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ORIGINAL PAPER

Ultrasound in Detection of Developmental Hip Dysplasia in Premature Born Children

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ABSTRACT

Introduction: Developmental hip dysplasia represents the most common deformation of locomotor system in children. Developmental modulation of the hip is expressed during first year of life which is important for early diagnosis and treatment. Therefore, in the practice, it is very important to set a diagnosis early with application of simple and convenient methods (ultrasound) in order to achieve fast and efficient therapeutical effect and avoid permanent disability. **Aim:** The aim of this paper is to point out the increase of prematurely born infants and their survival thanks to the development of Unit for Intensive Neonatal Care at the Pediatric Clinics in Sarajevo. **Material and methods:** Clinical investigation included 150 infants (77 girls and 73 boys) in whom the developmental hip dysplasia was diagnosed with clinical exam, ultrasound exam and x-ray of the hips. The exams were done in period of January 2012 to August 2014. **Results:** Two groups of patients were formed. The first one consisted of premature infants, total number of 75 (34 girls and 41 boys), with developmental hip dysplasia that was diagnosed at the first exam at the Ultrasound unit of the Pediatric clinics and at the Intensive Neonatal Care Unit of the Pediatric Clinics in Sarajevo. Second (control) group consisted of patients-on term infants who had diagnosed one of developmental hip dysplasia, total of 75 (43 girls and 32 boys) during first exam in the Ultrasound unit of the Pediatric clinics in Sarajevo. **Conclusion:** The frequency of premature birth is between 5 and 10% of all labors and demonstrates increasing trend. We suggest ultrasound examination of hips in each newborn, term or premature, at the age of 6 weeks after birth.

Key words: developmental hip dysplasia, ultrasound hip examination, premature infant

1. INTRODUCTION

The frequency of premature birth is between 5 and 10% of all labors and has increasing trend. Etiology of premature birth is in over 50% of cases unknown (1).

Developmental hip dysplasia is progressive disease in which secondary changes of structures of hip joint develop unless congruent articular bodies position is achieved. In Bosnia and Herzegovina the frequency of some of developmental hip dysplasia is the highest in whole Europe (Sweden 1.7; BiH 75 infants with developmental hip dysplasia to 1000 of live born infants) (2,3).

2. AIM OF PAPER

The aim of this paper is to point out to the increase of prematurely born infants and their survival thanks to the development of Unit for Intensive Neonatal Care at the Pediatric Clinics in Sarajevo. The need for detection of eventually existence of some type of developmental hip dysplasia in this population and to proof that ultrasound exam is a safe, fast, simple, convenient and cheap method for detection of any type of developmental hip dysplasia in prematurely born infants.

3. MATERIAL AND METHODS

This is a prospective study. Data obtained from preterm and term infants with one of the developmental hip dysplasia forms diagnose in the period of January 2009 to august of 2011 were collected.

Patients with developmental hip dysplasia that was diagnosed based on clinical, ultrasound and x-ray exam were analyzed. Obtained data were sorted regarding gender, age,

method of diagnosis, conducted treatment option and display of treatment outcome.

4. RESULTS

The research was done on the "General electronic LOGIQ C%", with probe of strength from 5 to 50 MHz (used 7.5 and 10MHz). There were no significant difference ($p > 0.05$) in the gender and age distribution of patients (Table 1. and 2.).

	N Girls	N Boys	Total
Group I-term infants	43	32	75
Group II-preterm infants	34	41	75
$X^2 = 1.7087$	$p = 0.191$		

Table 1. Gender distribution of infants including in study (n=150)

	girls	boys
Group I	2.2 month	2.3 month
Group II	33 WG	34 WG

Table 2. Average age when developmental hip dysplasia detected

Ultrasound and X-ray diagnostics, are methods necessary to confirm the clinical findings (Table 3.).

	Clinical exam	US	Confirmed by x-ray	
	Positive	Negative		
Group I	17 (22.6%)	58 (77.3%)	5 (6.6%)	4 (5.3%)
Group II	21 (28.0%)	54 (72.0%)	1 (1.3%)	1 (1.3%)
$X^2 = 0.317$	$p = 0.573$			

Table 3. Methods of detection of developmental hip dysplasia

The pathological findings more often affected both joints, than one (Table 4.).

	Left hip affected	Right hip affected	Both hips	Total affected
Group I	0/75	1/75	4/75	5/75
Group II	0	0	1/75	1/75
$X^2 = 0.75$				$p = 0.861$

Table 4. Frequency of developmental hip dysplasia affecting one or both hips

Diagnosis confirmed with ultrasound were treated with conservative therapy in all cases. Patients were cured in 80% of cases (the result of one patient is unknown) in Group I, and 100% in Group II (Figure 1.).

