Volume 20 Issue 50
Originally issued as K10



Global Journal of Medical Research: K
Interdisciplinary
Volume 20 Issue 10 Version 1.0 Year 2020
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals
Online ISSN: 2249-4618 & Print ISSN: 0975-5888

Ultrasound Diagnostics of Hip Dysplasia in Infants

By Nozima Solieva & Umida Rustamova

Abstract- We examined 60 children aged three weeks to 8 months of life, who were referred for consultation with an orthopedist by local pediatricians with suspected hip dysplasia. Traditionally, the clinical examination of the child has been given great importance. We concluded that the use of a new method of ultrasonographic diagnostics in children in infancy allows us to identify dysplasia of the hip joint at the very early stages of development and to accurately determine its forms and stages.

Keywords: *ultrasound diagnostics, hip, hip dysplasia, infants.*

GJMR-K Classification: *NLMC Code: WN 180*



Strictly as per the compliance and regulations of:



© 2020. Nozima Solieva & Umida Rustamova. This is a research/review paper, distributed under the terms of the Creative Commons Attribution-Noncommercial 3.0 Unported License http://creativecommons.org/licenses/by-nc/3.0/), permitting all non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Ultrasound Diagnostics of Hip Dysplasia in Infants

Nozima Solieva [α] & Umida Rustamova [σ]

Abstract- We examined 60 children aged three weeks to 8 months of life, who were referred for consultation with an orthopedist by local pediatricians with suspected hip dysplasia. Traditionally, the clinical examination of the child has been given great importance. We concluded that the use of a new method of ultrasonographic diagnostics in children in infancy allows us to identify dysplasia of the hip joint at the very early stages of development and to accurately determine its forms and stages.

Keywords: ultrasound diagnostics, hip, hip dysplasia, infants.

I. The Relevance of Research

Hip dysplasia (TPD) is one of the most common pathologies. Currently, the incidence of hip dysplasia is 6–20 cases per 1000 newborns; unfortunately, a tendency to increase the frequency of this disease is noted in ecologically unfavorable areas. The traditional diagnostic method remains X-ray, recording changes only in bone structures, the number of which in children in the first months of life is relatively small. According to various domestic and foreign authors, X-ray examination of the hip joints becomes informative at the age of no earlier than 3-5 months of life. The most important task of modern pediatric orthopedics is the early detection of children with congenital hip dislocation (VVB) and congenital dysplasia. It was found that the percentage of positive treatment results at an early age is inversely proportional to age [1, 2]. In 97% of children, it is possible to get good and excellent results if this pathology is detected before the age of 3 months and the early start of its treatment. In 82% of cases, you can achieve similar results if you start treatment after 3 and up to 6 months of life in children, and only in 30% of cases the results will be only good if treatment is started in the second half of life [3, 4, 5].

II. Objective

To determine the significance of early ultrasonographic diagnosis of hip dysplasia in infants.

III. Material and Research Methods

We examined 60 children aged 3 weeks to 8 months of life, who were referred for consultation with an orthopedist by local pediatricians with suspected hip dysplasia. Based on the ultrasound diagnostics department, we studied the hip joints of children of the first year of life when using ultrasound scanners equipped with linear scanning sensors with an operating frequency of 5-7.5 MHz.

The ultrasound technique and the ultrasound classification of the types of the structure of the hip joints were first developed by the Austrian doctor Graf R. (1989) and are currently supplemented and expanded by several domestic and foreign authors. The hip joint is formed by the acetabulum and the femoral head. The articular lip (labrum acetabular), which is often called the limbus, is attached around the circumference of the acetabulum (formed by the iliac, sciatic, and pubic bones, interconnected by an u-shaped cartilage). All these anatomical structures have a clear echographic image during on ultrasound examination. At the age of 1.5–6 months, nuclei of ossification of the femoral head are formed. As a rule, the ossification center is formed centrally, but it is possible to shift laterally or medially from the center of the head. Also, the process of ossification of the heads can be asymmetric. These changes, in the absence of other deviations, are not a sign of dysplasia and can be regarded as a normal option for the development of hip joints.

