

Pattern of Congenital Dislocation of the Hip in Arar City, Northern Saudi Arabia

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Abstract

Background: Developmental dysplasia of the hip (DDH) is one of the most widely discussed abnormalities in neonates. The etiology of DDH is unknown. There are many insights, however, from epidemiologic/demographic information. **Aim of the study:** To determine the incidence, risk factors and treatment modalities of congenital dislocation of the hip (CDH) in Arar city, Northern Saudi Arabia. **Methods:** This is prospective study involve 955(19100hips) infants referred to Arar central hospital. During the period from 1 January 2014, to 31 December 2016, each infant was evaluated by history taking, clinical and sonographic examination for hip abnormality. **Results:** The incidence of (CDH) was 3.1% (73.3% were females), 70.0% of the affected had positive family history and in 46.7% there was consanguinity between parents. In 80.0% there was regular follow up during pregnancy. 16.7% had history of oligohydramnios. Breech presentation was found in 26.7% and 15.0% delivered by caesarian section. First born children constituted 25.0%. The left hip joint was more affected(41.6%) , the right hip joint affected in 28.3% and bilateral CDH were involved in 13.3%. In the studied cases, 40.0% of the infants were treated surgically, 30% conservatively, 16% by both and 14% were referred to higher centers. **Conclusion and recommendations:** CDH in Arar, Central hospital and by inference in Northern region of Saudi Arabia was found to be 3.1%. Awareness programs, routine neonatal hip joint examination at birth and up to one year of age as well as ultrasound examination of pelvis in high-risk babies are strongly recommended.

Introduction

Developmental dysplasia of the hip (DDH) is one of the most widely discussed abnormalities in neonates. Previously termed congenital dislocation of the hip, DDH encompasses a group of related pediatric hip disorders, including clinical instability of the hip (neonatal or early postnatal), with or without anatomic dysplasia, subluxation, or dislocation. The definition of DDH is a complex and difficult issue [1,2].

This condition is usually diagnosed at birth; it mostly affects the left side of the hip in first-born newborns and babies born in a breech position. Girls are four times to be affected by DDH compared to boys [3]. DDH etiology is obscure and seems to be multifactorial. Risk factors for DDH includes genetic background, family history, female gender, skeletal abnormalities, and hormonal and environmental factors. DDH can also occurs in individuals with connective tissue conditions. These factors making the definition of the problem is difficult. It is difficult to determine the incidence of DDH based on an uncertain definition, and data on the subject in the literature will be vary widely [4, 5].

The overall frequency of developmental dysplasia of the hip is approximately 1 case per 1000 individuals; however, Barlow believed that the incidence of hip instability in newborns can be as high as 1 case for every 60 newborns.[6]

Congenital Hip Dislocation (CHD) can be easily discovered during initial neonatal examination through hearing "clicking" sounds when the legs are moved apart from one another. Early detection of CHD can be results in easily treatment by a few weeks of traction. While missing early diagnosis will results in the child's hip may develop incorrectly, and observed when the child begins to walk. If one hip is affected, the child will have a limp and lurch and with bilateral dislocation, there will be a waddling gait [7]. If this condition goes undetected it can cause one leg to look shorter than its counterpart and the buttock folds are also not symmetrical which causes more creases to be present on the affected side, and skin folds at the thigh are uneven[8].

Several ways are address to treat this abnormality. Conservative management (closed reduction) that can be used on newborns or infants is called a Pavlik harness. The Pavlik harness is a soft harness-like device that has straps that hold the legs apart and bent at the knee, in an attempt to keep the femur (ball) in the acetabulum (socket) in the correct position.

Fixation is considered other way after closed reduction in which the hip is positioned under anesthesia. This procedure can be done on children from the ages of six months to two years old. Still surgery (open reduction

and fixation) is another alternatives if the closed reduction not working. After the closed or open surgery is performed, the child may use a cast or brace in order to keep the hip bone in the socket while it is healing. This will results in a normal functioning hip joint.[7,8,9].

Many epidemiologic/demographic information were available to discuss the incidence, risk factors of DDH. In systematic medical literature review the incidence per 1000 live births ranges from 0.06 in Africans in Africa to 76.1 in Native Americans. There is a predominance of left-sided (64.0%) and unilateral disease (63.4%). In KSA a retrospective study conducted in the Aseer region of Saudi Arabia, they found that the incidence of CDH 3.5/1000 live births. [10,11].