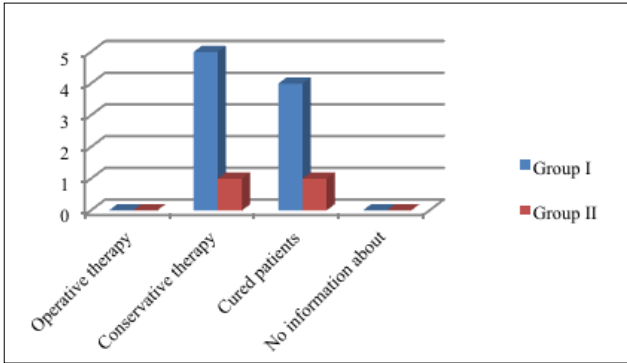


Figure 1. Treatment and treatment success

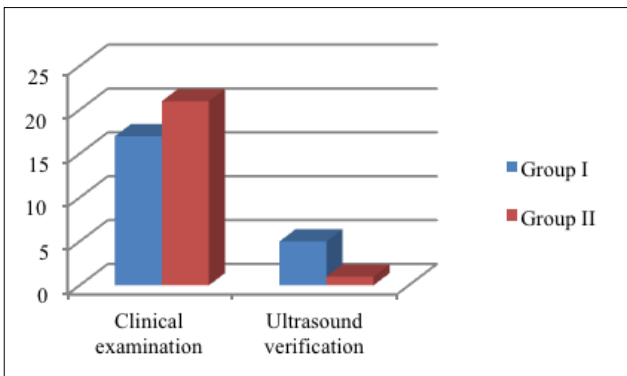


Figure 2. Necessity of ultrasound examination

The necessity of ultrasound is shown in Figure 2., where with ultrasound were confirmed only 29.4% and 4.7% of patients, in which in a clinical examination were suspected pathological findings.

Ultrasound detected different types of changes in preterm infants, and they are shown in Figures from 3. to 8.

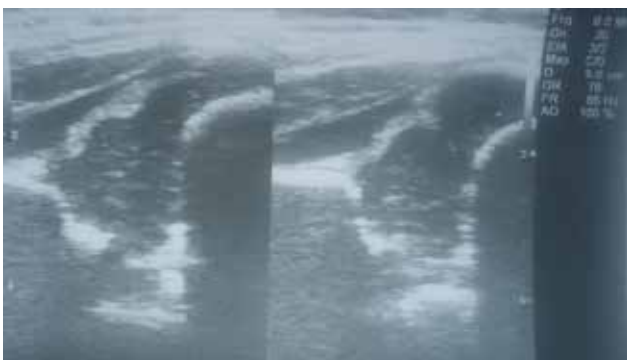


Figure 3. Prematurity hip 26 WG

5. DISCUSSION

Clinical study included total of 150 participants, out of which there were 77 females and 73 were male. The manner



