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Does the Gestation Age of Newborn Babies Influence the Ultrasonic Assessment of Hip Condition?

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SUMMARY

Introduction Ultrasound represents a method of examination of hips of newborn babies capable of defining hip condition and distinguishing stable and unstable hips based on morphological elements. It is accepted in a large number of countries as a method of examination of high risk newborns, or as a method of systematic screening.

Objective The objective of this study was to investigate correlation between ultrasonically estimated hip maturity and respective gestation maturity both in premature and term-born babies, and to investigate the influence of different delivery types on hips condition.

Methods In our study 2045 patients, 1141 males and 904 females, were examined in at the Institute of Neonatology over a period of 5 years. The average age was 34.04 gestation weeks. There were significantly more premature (1698 or 83.03%) than term-born babies (347 or 16.97%). Ultrasound hip examination, as a screening method, was carried out according to Graf. It was followed by clinical examination. Results were analyzed by appropriate statistical methods (χ^2-test, one-way ANOVA, multifactor ANOVA).

Results The overall frequency of unstable hips was 3.2%, 1.88% in males and 4.87% in females ($p<0.05$). 96.8% babies had stable hips, out of which 35.21% were mature and 61.59% immature. In the study of the breech presentation, out of 183 babies, unstable hips were found in 1.58% of male cases, and in 10.23% of female cases.

Conclusion Clinical screening of developmental dysplasia of the hip is insufficient for early diagnosis and decision about the treatment of premature babies. The high frequency of unstable hip type IIc (risky) and IId (decentralized) in premature babies requires early diagnosis and therapy. Wide swaddling for prematures should be applied up to eight months of age. Gentle manipulation is necessary while nursing and conducting physiotherapy of a premature baby.

Keywords: birth; premature; ultrasound; hip joint

INTRODUCTION

Ultrasound as a method of examination of hips of newborn babies was introduced and developed by Reinhard Graf [1, 2, 3]. It represents a static method, which defines hip condition and distinguishes stable and unstable hips based on morphological elements and measures of acetabular angles (Table 1). This method (either on its own or combined with the dynamic method of Harcke) is accepted in a large number of countries, in some places as a method of examination of high risk newborns, and in others as a method of systematic screening method (Austria, Germany, Serbia). Numerous case histories have been reported mostly relating to term-born babies [4-13]. There are fewer case histories relating to premature babies [14-20]. Certain differences are expected, since the hips in premature babies are also less mature at birth.

OBJECTIVE

The objective of this study was to investigate any correlation between ultrasonically estimated hip maturity and their respective gestation maturity both in premature and term-born babies, and to investigate the influence of different delivery types on hips condition.

Table 1. Graf classification

Hips	Stable		Unstable
	Mature	Immature	
Types	Ia, Ib	IIa+, IIa-, IIb	IIc, IId, IIIa, IIIb, IV

METHODS

Babies born prematurely with a high risk and seriously ill term newborns from Serbia were admitted for treatment at the Institute of Neonatology in Belgrade. The newborns were considered as a „high risk newborn" if defined neonatal risk factors were present [21]. The diagnosis of the developmental dysplasia of the hip (DDH) by Graf's ultrasound method, was introduced at the Institute in 1999. Screening of DDH was introduced because of risks present in premature newborns and in seriously ill term babies, as well as a significant number of babies from multiple pregnancies and pregnancies with breech presentations.

Between October 2001 and January 2006, within the routine DDH screening, 2045 patients were involved in a prospective study of the frequency of DDH. One thousand six hundred and ninty-eight babies were born premature (before 37 weeks), and 347 were born in term (between 38-42 weeks). There was a group of 183 babies at highest risk from unstable hip who were in a real breech presentation. Anamnestic data about DDH in their families was mostly uncertain.

The first ultrasound hip examination was performed as soon as general patient's condition allowed it (when additional oxygenation was no longer needed and brief detachment from the incubator was possible). Ultrasound hip examination was done in a comfortable room, in a regular deck-chair providing an adequate lateral position. Each hip was examined separately, the right one first by convention. The report included a printed image (sonogram). For unstable hips two sonograms were made, providing the morphometric control of morphological diagnosis. All the findings at patients' check-ups, done during the treatment, were documented and added to the original examination report. This report also contained anamnestic data about pregnancy and delivery, anthropometric measuring, possible signs of risk and clinical signs for DDH, as well as neurological condition. In order to minimize the patient's stress, ultrasound examination was followed by a clinical examination covering a complete inspection of the skeletal system, joint mobility, especially of the hips, presence of skin wrinkles, any asymmetry or deformities. The examination was performed by a modern ultrasound device Biomedica MEGAS, with 7.5 and 10 MHz probes.