This study aims to determine the incidence, predisposing risk factors, treatment modalities of congenital dislocation of the hip (CDH) in Arar city, Northern Saudi Arabia.

Subjects and Methods

This is a prospective study involve all neonates 955 (19100 hips) born in maternity and child hospital in Arar city, KSA. Between 1 January 2014, and 31 December 2016

- 1- They were examined clinically during the first 48 hours of life. Inclusion criteria include each infant suspicious of congenital hip dislocation, referred to Arar central hospital was examined clinically and by ultrasonography by experienced pediatrician (clinically) and pediatric orthopedic surgeons working independently. From 955 (19100 hips) we examined 350 infants (700 hips) clinically and by ultrasonography.
- 2- The sonographic investigation was performed by a senior radiologist or under his supervision.
- 3- Screening first done by the pediatrician then Ultrasonography lastly referred to pediatric orthopedic for final diagnosis and management.
- 4- The diagnosis was confirmed in 300 infant. For each diagnosed case, control case was selected from neonates free after all steps were done. (300 controls).

Data on age, family history, gender, previous occurrence of congenital hip dislocation in siblings, consanguinity between parents, regular follow up of pregnancy, occurrence of oligohydramnios during pregnancy, breech presentation, type of delivery and other skeletal abnormalities, and so on, were evaluated, to determine the predictors.

Statistical analysis: Data were compiled and analyzed using statistical package for the social sciences (SPSS, version 16), results were analyzed with frequencies, and Chi-squared test as appropriate Confidence level and p-value were set at 95% and 5%, respectively.

Ethical considerations: Parents of the neonates was informed about the study objectives. The participation was completely voluntary No name was recorded on the questionnaires.

Results

Incidence of congenital hip dislocation (by clinically and radiological diagnosis) is shown in Table (1). The overall incidence of congenital hip dislocation among all newborn infants in our study is 3.1% of cases.

Important characteristics of all of the studied children (cases and control) is shown in Table (2). The total number of suspected congenital hip dislocation cases diagnosed clinically and by radiological during the study period is 300 case. Of these case 61.7% were < 6 months. Females represent 71.7% of cases. Family history of CHD in sibling was detected in 23.3%, 30.0% had remote family history of congenital hip dislocation. Consanguinity between parents were detected in 45.0% of cases. Occurrence of oligohydramnios during pregnancy was noticed in 11.7%, 20.0% delivered with breech presentation, and 83.3% delivered normal vaginal.

Risk factors of congenital hip dislocation in both cases and controls is shown in Table (3). Infant less than 6th month of age were presented in 53.3% of cases and 70.0% of controls. Age of presentation shows a significant difference among the affected cases (OR 0.48 & P=0.04). inspite that the females constituted 73.3% of cases there was no significant difference in sex among the studied cases. Breech presentation was present in 13.3% of cases) and has significant difference compare with controls (OR: 2.36 P Value 0.04). In spite that no significant difference between cases and controls in the occurrence of oligohydramnios, it was detected in 16.7% of cases and only 6.7% of controls.

Table (4) illustrates the side of lesion and types of treatment of cases, of neonatal hip dislocation, it is clear from the table that, both hip joints were involved in 13.3%, the left hip joint in 41.6% and the right hip joint in 28.3%. In the studied cases, 40.0% of the infants were treated surgically, 30% conservatively, 16% by both and 14% were referred to higher centers.