IV. Results and Discussions

According to the literature, early detection of congenital hip dislocation and congenital dysplasia remains at a low level of 30–40% when using the old system of organizational and therapeutic measures (x-ray and clinical examination of children under six months of age). But, due to the poverty of clinical symptoms, the diagnosis of this pathology can be very difficult at such an early age, but, despite this, this study should be carried out in the first days of a child's life, the purpose of which is to identify hip dysplasia [6. 7]. Until recently, the main method for diagnosing the pathology of the hip joint was radiography (RG). However, due to radiation exposure and the impossibility of visualizing the proximal end of the femur and the roof of the acetabulum, as well as identifying deviations in their structure due to the predominance of cartilage, its use is not practical up to 3 months of age. Ultrasonography (USG) is a relatively new alternative method that allows you to expand the diagnostic capabilities to assess the state of development of the hip joints in newborns and

Author α: Department of Radiology, Republican specialized scientific and practical center of Traumatology and Otropedia, Tashkent, Uzbekistan. e-mail: author.uzb@mail.ru

© 2020 Global Journals

children in the first months of life [8, 9]. Using this diagnostic method makes it possible to visualize the soft tissue components of the hip joint. Non-invasiveness, the absence of special training, the absence of contraindications and complications, the possibility of repeated and regular use, the absence of radiation exposure, the speed of execution, mass screening, and most importantly, the optimal age range of the examined from 0 to 10 months, all these are indisputable advantages of this method.

Based on the results obtained, it should be noted that in clinical practice there is an over diagnosis of dysplasia. When clinical symptoms of hip dysplasia are identified, the diagnosis is confirmed with ultrasound in only 47% of cases. Thus, the use of ultrasound can clarify or completely exclude the alleged orthopedic pathology, which often saves the child from unnecessary treatment. With the modern development of diagnostic equipment, ultrasound of the hip joints seems to be an advantageous alternative to x-ray diagnostics of the pathology of the hip joints in newborns, as it allows us to evaluate the cartilage structures that mainly represent the child's joint in the first months of life, as well as muscle and connective tissue components, while avoiding unjustified radiation exposure [9, 10, 11]. In addition to these obvious advantages, ultrasound allows you to conduct functional tests in real-time (bringing the thigh to the stomach with simultaneous rotation of the inside, tests according to the Barlow, Ortolani method), and conduct dynamic monitoring during treatment [12].

Types of hip joints:

Type 1a, b: mature joint for the angle α is 60–69 degrees, the angle β is 55–77 degrees.

Type 2a: physiological immaturity of the hip joint up to three months. The angle α is 50 - 59 degrees, the angle β is 56 - 77 degrees, the CCP is ≤ ½.

Type 2B: DTBS in children older than 3 months. The angle α is 43 - 49 degrees, the angle β ≥ 77 degrees.

During functional tests, transient decentration of the femoral head within the acetabulum is detected. It is possible to identify decentration with a change in angular indicators when the position of the subject is changed on the back or on the side, the CCPs are ½ – ⅓.

Type 3a: subluxation (eccentricity). The angle α is less than 43 degrees, the angle β is more than 77 degrees, the bone part of the acetabulum roof is flattened, the head is eccentric, in children older than 3 months, as a rule, the echogenicity of the cartilaginous part of the acetabulum roof is increased (due to prolonged head pressure femur per capsule of the joint), CCPs make up less than ⅓. *type 3b:* with a degenerative change in the cartilaginous part of the acetabular roof, the CCP is less than ⅓. *type 4:* dislocation. There is an ultrasound symptom of the "empty" acetabular cavity. The bony part of the roof of the acetabulum is sharply flattened, the limbus, as a rule, is not visualized, since it is wrapped in the joint cavity.

