

A Cross Sectional Study of Early Detection of Developmental Dysplasia of Hip Joint by Ultrasonography in Infants below 90 days of Age

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Abstract

Original Research Article

Hip dysplasia is an abnormality of the hip joint where the acetabular socket portion does not fully cover the ball portion of femoral head, resulting in an increased risk for joint dislocation. DDH ranges from a simple flattening of the acetabular cavity to the complete dislocation of the femoral head. If untreated, DDH can cause early hip osteoarthritis and, in the most severe forms, the presence of a limp with severe functional limitations, since walking age 5. In the past, the incidence of severe forms of the disease without an early diagnosis program, was reported to be 0.13% of all newborns. **Aim:** To assess the usefulness of ultrasonography in early detection of Developmental Dysplasia of Hip joint in infants below 90 days of age. **Material and Methods:** A Cross sectional study was carried out under department of Radiology at a Tertiary rural health care centre. All neonates born in labor room and infants below 90 days of age receiving outpatient and inpatient care at tertiary rural health care centre fulfilling the inclusion criteria. Thus total 630 neonates were studied. Data were entered in EXCEL sheet and analysed using SSPS software version 20.0. Risk factors were presented and assessed by chi-square. **Results:** Majority 96.5% neonates had age less than 5 days. Mean age was 3.03+5.5 days, ranging between 1 Day to 86 days. On coronal- neutral HIP angle, on right mean alpha was 61.1 and beta was 61.5 and on left side mean alpha was 60.2 and beta was 62.9. Prevalence of Developmental Dysplasia of Hip joint was found to be 1.6%. **Conclusion:** Present study showed significance for gender, family history and gestational age. Present study concludes that USG can do early detection of DDH because Clinical presentation of DDH is little late. So for early diagnosis and treatment USG can be used as a screening test for all the newborns for DDH.

Keywords: Developmental Dysplasia, hip joint, Ultrasonography, infants.

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INTRODUCTION

Hip joint pathology in children encompasses wide range of diseases, including congenital and acquired disorders [1]. Hip dysplasia, Legg–Calve–Perthes disease and juvenile slipped capital femoral epiphysis account for up to 25% of all pathologies of the musculoskeletal system in pediatric patients. Hip dysplasia is an abnormality of the hip joint where the acetabular socket portion does not fully cover the ball portion of femoral head, resulting in an increased risk for joint dislocation. DDH ranges from a simple flattening of the acetabular cavity to the complete dislocation of the femoral head [2]. If untreated, DDH can cause early hip osteoarthritis [3, 4] and in the most severe forms, the presence of a limp with severe functional limitations, since walking age [5]. In the past, the incidence of severe forms of the disease

without an early diagnosis program was reported to be 0.13% of all newborns [6].

AIM

To assess the usefulness of ultrasonography in early detection of Developmental Dysplasia of Hip joint in infants below 90 days of age.

MATERIAL AND METHODS

A Cross sectional study was carried out under department of Radiology at a Tertiary rural health care centre. All neonates born in labor room and infants below 90 days of age receiving outpatient and inpatient care at tertiary rural health care centre fulfilling the inclusion criteria. Thus total 630 neonates were studied. After approval from institutional ethical committee study were conducted. All of the inpatient infants and those attending OPD and newborns in the labor room

fulfilling the inclusion criteria are studied. After explaining the details and taking informed consent from parents or guardian, then infants were examined and then were subjected to sonographical examination by using Graf technique. Data were entered in EXCEL sheet and analysed using SPSS software version 20.0. Risk factors were presented and assessed by chi-square.

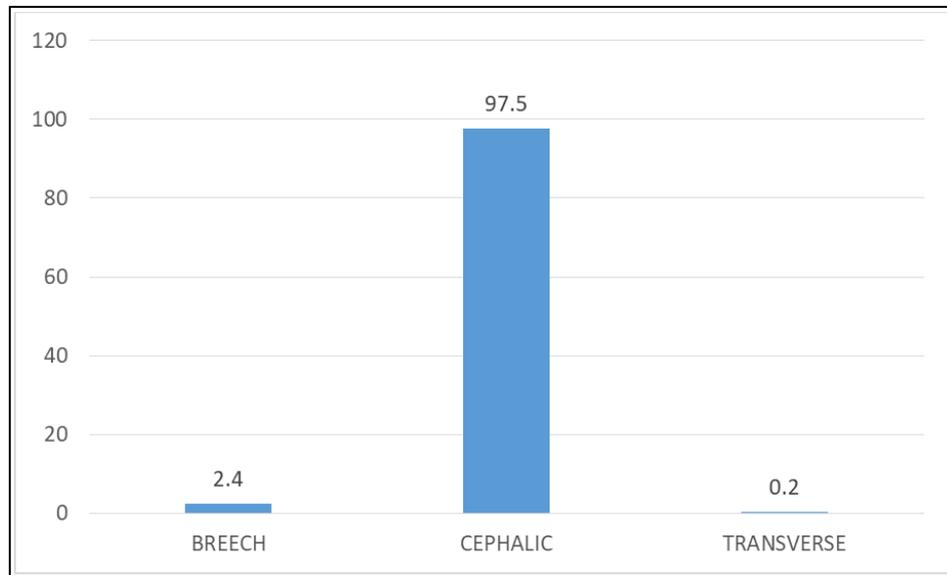
RESULTS

Majority 96.5% neonates had age less than 5 days. Mean age was 3.03+5.5 days, ranging between 1 Day to 86 days.