After discharge from hospital, all patients with unstable hips were transferred to a paediatric orthopaedic surgeon, while patients with stable hips were referred for examination in an authorised paediatric hospital.

The statistical data analysis was done using the following methods: chi-square test, one-way ANOVA and multifactor ANOVA. The accepted levels of significance were 0.05 for statistically significant and 0.01 for statistically high significant results.

RESULTS

The research involved 2045 babies (4090 hips). The average patient's age was 34.04 gestation weeks, with an average body weight of 2067.13 g on delivery and 2518.38 g on examination. There were 1141 male babies (2282 hips), and 904 female (1808 hips). The difference in sex was not statistically significant ($p>0.05$) (Table 2). One thousand six hundred and eighty-nine babies were premature (3396 hips, 83.03% of all babies), and 347 babies were born at full term (694 hips, 16.97%). Difference in the frequencies of premature and term babies was highly statistically significant in favour of premature babies ($\chi^2=18.24$; $p<0.01$), certainly due to the institution profile (Table 3).

Table 2. Distribution of the examinees by sex and delivery terms

Sex	Delivery term		Total
	Preterm	Term	
Male	918 (54.06%)	223 (64.27%)	1141 (55.8%)
Female	780 (45.94%)	124 (35.73%)	904 (44.2%)
Total	1698 (100%)	347 (100%)	2045 (100%)

The average age of the premature babies was 32.94 weeks. The average body mass on delivery was 1840.42 g, and 2427.52 g on examination. The premature male babies amounted to 918 (54.06%), and female 780 (45.94%) among all examined 1698 babies. By the method of single-factor analysis of variance, individually, by gestation weeks, it was found that the difference by sex among the premature babies was not statistically significant. ($F=5.276$; $p>0.05$).

Using a method of „a priori probability", the female babies were born premature with the probability of 86.3%, and for the male ones the probability of premature birth was 80.5%.

Out of 347 examined term-born babies, the average gestation period was 39.43 weeks. The average birthweight was 3178.72 g, and 3334.28 g on examination. Of these, 223 were boys (64.27%) and 124 were girls (35.74%) (Table 4). There were significantly more boys than girls ($p<0.01$). Using the method of a single-factor analysis of variance (ANOVA), individually, by gestation weeks, it was found that the difference of male/female frequencies in this group of term examinees was not statistically significant ($F=5.276$; $p>0.05$). By the method of intergroup differences, it was found that among those born between 38 and 40 weeks, male sex dominated by more than 65%, but among those born between 41 and 42 weeks, female sex predominated. The difference was statistically significant ($F=5.283$; $p<0.05$).

The frequency of unstable hips in the whole sample (all examined babies) was 3.2%. The frequency of unstable hip in the male examinees was 1.88%, while among the female examinees it was 4.87%, with statistically significant difference in favour of female babies ($p<0.05$) (Table 5).

The frequency of unstable hips among the premature examinees was 2.56%. The frequency of unstable hips among the pre-term males was 1.42%, and females 3.91%, and the difference was not statistically significant ($p>0.05$) (Table 6).

Table 4. Distribution of the term examinees by sex and gestation maturity

Sex	Gestation weeks					Total
	38	39	40	41	42	
Male	65	35	105	13	5	223 (64.27%)
Female	34	18	48	17	7	124 (35.73%)
Total	99	53	153	30	12	347 (100%)

Table 5. Distribution of the examinees according to Graf types of hips and by sex

Sex	Hip type		Total
	Stable hips (type Ia, Ib, IIa+, IIa-, IIb)	Unstable hips (type IIc, IId, IIIa, IIIb, IV)	
Male	2243 (56.66%)	43 (32.82%)	2282 (55.8%)
Female	1716 (43.34%)	88 (67.18%)	1808 (44.2%)
Total	3959 (100%)	131 (100%)	4090 (100%)

Table 3. Distribution of pre-term examinees by sex and gestation maturity

Sex	Gestation weeks														Total
	24	25	26	27	28	29	30	31	32	33	34	35	36	37	
Male	0	1	3	16	45	41	62	82	109	113	135	138	114	59	918
Female	1	0	9	13	37	40	58	76	89	92	121	108	85	51	780
Total	1	2	12	29	82	81	120	158	198	205	256	246	199	110	1698

The sample of premature babies was then divided into individual groups by the respective gestation age and type of the hip. Within every gestation week, by the method of variance analysis for proportions, the male/female ratio was ranked according to the respective hip category. For any single gestation week, the difference in male/female ratio was not statistically significant (p>0.05) (Table 7). Consequently, there was no correlation between gestation maturity neither of premature babies nor of the sex for any type of hips according to Graf.