Table (1): Incidence of congenital hip dislocation (by clinically and radiological diagnosis), Arar, KSA, 2016 (N=9550)

Congenital hip dislocation	No.	%
▪ Yes	300	3.1
▪ No	9250	96.9
▪ Total	9550	100.0

Table (2): important characteristics of all of the studied children (cases and control), Arar, KSA, 2016 (n=600)

Parameters	No.	%
Age group		
▪ < 6 months	370	61.7
▪ > 6 month	230	38.3
Sex		
▪ Female	430	71.7
▪ Male	170	28.3
Previous occurrence of congenital hip dislocation in siblings		
▪ No	460	76.7
▪ Yes	140	23.3
Consanguinity between parents		
▪ No	330	55.0
▪ Yes	270	45.0
Family history of congenital hip dislocation		
▪ No	420	70.0
▪ Yes	180	30.0
Regular follow up of pregnancy		
▪ No	80	13.3
▪ Yes	520	86.7
Occurrence of oligohydramnios during pregnancy		
▪ No	530	88.3
▪ Yes	70	11.7
Breech presentation		
▪ No	480	80.0
▪ Yes	120	20.0
Type of delivery		
▪ Normal vaginal	500	83.3
▪ Cesarean section	100	16.7

Table (3): illustrates the comparison of the studied risk factors of congenital hip dislocation between cases and control, Arar, KSA, 2016

	Congenital hip dislocation (finally)		Total (n=600)	P value	OR
	Control (n=300)	Cases (n=300)			
Sex					
▪ Female	210 (70.0)	220(73.3)	430(71.7)	0.408	0.84
▪ Male	90 (30.0)	80(26.7)	170(28.3)		
Age group (in months)					
▪ < 6	160(53.3)	210(70.0)	370(61.7)	0.03	0.48
▪ > 6	140(46.7)	90(30.0)	230(38.4)		
Breech presentation					
▪ No	260(86.7)	220(73.3)	480(80.0)	0.04	2.36
▪ Yes	40 (13.3)	80(26.7)	120(20.0)		
Mode of delivery					
▪ Normal	245(81.6)	255(85.0)	500(83.3)	0.09	2.20
▪ Cesarean section	55(18.3)	45(15.0)	100(16.7)		
Occurrence of oligohydramnios during pregnancy					
▪ No	280(93.3)	250(83.3)	530(88.3)	0.07	2.80
▪ Yes	20 (6.7)	50 (16.7)	70(11.7)		
Regular follow up of pregnancy					
▪ No	20(6.7)	60(20.0)	80(13.3)	0.029	0.28
▪ Yes	280(93.3)	240(80.0)	520(86.7)		
Family history of congenital hip dislocation					
▪ No	210(70.0)	210(70.0)	420(70.0)	0.54	1.0
▪ Yes	90(30.0)	90(30.0)	180(30.0)		
Consanguinity between parents					
▪ No	170(56.7)	160(53.3)	330(55.0)	0.42	1.14
▪ Yes	130(43.3)	140(46.7)	270(45.0)		
Previous congenital hip dislocation in siblings					
▪ No	240(80.0)	220(73.3)	460(76.7)	0.25	1.45
▪ Yes	60(20.0)	80(26.7)	140(23.3)		
Being the first born child					
▪ No	245 (81.6)	225 (75.0)	470(78.3)	0.18	1.48
▪ Yes	55(18.3)	75 (25.0)	130(21.6)		

Table (4): Side of lesion and types of treatment of cases, of neonatal hip dislocation, Arar, KSA, 2016 (n=300)

Side of dislocation	No.	%
▪ Both hip joints	40	13.3
▪ Left side	125	41.6
▪ Right side	85	28.3
Treatment type		
▪ Open reduction surgery	120	40.0
▪ Conservative treatment	90	30.0
▪ Both	50	16.6
▪ Referred to higher centers	40	13.4

Discussion

The etiology of developmental dysplasia of the hip (DDH) is unknown. Variations in the incidence of DDH are well known. In the current study, the incidence of congenital hip dislocation among all newborn infants was 3.1%. Our finding is supported by *Barlow*, who believed that the incidence of hip instability in newborns can be as high as 1.66% . [6]. A study was carried out in the Aseer region of Saudi Arabia during a 4-year period between 1995 to1999. Had found that the incidence was 3.5/1000 live births which is far less than our finding [10]. There is significant variability in incidence within each racial group by geographic location *Loder & Skopelja , 2011* [11] mentioned that the incidence of CHD is widely varied from 0.06/ 1000 in Africans to 76.1/1000 in Native Americans.