Figure 4. Prematurity hip-correction age 1.5month age

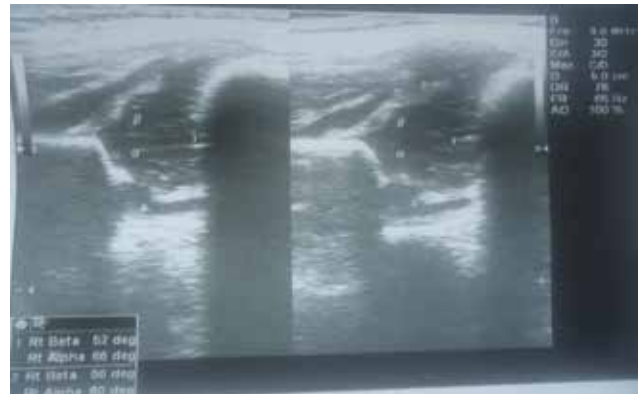


Figure 5. Prematurity hip type IIa

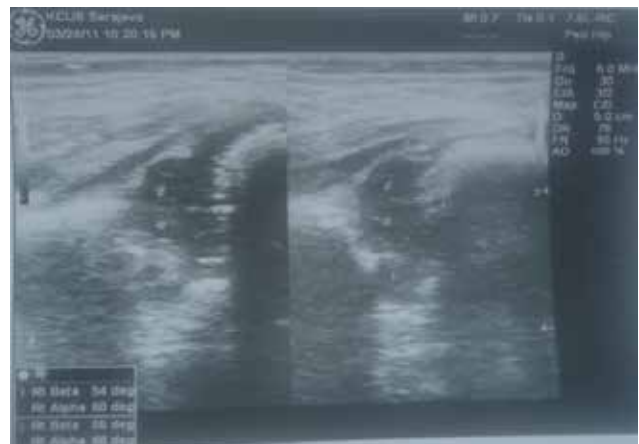


Figure 6. Prematurity hip type IIb

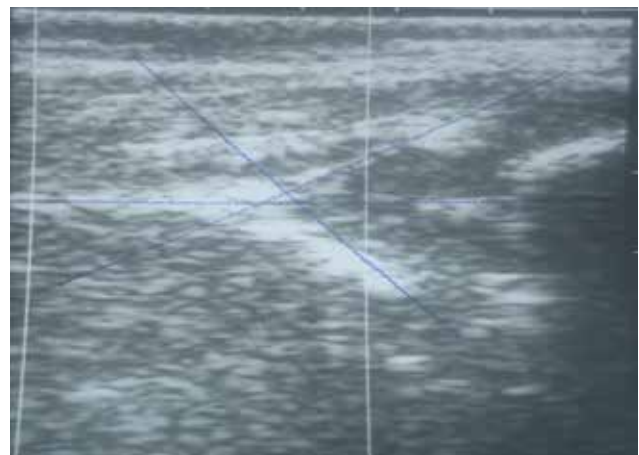


Figure 7. Prematurity type IV developmental hip dysplasia

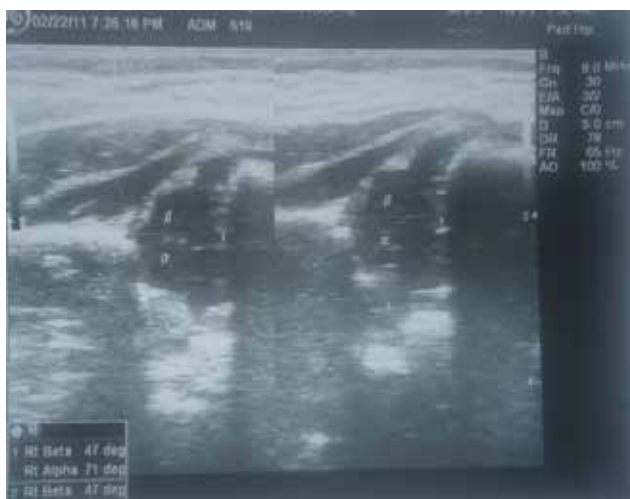


Figure 8. Prematuriti hip type Ia.

of diagnosing suspected developmental hip dysplasia was done via clinical, ultrasound and radiological examination. In the investigated group, a positive clinical finding was established in 22.6% children while no pathological changes were found in 77.3% participants. In the control group a positive clinical finding was established in 28%, and normal finding in 72% patients. We emphasize that clinical exam is a subjective method depending on experience of attending doctors and it was shown to be insufficient method for detection of the developmental hip dysplasia (4, 5, 6). Additional check of positive clinical diagnostic signs should be performed via ultrasound or x-ray diagnostic methods (7).

Out of total 75 on term infants developmental hip dysplasia was found in 5 participants while right hip was affected in one and both hips in 4 patients. In prematurely born infants, developmental hip dysplasia was found in only one patient with both hips affected. Obtained results speak in favor that prematurely born infants do not belong to the risk group for appearance of developmental hip dysplasia, and that developmental hip dysplasia is a progressive disease in which secondary structure changes of hip tissue and its surrounding is developed unless a congruent relation of joint bodies is achieved (8, 9). Thanks to the introduction of mandatory ultrasound screening in Sarajevo Canton first ultrasound hip examination was done in first two months after birth when an ultrasound exam is sufficient to establish diagnosis. The most recent investigations recommend period 6 weeks after birth as the optimal time for the first ultrasound examination of the hip (10). Regarding examining premature infants, the advantages of the ultrasound are even more emphasized since the premature hip structures are made of cartilage (11). Introduction of ultrasound hip examination in diagnosis of developmental hip dysplasia overcame disadvantages of clinical and radiological investigation, while radiological examination is not convenient in first three month due to the cartilage structure of joints and due to the risk of x-rays what is very important in prematurely born children (12). Ultrasonography is a diagnostic method that enables detection of developmental hip dysplasia right after birth by visualization of bone and

cartilage structures. It should be implemented as a screening method of each newborn (term or preterm) at the age of 6 weeks after labor. Period for examination in preterm newborns should be calculated as corrected age (gestation age in which the infant was born and add time following labor) (13).

The study results demonstrate that developmental hip dysplasia was timely diagnosed in all participants and that all patients were successfully treated with conservative treatment methods (14,15).

Unfortunately, in both groups of patients there is a certain number of patients whose therapeutical outcome is unknown since parents did not bring child to control visit.

6. CONCLUSION

Health care in general is directed toward early detection of different deviations in children development. Developmental hip dysplasia, the most common deformation of locomotory system still has unknown etiology. Etiopathogenetic processes continuously and progrediente directly act to the degree of anatomic changes of hip and have to be interrupted with early diagnosis and appropriate treatment. The frequency of premature birth is between 5 and 10% of all labors and demonstrates increasing trend. We suggest ultrasound examination of hips in each newborn, term or premature, at the age of 6 weeks after birth, taken into account corrected age in premature born children.

CONFLICT OF INTEREST: NONE DECLARED.

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