The Pavlik harness is the most important next step in treatment for Baby Girl. One week follow up with ultrasound is necessary to evaluate maintained femoral head reduction. If the hip is not reducible by 3-4 weeks, harness should be abandoned and other treatment options initiated.

If the Pavlik harness is unsuccessful in reducing or maintaining reduction of the femoral head, or there is resultant dysplasia, there is an algorithmic approach to the treatment of further dysplasia based on patient age and level of dysplasia. If the patient is less than 18 months of age, usually closed reduction is attempted followed by hip spica casting. If the patient is older than 18 months of age, usually open reduction is required. Resultant dysplasia or more significant dysplasia may require femoral or pelvic osteotomies to best address resultant anatomic changes. If the radiographic findings remain abnormal after 2-3 years of observation usually a pelvic osteotomy is suggested.

The most significant complication of hip dysplasia is avascular necrosis and can be seen with all forms of treatment. Precautions are taken through all forms of treatment to avoid this complication, but it still can occur. Follow up on successfully treated patients is recommended until at least 5 years of age and patients should be followed up to skeletal maturity if treated for a dislocated hip.

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references

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