



ORIGINAL ARTICLE

A pilot study to assess justification of radiographic evaluation for developmental dysplasia of the hip.

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ABSTRACT... Objective: To evaluate justification of radiography in patients referred for the evaluation of Developmental dysplasia of the hip (DDH). **Study Design:** Retrospective Cross Sectional study. **Setting:** Department of Radiology, Northwest School of Medicine, Peshawar. **Period:** Jan 2020 till Dec 2021. **Material & Methods:** Patient database was searched for paediatric patients (<18 years old) who underwent plain radiography for the purpose of diagnosis of DDH over a period of 2 years. The basic demographics including age of the patient at the time of the investigation were abstracted and analysed. X-rays performed on a patient younger than 6 months were deemed as 'Not Justified'. **Results:** The frequency of positive cases was 12.5%. Radiography was deemed not justified in 5.4% of the cases. **Conclusion:** There is need to create further awareness among referring physicians regarding modalities employed in assessment of DDH in order to avoid unjustified radiation exposure.

Key words: Congenital Dysplasia Hip, DDH, Developmental Dysplasia of the Hip, Musculoskeletal, Pediatrics, Ultrasound, X-Ray.

INTRODUCTION

Developmental Dysplasia of the Hip (DDH) is a broad term that includes a large variety of abnormalities in the hip joint. It was previously referred to as congenital dysplasia of the hip (CDH), however, it has since been renamed as the deformity may occur at any point from conception till skeletal maturity.^{1,2} The presentation of this condition varies from simple instability to dysplastic acetabulum to complete dislocation and pseudoarthrosis of the femoral head.

The incidence of DDH varies around the world. An estimation of 0.5-1.5% has been reported in literature, however, there is a large variation in literature, especially after the use of ultrasonography became popular for diagnosis. One large demographic study shows incidence in natives of Pakistan, India and Bangladesh to be approximately 1.37 per 1000.³ No large-scale demographic studies are available from Pakistan

to determine its epidemiology accurately.

DDH is a multifactorial condition. Genetic factors play a role, evidenced clinically by increased incidence in female children, with a positive family history and in the Asian population. Other risk factors such as breech presentation at birth, advanced maternal age, post maturity and oligohydramnios indicate that mechanical factors also very well play a part in the development of this condition. A noteworthy fact is that in communities where mothers carry their neonates on their backs with the hips abducted have a lower incidence of DDH.^{4,5}

Regardless of the factors, it is extremely important to detect DDH as early as possible. By early detection of the condition, non-invasive management options such as the Pavlik Harness may be used. This could save the child from requiring multiple surgical procedures which

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require expertise & accessibility to which is usually limited in developing world.⁶ Unfortunately, lack of awareness, expertise, and late presentation (as cases come to notice once the child begins to walk) are all contributors to late presentation of this condition in the developing world.⁷

There are multiple ways to evaluate for this condition. The Ortolani test and Barlow manoeuvres should be a part of all new-born examinations to clinically assess for DDH. Previously, the imaging modality of choice for all age groups was plain radiographs, taken in AP and frog leg lateral views. This has however changed over the last few decades with improvement in ultrasound technology and techniques, currently rendering ultrasound as the modality of choice for children younger than 6 months of age.¹

However, in some parts of the world, there is still lack of awareness among referring physicians regarding what type of investigations to order. It is not unusual for radiographs to be ordered in newborns and infants less than six months of age for assessment of DDH.⁴ There is a lack of literature to outline prevalent practices for radiological screening and diagnosis of DDH in our country.

OBJECTIVE

To estimate the frequency of DDH in suspected cases referred for radiological assessment and to determine justification for use of radiography in these cases.

MATERIAL & METHODS

This retrospective cross sectional study was conducted at Department of Radiology, Northwest School of Medicine, Peshawar. Our patient database was searched for paediatric patients (<18 years old) who underwent plain radiography for the purpose of diagnosis of DDH over a period of 2 years from Jan 2020 till Dec 2021. Their radiographs along with reports were reviewed to confirm the diagnosis of DDH. The basic demographic features including age of the patient at the time of investigation were abstracted and analysed using Microsoft Excel version 2018. Radiographs performed on patients

younger than six months of age were deemed as 'Not Justified'. Ethical approval for this study was granted by Institutional Review Board by letter ref no: IRB&EC-AHL-4029-2022 dated 19/07/2022.

RESULTS

A total of 56 patients were identified who underwent radiographs for diagnosis of DDH. The results are displayed in Table-I. Of the three cases that were labelled as 'not justified' for radiography, one was diagnostic for DDH on left side.

Total number of patients	56
Gender	Males: 35 (62.5%) Female: 21 (37.5%)
Age (years)	Mean: 2.23 (+/- 1.52) Median: 2 yrs
"Not justified" radiography	3 (5.4%)
	Total
	7 (12.5%)
Positive for DDH	Right sided
	Left sided
	Both sides
	2
	3
	2

Table-I.

DISCUSSION

The frequency of positive cases in our sample was 12.5%. Although prior studies may have shown that radiography has comparable results for diagnosis of DDH, there are definite benefits of using ultrasound as modality of choice for infants less than six months of age.⁷

The foremost is the lack of radiation involved in ultrasonography. Secondly, ultrasonography is a dynamic study as opposed to radiography and real time manoeuvres can be performed to assess instability. Thirdly, ultrasonography provides much better visualization of soft tissues adequate evaluation of which (especially the triradiate ligament) is of utmost importance in cases of DDH. Fourthly, due to non-ossification, the femoral heads are not properly visualized on radiographs at age less than six months whereas ultrasound allows adequate visualization of entire femoral head and its placement immediately after birth.^{8,9}

There is debate as to whether all newborns should undergo radiological evaluation for DDH. It has

been proven on multiple occasions, for example study by Holen et al. revealed that selective investigation of patients identified as high risk through clinical examination is just as effective as routine ultrasonography. Ultrasound has been proven to be more sensitive and specific, being able to detect low grade dysplasia that may be missed on radiography. Studies, such as that done by Kitay et. all have shown ultrasound to be an acceptable alternative to radiography even at the age six months as well.⁹⁻¹²

There is further need for epidemiological studies to better estimate the incidence and prevalence of DDH in our population. There is also need for creating awareness regarding types of radiological modalities among all physicians to ensure early and accurate detection of DDH while simultaneously avoiding unjustified radiation exposure. A major limitation of this study was small sample size; as the aim was to highlight the trends in current practice, the authors would like to propose further large-scale studies from our region to better assess both the epidemiology and diagnostic trends for this disorder.

Efforts should be made to create awareness of this condition and its early detection at all levels of medical education. The aim being to ensure early detection by use of appropriate imaging modality & avoiding unjustified radiation exposure in children.^{8,13}

CONCLUSION

We can notice that 5.4% of the cases ordered for our patients were “not justified” & these cases could be better evaluated by ultrasound simultaneously avoiding unnecessary radiation exposure.



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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Saad Siddiqui	Idea, Data collection, Review.	
2	Mubeen Ali	Writeup, Final review.	
3	Shandana Khan	Final review.	