The frequency of unstable hips among the term examinees was 6.34%; in males it was 3.78%, and in females 3.91%, without statistically significant difference (p>0.05) (Table 8).

The sample of term-born babies was also divided into single groups according to their gestation age and the type of hips, in the same manner as described previously; on the first examination altogether 347 babies were involved (694 hips). For any single gestation week the difference in frequency was not statistically significant (p>0.05). In this examinees group, the sex of the child had no particular influence on the hip stability (type of hip by Graf), there was no correlation between gestation maturity and the patient's age for each type of hip by Graf.

Among 347 term-babies (694 hips), on the first examination 650 stable (93.66%) and 44 unstable hips (6.34%) were found. In the group of stable hips there were 307 (47.23%) mature hips and 343 (52.77%) immature ones (Table 9).

Analysing the whole sample (both premature and term-born babies), 96.8% babies had stable hips (mature stable hip, type Ia and Ib, had 35.21% and immature stable hip IIa+, IIa- and IIb, had 61.59%). Unstable hips (IIc, IId, IIIa, IIIb and IV) had 3.2% babies. Premature babies had 97.4% stable hips (mature 33.35% and 64.05% immature) and 2.6% unstable hips. The stable hips were present in 93.66% term babies (44.24% mature and 49.42% immature) and unstable in the remaining ones 6.34% (Table 10).

Besides, we made additional significant observations concerning the delivery type in babies born by breech delivery and Caesarean section. Among 183 babies (366 hips) with pelvic position, there were 95 males (190 hips), and 88 females (176 hips). Among the males there were 3 unstable hips (1.58%), while among the females there were as many as 18 unstable hips (10.23%). According to sex

Table 6. Distribution of the pre-term examinees according to Graf types of hips and by sex

Sex	Hip type		Total
	Stable hips (type Ia, Ib, IIa+, IIa-, IIb)	Unstable hips (type IIc, IId, IIIa, IIIb, IV)	
Male	1810 (54.7%)	26 (29.89%)	1836 (54.06%)
Female	1499 (45.3%)	61 (70.12%)	1560 (45.94%)
Total	3309 (100%)	87 (100%)	3396 (100%)

Table 8. Distribution of the term examinees according to Graf hip type and by sex

Sex	Hip type		Total
	Stable hips (type Ia, Ib, IIa+, IIa-, IIb)	Unstable hips (type IIc, IId, IIIa, IIIb, IV)	
Male	433 (66.62%)	17 (38.64%)	450 (64.84%)
Female	217 (33.38%)	27 (61.36%)	244 (35.16%)
Total	650 (100%)	44 (100%)	694 (100%)

Table 7. Distribution of the pre-term examinees according to Graf hip types, sex and gestation week (GW)

GW	Sex	Hip type according to Graf									
		Ia	Ib	IIa+	IIa-	IIb	IIc	IId	IIIa	IIIb	IV
24	M										
	F			2							
25	M				2						
	F										
26	M		2			4					
	F				2	15					1
27	M	10	6	2	4	10					
	F	4	2	6		14					
28	M	13	13	14	20	28	2				
	F	10	8	10	14	32					
29	M	23	5	12	22	20					
	F	14	14	14	22	14	2				
30	M	21	20	14	41	26	2				
	F	27	9	22	36	20	2				
31	M	17	14	64	50	18		1			
	F	22	31	36	49	14					
32	M	51	27	69	58	10	3				
	F	20	15	55	65	12	11				
33	M	57	21	96	42	6	4				
	F	56	15	68	31	11	3				
34	M	60	34	127	36	10	2			1	
	F	50	30	108	40	2	12				
35	M	61	36	137	34	4	3	1			
	F	61	16	110	18	4	7				
36	M	75	31	106	10	2	2	2			
	F	35	24	88	10	2	11				
37	M	30	10	67	8		3				
	F	22	11	49	6	2	12				
Total		739	394	1276	620	280	81	4		1	1