Of 64 children, the absence of ultrasound pathology of the joints was diagnosed in 12 children (18.8%) (type of joint structure 1a, mature - 8 boys, 4 girls). 13 children (20.3%) (over the age of 2.5 months) were diagnosed with delayed formation of ossification nuclei in the presence of normal angular indices. In 32.8% of cases (21 examined children, of which 14 were girls, 7 boys), type 2a – 2b dysplasia was detected. In 11 children (17.2%) (7 girls, 4 boys), type 2c dysplasia was diagnosed, in all cases accompanied by slow formation of ossification nuclei. In 7 cases (10.9%), 3-eccentric dysplasia was detected. As noted, there is a gender imbalance for hip dysplasia, which is defined by some authors as a risk group and is explained by a greater.

It should be especially noted that girls have noted all severe degrees of delay in the development of joints. Thus, this pathology can be considered gender-related. Given this particular pathology, it seems to us 100% to recommend a screening ultrasound examination of newborn girls. In all cases, when detecting orthopedic pathology, treatment was carried out and during the treatment, children were dynamically monitored.

V. Conclusions

The most optimal time for a screening study is 4-6 weeks of life. At this age, the hip joint is already mostly formed, and pathological changes in the joints revealed during this period lend themselves most to orthopedic correction, since the formation of a dysplastic joint is still incomplete (as practice shows - hip dysplasia in most cases is accompanied by a developmental delay ossification nuclei). Not the least role is played by the fact that the smaller the age of the child, the shorter the period of orthopedic treatment and the less anxiety the forced restriction of movements of the child itself.

References Références Referencias

1. von Kries R. et al. Effect of ultrasound screening on the rate of first operative procedures for developmental hip dysplasia in Germany //The Lancet. – 2003. – Т. 362. – №. 9399. – С. 1883-1887.
2. Thaler M. et al. Cost-effectiveness of universal ultrasound screening compared with clinical examination alone in the diagnosis and treatment of neonatal hip dysplasia in Austria //The Journal of bone and joint surgery. British volume. – 2011. – Т. 93. – №. 8. – С. 1126-1130.

© 2020 Global Journals

3. Laborie L. B. et al. Selective ultrasound screening for developmental hip dysplasia: effect on management and late detected cases. A prospective survey during 1991–2006 //Pediatric radiology. – 2014. – Т. 44. – №. 4. – С. 410-424.
4. Clarke N. M. P. Swaddling and hip dysplasia: an orthopaedic perspective. – 2014.
5. Fitch R. D. Ultrasound for screening and management of developmental dysplasia of the hip //North Carolina medical journal. – 2014. – Т. 75. – №. 2. – С. 142-145.
6. Delaney L. R., Karmazyn B. Developmental dysplasia of the hip: background and the utility of ultrasound //Seminars in Ultrasound, CT and MRI. – WB Saunders, 2011. – Т. 32. – №. 2. – С. 151-156.
7. Walton M. J. et al. The success of management with the Pavlik harness for developmental dysplasia of the hip using a United Kingdom screening programme and ultrasound-guided supervision //The Journal of bone and joint surgery. British volume. – 2010. – Т. 92. – №. 7. – С. 1013-1016.
8. Hareendranathan A. R. et al. A technique for semiautomatic segmentation of echogenic structures in 3D ultrasound, applied to infant hip dysplasia //International journal of computer assisted radiology and surgery. – 2016. – Т. 11. – №. 1. – С. 31-42.
9. Thallinger C. et al. Long-term results of a nationwide general ultrasound screening system for developmental disorders of the hip: the Austrian hip screening program //Journal of children's orthopaedics. – 2014. – Т. 8. – №. 1. – С. 3-10.
10. Weinstein S. L., Mubarak S. J., Wenger D. R. Developmental hip dysplasia and dislocation: Part I //JBJS. – 2003. – Т. 85. – №. 9. – С. 1824-1832.
11. Perka C. et al. Developmental hip dysplasia treated with total hip arthroplasty with a straight stem and a threaded cup //JBJS. – 2004. – Т. 86. – №. 2. – С. 312-319.
12. Bar-On E. et al. Ultrasonography of the hip in developmental hip dysplasia //The Journal of bone and joint surgery. British volume. – 1998. – Т. 80. – №. 2. – С. 321-324.

© 2020 Global Journals