Ultrasonographic Survey For Developmental Dysplasia Of The Hip In Female Neonates In Al-Najaf City

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الخلاصة

تضمنت هذه الدراسة (٢٥٠) أنثى حديثة الولادة تتراوح أعمارهن بين (١-٢٨) يوم في مستشفى الزهراء للولادة و الأطفال في مدينة النجف في وحدة الخدج وحديثي الولادة للفترة من نيسان إلى تشرين الأول سنة ٢٠٠٨ مع عدم وجود تأريخ مرضي أو عوامل خطورة سريريه للخلع الولادي للحوض ، واشتملت هذه الدراسة الفحص التشخيصي بالسونار للكشف المبكر عن حالة الخلع الولادي للحوض وكانت النتائج ثلاث حالات فقط.

اثنان منهما كانت الولادة طبيعية والثالثة بواسطة العملية القيصرية وجميع الحالات كانت الجهة اليمنى هي الأكثر عرضه للإصابة

Abstract: This prospective study deals with 250 female neonates who were (1-28 days)old , they were admitted to the intensive care unite of neonates in AL-Zahraa teaching hospital in AL-Najaf city through the period from April to October 2008.

We used gray scale sonography (Dynamic with stress technique) as a screening tool for developmental dysplasia of the hip (DDH). The positive result from total number was three (1.2%).Two of them were delivered by normal vaginal delivery and one delivered by caesarian section ,in all the affected neonates the right hip joints were involved.

Introduction

Developmental Dysplasia of the Hip, Congenital Dislocation of Hip

Hip dysplasia refers to abnormality in the size, shape, orientation, or organization of the femoral head, acetabulum, or both. Acetabular dysplasia is characterized by an immature, shallow acetabulum and can result in subluxation or dislocation of the femoral head. Developmental dysplasia of the hip (DDH) was formerly referred to as congenital dislocation of hip. The incidence of DDH is variable and depends on many factors. Approximately one in 1000 children is born with a dislocated hip, and 10 in 1000 may have hip subluxation [(1-3)].

Factors contributing to DDH include breech presentation, female sex, positive family history, firstborn status, and oligohydramnios. Intrauterine position, sex, race, and positive family history are the most important risk factors. Family history positive for DDH may be found in 12 to 33 percent of affected patients [(4,5)].

The risk of DDH for a child has been documented as 6 percent when there is one affected sibling, 12 percent with one affected parent, and 36 percent if a parent and a

sibling are affected [6]. Eighty percent of children with DDH are females ,this is postulated to be related to the effects of additional estrogen produced by the female fetus which increases ligamentous laxity[7].

DDH occurs more often in children who present in the breech position [8] . Firstborn children are affected twice as often as subsequent siblings, In utero postural deformities and oligohydramnios also are associated with DDH For unknown reasons, DDH is less common in black persons [9,10].

The postnatal extra uterine environment also plays a role in DDH. The incidence of DDH is high in Native American cultures that use swaddling which forces the hips into adduction and extension [11] .

No first-line clinical method exists for diagnosing DDH during the neonatal period[12]. Evaluation of the hip begins with observation of both lower extremities. The diaper should be removed and the infant relaxed. Provocative dynamic tests, such as the Ortolani and Barlow maneuvers, should be performed to assess its stability. Because these tests often are difficult to interpret, they should be performed routinely in children three months or younger[13].

Radiographs of newborns with suspected DDH are of limited value because the femoral heads do not ossify until 9 months of age. Plain radiographs are useful after four to six months of age [14] .

Ultrasonography is the study of choice to evaluate DDH in infants younger than six months because it is capable of visualizing the cartilaginous anatomy of the femoral head and acetabulum [14-17] .

Ultrasonography is sensitive as a screening tool in the first six weeks of life [18] .