Female sex had the highest percentage for presentation 73.3% of cases. It is lower than the percentage

previously detected in 1999 study previously done in the same region, 78.3% of cases were females [10]. Family history is the risk factor that clearly appears in our study where, 70.0% of cases had family history of congenital hip dislocation and 46.7% of cases there was consanguinity between parents. This is agreed with *Loder & Skopelja, 2011*, who stated that predictors of DDH positive family history, and gender (female) [11]. In other Spanish study, dislocation of the hip is more frequent in females with a ratio of 5.3 to 1 [12].

Mode of delivery is another accused risk factor [10, 11], in our study, 85.0% of cases delivered normal vaginal, especially with breech presentation. This is supported also by results of study done by *Clausen & Nielsen, 1988*, they found that the frequency of breech presentation in congenital hip dislocation was 13.3% and the cesarean section rate was 39.1% [13]. *Lowry et al. (2005)*, studied the incidence of developmental dysplasia of the hip according to the mode of delivery in breech presentation and found that was 3.69% following pre-labor Caesarean section, 6.64% for intrapartum Caesarean section and only 8.11% after vaginal delivery. They concluded that in breech presentation the incidence of DDH can be slightly reduce by caesarian section delivery [14,15].

In the current study, both hip joints were involved in 13.3%, the left hip joint in 41.6% and the right hip joint in 28.3%. our results are in accordance with a study conducted in Aseer Region Saudi Arabia, Both hip joints were involved in 50.3% of cases which more than our figure, the left hip joint in 27.3% of cases and the right hip joint in 22.3% of cases. In the Spanish study, the hip more frequently affected is the left [12].

In our results, first born children constituted 25.0% of cases, this is also supported by a study done by *Padilla, 1990* and found that 50% of the children affected are first-born [12].

In comparison with the study done in Aseer region KSA, it is clear that the use of surgery as a first line of management was reduced and most of cases nowadays treated conservatively. In the present series, 70.0% of the children were treated conservatively, 13.3% were treated surgically and both treated 16.0%. While in the study done before by *Mirdad 2002*, 46% of the children were treated surgically, 42% were treated conservatively and 12% were treated by both [10].

In our study there was considerable number of oligohydramnios during pregnancy found in 16.7% of cases. *Loder & Skopelja 2011*, concluded that amniocentesis, premature labor, and oligohydramnios may increase the risk of DDH [11].

Conclusion and recommendations

CDH in Arar, Central hospital and by inference in Northern region of Saudi Arabia was found to be less than that in Aseer region. Awareness programs, routine neonatal hip joint examination at birth and up to one year of age and ultrasound examination of pelvis in high-risk babies should be widely recommended to all region of the kingdom. To determine the overall incidence of DDH in whole kingdom we recommend that this study to be carried out in all region of KSA.

Strengths and weakness

This study cover an important abnormality that can affect the child health and developments. Studying risk factors for developing DDH can help to prevent its occurrence and decrease its incidence. This screening is not done before in Arar region. The screening program should be more extended to all neonates. Risk factors should be more investigated to ensure their effects in occurrence of DDH.

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In a retrospective study conducted to determine the incidence, pattern, predisposing risk factors, treatment modalities and outcome of congenital dislocation of the hip (CDH) in the Aseer region of Saudi Arabia, during a 4-year period between 1996 to 1999. 300 children were found to have CDH with an incidence rate of 3.5/1000 live births. Only 32.4% of CDH was diagnosed in first 6 months of life. Mean age at diagnosis was 14.5 +/- 19.7 months while the mean age at treatment was 44.50 +/- 36.41 months. Some 235 cases (78.3%) were females (M:F ratio = 1:3.6) and 292 (97.7%) were Saudi nationals. There was a positive family history in 64 cases (21.3%). Both hip joints were involved in 151 cases (50.3%), the left hip joint 82 cases (27.3%) and the right hip joint in 67 cases (22.3%). Delivery was by spontaneous vaginal delivery in 268 cases (89.3%), caesarean section in 28 cases (9.3%) and breech delivery in 29 cases (10%). Limping and waddling gait were the most common clinical presentation seen in 166 cases (55.3%). In 22 children (7.3%), the parents were blood relatives. First born children constituted 56 out of 216 (25.9%). In the present series, 46% of the children were treated surgically, 42% were treated conservatively and 12% were treated by both. Avascular necrosis (AVN) of the femoral head following the treatment was seen in 6 children (2%) [10].