Table 9. Distribution of the term examinees according to Graf type of hip, sex and gestation age (in gestation weeks – GW)

GW	Sex	Hip type according to Graf									
		Ia	Ib	IIa+	IIa-	IIb	IIc	IId	IIIa	IIIb	IV
38	M	30	21	69	5	2	3				
	F	18	2	37	4		5	2			
39	M	30	9	24	2		5				
	F	12	2	19	2		1				
40	M	72	39	82	10	4	7				
	F	27	8	39	6		4	5	1	1	1
41	M	18		7			1				
	F	6	4	19			4	1			
42	M	2	2	5			1				
	F	3	2	7			2				
Total		218	89	308	29	6	33	8	1	1	1

Table 10. Distribution of frequency of hip types according to Graf

Hip type	Term	Preterm	Total
I a	31.41%	21.76%	23.4%
I b	12.82%	11.6%	11.81%
Σ type I	44.24%	33.36%	35.21%
II a+	44.38%	37.55%	38.73%
II a -	4.18%	18.26%	15.87%
II b	0.87%	8.25%	6.99%
Σ type IIa,b	49.42%	64.06%	61.59%
Σ type I-IIa,b	93.66%	97.42%	96.8%
II c	4.76%	2.39%	2.79%
II d	1.15%	0.12%	0.29%
III a	0.14%	0%	0.02%
III b	0.14%	0.03%	0.05%
IV	0.14%	0.03%	0.05%
Σ type IIc-IV	6.34%	2.56%	3.2%
Σ type I-IV	100%	100%	100%

Table 11. Distribution of examinees' hips born by breech delivery, according to sex and Graf hip type

Sex	Hip type		Total
	Stable hips	Unstable hips	
Male	187 (98.42%)	3 (1.58%)	190 (100%)
Female	158 (89.77%)	18 (10.23%)	176 (100%)
Total	345 (94.26%)	21 (5.74%)	366 (100%)

among the babies from pregnancies with breech delivery, the difference in the frequency of unstable hips was highly statistically significant, with the prevalence of an unstable hip in females at the 6:1 ratio (χ^2=26.1; p<0.01) (Table 11).

Among 183 babies from pregnancies with breech position, there were 164 premature babies (328 hips, 89.62%), representing 9.66% of all premature babies, while 19 (38 hips, 10.38%) were born in term, representing 5.48% of all term babies. The difference in the number of premature babies from breech presentation in comparison to the term ones was highly statistically significant (χ^2=14.5; p<0.01).

Among the babies with pelvic presentation, the frequency of unstable hip in premature babies was 4.88% (16 hips) and in term-born babies it was 13.16% (5 hips). The difference was not statistically significant (χ^2=2.94; p>0.05).

The frequency of unstable hips among the babies born by Caesarean section was 2.38%. There was an exceptionally high percentage of unstable hips in babies born by Caesarean section during the period between the 32nd and the 34th gestation week (13.33%), in comparison to the babies born „per vias naturalis" (2.22%).

DISCUSSION

In Serbia ultrasound examination of all babies' hips is obligatory within the first three months of age, with a tendency to organise the primary sonoscreening in maternity hospitals [11, 12]. In the region of Vojvodina, the concept of primary (in neonates) and secondary sonoscreening (in infants) has been almost completely implemented [12]. Vukašinović [11] and Pajić [12] state that primary sonoscreening is imposed by the fact that treatment started early offers the best results; if the treatment starts within the first week of life, the hip type IIc will restore to normal after 3.9 months, the hip type IId after 4.5 months and the hip type III after 4.9 months of treatment [11, 12]. The secondary sonoscreening of DDH has been introduced, because the evolution from a stable to an unstable hip is also possible [18-22]. The evolution of type I into the type IIb has been observed by Pajić in 1% of hips, by Garner in 0.07% and by Rosendhal in 0.066% cases [12]. According to Graf, the hip type IIa- also belongs to the "risky hip" group, because 88.5% of them become decentralized, while the hip type IIb is considered as conditionally pathological due to the persistence or progression of the acetabular dysplasia [12].

Shuler says that owing to ultrasound screening 80% of unstable hips could undergo healing from the first week of life [12].

Paner, Rossak and Rosendhal are supporters of the screening of DDH, because cases with a late diagnosis of dislocation require early operative treatment [12, 23]. Ultrasonographic screening will not make this problem disappear, but will significantly contribute to an early application of conservative or surgical treatment [23].