The goal of treatment in DDH is to achieve and maintain reduction of the femoral head in the true acetabulum by closed or open means. The earlier treatment is initiated, the greater the success and the lower the incidence of residual dysplasia and long-term complications. Subluxation of the hip at birth often corrects spontaneously and may be observed for two weeks without treatment. The double- or triple-diaper technique which theoretically prevents hip adduction, has not demonstrated improved results when compared with no intervention at all. When subluxation persists beyond two weeks of age, treatment is indicated and the appropriate referral should be made [12].

In newborns and infants up to six months of age closed reduction and immobilization in a Pavlik harness is the treatment of choice. The Pavlik harness dynamically positions the hips in flexion and abduction while allowing motion. Avascular necrosis of the femoral head has been reported with Pavlik harness treatment and may be related to hyperabduction . In addition, hyperflexion has the potential to cause femoral nerve palsies[19, 20]. Reduction of the hip should be confirmed by Ultrasonography within three weeks of harness placement. Treatment usually is continued for at least six weeks full-time and six weeks part-time in young infants, and possibly longer in older children. If a dislocated hip is not reduced within three weeks, the harness should be discontinued and an alternative treatment selected. This usually involves closed reduction under anesthesia with hip spica casting [21]. The long-term results of Pavlik harness treatment (e.g., nonoperative treatment) show a 95 percent success rate for acetabular dysplasia and subluxation .The success rate drops to 80 percent for frank dislocation[22, 23].

In children older than six months, closed reduction under general anesthesia and hip spica casting is the treatment of choice [24, 25]. Immobilization in the hip spica cast after closed reduction usually continues for at least 12 weeks after closed reduction [26].

If the hip is irreducible by closed means, or a concentric reduction is not achieved, successful treatment requires open reduction [27,28].

The goal of operative treatment of DDH is to normalize the hip joint to delay or prevent the premature onset of osteoarthritis. Intervention in early childhood, when remodeling potential is greater, provides the best opportunity for the development of a normal joint (29).

Children with untreated hip dysplasia have been shown to develop premature degenerative changes by the time they reach skeletal maturity, and develop painful arthritis in their thirties [30,31].

Joint-preserving salvage osteotomies and total hip arthroplasty are surgical options once a child has achieved skeletal maturity [32, 33]. Children in whom Pavlik harness treatment is initiated before six months of age have excellent results, although long-term studies are lacking. The majority have no symptoms of arthritis, with mild radiographic abnormalities by skeletal maturity [34-38].

In general, the goal of the family physician in examining for DDH should be early diagnosis and referral. This is because treatment earlier in life especially within the first six months is safer and more successful than treatment after the child is walking[39].

Aim of the study

This study is designed to evaluate the prevalence of DDH in female neonates in Al-Najaf city by using gray scale sonography .

Patients and methods

This prospective study was conducted in AL-Zahraa teaching hospital in AL-Najaf city on 250 female neonates who were 1-28 days old through the period from April to October 2008.

We examined 250 neonates from the neonatal intensive care unit of both deliveries ;Caesarian section and normal vaginal delivery regardless of body weight , gestational age and Barlow's or Ortolani's test positivity. With exclusion of the following risk factors:

1-Breech presentation.
2-Congenital anomaly.
3-Twins.
4-Oligohydramnios
5-Family history of previous DDH.
6-Hypotonia.
7-Hypertonia.

Ultrasonic examination of both hip joints of every neonate was performed with 7.5MHz linear transducer on a real time B-mode scanner Fukoda Denish Tellus.

The method used in examination was the dynamic technique which includes dynamic assessment of the hip in multiple positions.

Scanning was performed with neonates in Rt. & Lt. decubitus position for ipsilateral hip joint examination and transducer was positioned over the lateral or posterolateral aspect of the hip. The hip joints were examined in neutral position and in flexion position. With the hip flexed ,the femur adducted the stress maneuver was performed. Images were obtained in transverse and coronal planes with respect to the body.

Results

Ultrasound examinations were done for 250 neonates ,182 were products of normal vaginal delivery (72.8%) and 68 neonates were products of caesarian section (27.2 %) … table 1.