1. Age distribution of neonate

Age in days	Frequency	Percentage
<5	608	96.5
5 to 10	13	2.1
>10	9	1.4
Total	630	100

Graph 1 shows at birth most common presentation was cephalic 97.5%, followed by 2.4% had breech and 0.2% had transverse lie.



Graph 1: Presentation at time of birth

2. HIP angle (coronal- neutral)

Angle		Mean	SD
Right	Alpha	61.1	3.05
	Beta	61.5	7.9
Left	Alpha	60.2	2.3
	Beta	62.9	7.8

On coronal- neutral HIP angle, on right mean alpha was 61.1 and beta was 61.5 and on left side mean alpha was 60.2 and beta was 62.9.

3. Graff classification (right side)

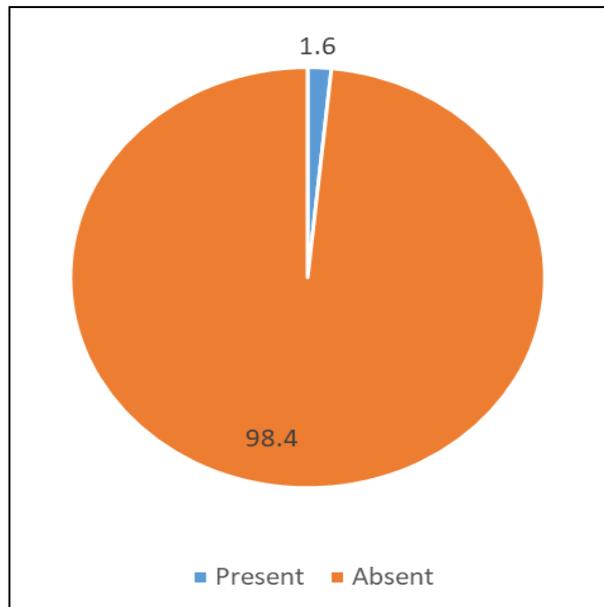
GRAFF CLASSIFICATION (RIGHT)	Frequency	Percentage
I	453	71.9
IIA+	175	27.7
IIC	2	0.4
Total	630	100

On Graff classification (right side), majority 71.9% were in grade I, 27.7% in grade II A+ and 0.4% in IIC.

4. Graff classification (left side)

GRAFF CLASSIFICATION (LEFT)	Frequency	Percentage
I	376	59.7
IIA+	246	39.0
IIA-	3	0.5
IIB	1	0.2
IIC	3	0.5
IIIA	1	0.2
Total	630	100

On Graff classification (left side), majority 59.7% were in grade I, 39% in grade II A+, 0.5% in IIA-, 0.2% in IIB, 0.5% in IIC and 0.2% in IIIA.



Graph 2: Proportion of DDH

Graph 2 shows Proportion of Developmental Dysplasia of Hip joint was found to be 1.6%.

5. Correlation between USG finding and clinical presentation of DDH

On USG	On clinical presentation		Total
	Yes	No	
Yes	6	4	10
No	0	620	620
Total	6	624	630
Sensitivity			100%
Specificity			99.36%
Positive Predictive Value			60%
Negative Predictive Value			100%
Diagnostic Accuracy			99.37%

DISCUSSION

Majority 96.5% neonates had age less than 5 days. Mean age was 3.03±5.5 days, ranging between 1 Day to 86 days. Christian Tschauner *et al.*, [7] showed that 5.5 to 2 months in the two subsequent two cohorts.

On coronal- neutral HIP angle, on right mean alpha was 61.1 and beta was 61.5 and on left side mean alpha was 60.2 and beta was 62.9. study by O Rühmann, D Lazović, P Bouklas, F Gossé and J Franke

[8] showed alpha < 55 degrees as worse. Sezer C *et al.*, [9] showed that mean alpha angle was 70.2 ± 6.6 .

On Graff classification (right side), majority 71.9% were in grade I, 27.7% in grade II A+ and 0.4% in IIC. On Graff classification (left side), majority 59.7% were in grade I, 39% in grade II A+, 0.5% in IIA-, 0.2% in IIB, 0.5% in IIC and 0.2% in IIIA. study by O Rühmann, D Lazović, P Bouklas, F Gossé and J Franke [8] showed that majority were in type Iia. Sezer C *et al.*, [9] showed that on Graff's classification majority on both sides Ib was seen 93-95% and least was Iic.

On association between USG and clinical diagnosis, Study by Woodacre *et al.*, [10] showed that 4.9% prevalence. Significance was seen for gender, family history and post term delivery. Similar findings were seen for present study.

A study was done by A E Lange *et al.*, [11] found DDH in 169 (6.7%) term infants and 181 (7.1%) infants in the overall population. A study was done by Virginie Pollet *et al.*, [12] found incidence of DDH was 6.6/1000 newborns. Late-presenting DDH was detected in 2.2/1000 newborns. Bayalag Munkhuu *et al.*, [13] found incidence of ultrasonographically detected DDH of 0.7% in Mongolian newborns including 0.2% Type 2c, 0.4% Type D, 0.08% Type 3 and 0.02% Type 4 hips.

CONCLUSION

Present study concludes that early detection of DDH is possible. Early detection and treatment is key to any disease. Gender and can be considered for prior screening and detecting the disease. Majority cases had cephalic presentation, and mean angle were more than 50 degree.

DDH should be detected before the child starts walking. Graff classification helps in detecting the disease early and even tells the severity of the disease. This further helps in planning the treatment of the child.

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