According to Clarke, sonoscreening of DDH is obligatory at least for high risk newborns [12].

Godward and Dezateux [24] state that in Britain 70% of children with DDH operated on for the first time before 5 years of age have failed to be diagnosed within the first months of life in spite of the clinical screening of newborns. On behalf of the DDH Workgroup, they suggest that basic social insurance system should include primary ultrasonographic hip screening.

Screening for DDH during a four year period at the Institute of Neonatology in Belgrade included 2045 babies with average gestation age of 34.04 weeks, an average birthweight of 2067.13 g, and on examination of 2581.38 g. There were 1141 boys (55.8%) and 904 girls (44.2%). Of these, 1698 (83.03%) were prematures and 347 (16.97%) term-born babies. The difference in the number of male and female cases was not significant, but the difference in the frequency of premature and term-born babies was statistically highly significant due to the institution profile. The frequency of unstable hips was 3.2% (131 hips). This is a rather high frequency, but still in compliance with other authors' data, which can be explained by a great number of high risk pregnancies, pregnancies with embryonic malposition (8.95%) and multiple pregnancies, and by the demographic diversity of patients.

In an analysis of about 100,000 hips examined by authors from different regions worldwide, the observed frequency of DDH is between 0.57 and 3% [12]. During the ultrasonographic screening of DDH in Vojvodina lasting for several years, Pajić estimated that the frequency was 2.3%, with an increasing tendency to 2.82% due to the migration of the population from the so-called DDH endemic regions of former Yugoslavia.

According to Vukašinović [11], the frequency of DDH in newborns and infants in Belgrade is 2.4%.

Matasović [25] reports that the frequency of DDH in Croatia is 4.1%.

Tuncay et al. [16], examined 432 premature and 1160 term-born babies, with risk factors similar to those found in our examinees, and found that treatment was required for 3.24% premature and 3.02% term-born examinees, which mostly corresponds to our results. In his study, Rosendhal et al. [23] found that 3% of newborn babies had hip dysplasia.

Among 2045 babies in our study, there were 96.8% stable hips (3959), and of those 35.21% represented mature stable hips (type Ia 23.4% and type Ib 11.81%). Among our examinees, a mature stable hip was detected more rarely comparing to literature data, ranging from 25.34% (Mellerowich) to 84.36% (Pauer), most often between 60% and 80% [12]. Immature stable hips accounted for 61.59% (type IIa+ 38.73%, type IIa- 15.87% and type IIb 6.99%), while their frequency reported in literature ranged between 13.7% and 73.9% [12].

The peculiarity of our sample (higher percentage of premature babies, statistically highly significant) is evidenced by a significant incidence of immature stabile hips (types IIa+, IIa-, IIb), which are susceptible to decentration.

Out of 131 unstable hips found in our study, 2.7% were classified as type IIc, 0.29% as type IId, 0.02% as type IIIa, 0.05% as type IIIb and 0.05% as type IV. The distribution of the frequency of hips with instability and luxation was in accordance with literature data (Oberthaler, Tonnis, Konermann) [12]. Forty-three unstable hips (1.88%) were found in male examinees and 88 unstable hips (4.87%) in female examinees. The difference in the frequency of unstable hips was statistically important in favour of females.

There were 1698 (83.03%) premature babies in the examined group. Their average gestation age was 32.94 weeks, average birth-weight 1840.42 g, and on examination 2427.52 g. Among them, 918 (54.06%) were boys and 780 (45.94%) girls; the male/female ratio was not statistically significant. The frequency of unstable hips in premature babies was 2.56%; statistically significantly lower than the frequency in the term babies group (6.34%). This finding is another confirmation of the current concept of DDH etiopathogenesis, stating that this disturbance appears during the last few weeks of foetal development under the influence of the intrauterine mechanical factors (the shape of uterus, luxation provoking fetal position, multiple pregnancy, reduced quantity of embryonic water, increased body mass of fetus), which exert pressure onto the femoral greater trochanter, thus destabilizing it easily from its relation to the inheritably predisposed dysplastic acetabulum [11, 12].