The results were :

1-Three patients (1.2 %) had developmental dislocation of hip (table 1).

2-Those patients with positive ultrasound finding , two cases were product of normal vaginal delivery and one case of caesarian section (table 1).

3-All three cases were affected on the right side (table 2).

Table 1: Distribution of the study sample according to type of delivery & positive sonographic findings .

Type of delivery	Patients no.(%)	Patients no. with positive US findings(%)
Caesarian	68(27.2%)	1(0.4%)
Normal	182(72.8%)	2(0.8%)
Total	250(100%)	3 (1.2%)

Table 2 : Distribution of the study sample according to the sonographic findings & affected side .

Patients no. with Positive US finding	Affected side		
	Right	Left	both
3	3	0	0

Discussion

A clinically unstable hip in a newborn may be an early sign of congenital dysplasia. Unless followed and treated at a young age, it can progress to a degenerative hip joint disorder with considerable functional disability in adult life .DDH could be discovered early after birth and successfully treated by conservative methods. Late diagnosis of DDH needs surgery with same degree of morbidity (9,19,26).

Hip ultrasonography is a noninvasive, repeatable study, which can evaluate the newborn without ionizing radiation. It facilitates demonstration of abnormalities that may not be detected on physical examination(15). This is the only method that can be used in the diagnosis, follow-up and confirmation of reduction in the Pavlik harness(17).

The current study showed that three cases (1.2%) were diagnosed by ultrasound to have DDH , those neonates did not have risk factors such as breech presentation , oligohydramnios & family history of DDH. They were followed by orthopedic surgeon and treated by double napkins for six weeks, one of them had complete reduction with successful treatment and the second one had reduction in 50% and need Pavlik harness. The third one was lost during follow up.

This is compared to the results of other screening studies from 1980s & 1990s , the incidence of DDH was (2.4 %) with risk factors : breech presentation, family history & oligohydramnios (39).

However a study conducted in Turkey at 2007 reported a higher incidence rate for DDH 3.4% with risk factors(breech presentation, family history and oligohydramnios) (40).

Although Caesarian section (C/S) is considered a recognizable risk factor for DDH(2) , this study showed that only one out of 68 neonates who were delivered by C/S was found to have DDH while 2 neonates out of 182 who were delivered by normal vaginal delivery were found to have DDH .

Instability & dislocation is usually unilateral, more prevalent on the Lt.side (Lt : Rt = 2:1) (3,7) , in our study all the three neonates with DDH had unilateral Rt. sided DDH .

The difference between our results & those of other investigators may be related to selection of patients, their number , the associated risk factors & possibly our social habits regarding neonatal care.

DDH is a major health problem leading in untreated babies to permanent disability. Costs for treatment, surgery and rehabilitation of these cases are much higher than from a relative simple prevention. The relatively simple ultrasound screening method has permitted an early diagnosis and treatment of DDH .

Recently, the treatment of DDH starts in the maternity unit or at the first control examination. The treatment of DDH is recommended in the first six weeks of life, or at least in the third month of life. Organized teamwork for an early detection and treatment of DDH has given impressive results. Coordinated work of obstetricians, pediatricians-neonatologists, radiologists and children's surgeons-orthopedists has led to the early

diagnosis and treatment of DDH, leading to the exclusion of surgery as a method of treatment (19).

Ultrasonography is useful , but its routine use as a screening tool is still debatable as it is operator dependant & needs experience . Two different approaches as either screening all newborns or those with risk factors can be used according to the incidence of DDH in different countries.

Though DDH is still encountered in our country, considering the nature of the disease screening newborns with risk factors could be a reasonable approach.

Conclusion

The ultrasound examination is a simple, easy and available tool for diagnosing DDH .

The absence of risk factors of DDH do not rule out the presence of DDH.

The normal physical examination of neonate do not rule out the presence of DDH, so the ultrasound examination should be done for all neonates especially females.

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