There were 87 (2.56%) unstable hips, with 81 (93.1%) of them classified as type IIc; 4 hips (4.6%) as type IId and one hip (1.15%) classified as type IIIb and type IV each. No hips of the type IIIa were found. The frequencies of stable immature hips with the type IIa- (decentralized) and type IIb (risky), and unstable hips type IIc (critical) demonstrated vulnerability of hips of premature babies as well as the need for an early diagnosis, careful regular examination and early therapy. The difference in unstable hips frequency by sex in the group of premature babies was not statistically significant. The difference in sex did not influence the prediction of hip evolution in babies of the same gestation maturity. Langer and Kaufman found a high frequency of hips type Ib and IIa in premature babies, in contrast to our findings [15]. Also, a high frequency of the type IIa was found by Bick and his associates (7%), and Amato with associates (10%) [19, 20].

There were 347 term babies (16.97% of total 2045) with average gestation age 39.43 weeks, average body mass 3178.82 g on birth and 3334.28 g on the first hip examination. There were 225 boys (64.84%), and 122 girls (35.16%). The difference of frequency according to sex was statistically significant in favour of male babies. 44 (6.34%) unstable hips were found, without significant difference between male and female. Term-born babies had as many as 44 unstable hips (35.59% of 131), because of a very high frequency of babies with breech delivery (13.16%).

Out of 2045 examined babies, 183 (8.95%) were born by breech delivery. The rate of unstable hips in 5.74% of these babies was highly significant statistically compared to the frequency found in the remaining 1862 babies, equalling 2.95%. The difference of unstable hip frequencies in female and male babies within this group was also statistically highly significant, with the ratio of 6:1 in favour of females. The proposed explanation for this difference is that female newborns are especially sensitive to the mother's hormone relaxine which increases hip instability [26]. The frequency of unstable hips in our sample among babies with breech delivery was 4.88% for premature and 13.16% for term-born babies.

The most important was the real breech position with flexion of fetal hips and extension of the knees - „luxation provoking position" [11].

Although preterm delivery or breech births are not absolute indications for Caesarean section [27], it has still been done in a significant percentage after 32nd gestation week, and most often between 35th and 37th gestation week. The frequency of unstable hips among babies born by Caesarean section was 2.38%.

CONCLUSION

Based on the results of our study, we can offer some recommendations:

- We are obliged to perform a complete physical examination of all babies, including premature babies, regardless of the seriousness of their clinical condition, for DDH screening.
- Clinical screening of DDH is insufficient for an early diagnosis and decision about the treatment of premature babies.
- The high frequency of unstable hip type IIc (risky) and IId (decentralized) in premature babies requires early diagnosis and therapy.
- If primary and secondary clinical and ultrasonographic DDH screenings are applied, it is still reasonable to apply wide diapering during the period of hip maturation. For premature babies wide diapering is reasonable at least up to eight months of age.
- Gentle manipulation is necessary while treating and conducting physical therapy of a premature baby.

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Утиче ли гестациона зрелост новорођенчета на ултразвучно процењену зрелост кукова?

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КРАТАК САДРЖАЈ

Увод Ултрасонографија кукова новорођенчади стање кука дефинише на основу морфолошких елемената и мерења углова ацетабулума, разликујући на тај начин стабилне и нестабилне кукове. Метода је у многим срединама прихваћена, било као метода прегледа ризичне новорођенчади, или као метода систематског прегледа.

Циљ рада Циљ рада је био да се испита корелација ултразвучно процењене зрелости кукова са гестационом зрелошћу код превремено и термински рођене деце и укаже на специфичне елементе зрелости кукова код деце рођене карличном презентацијом или царским резом.

Методе рада Истраживање је обухватило 2.045 пацијената (1.141 дечак и 904 девојчице) Института за неонатологију у Београду током петогодишњег периода. Просечан узраст испитаника био је 34,04 гестационе недеље. Било је статистички значајно више превремено рођене (1.698 деце или 83,03%) него деце рођене у термину (347 деце или 16,97%). Примењена је скрининг-метода према Графу, уз клинички преглед. Резултати су анализирани одговарајућим статистичким методама (χ^2-тест, једнофакторска *ANOVA*, мултифакторска *ANOVA*).

Резултати Учесталост нестабилних кукова била је 3,2% – 1,88% код дечака и 4,87% код девојчица (p<0,05). Од 96,8% деце са стабилним куковима, 35,21% су чинила новорођенчад рођена у термину, а 61,59% превремено рођена деца. Карлична презентација на рођењу забележена је код 183 пацијента, међу којима је нестабилност зглоба кука установљена код 1,58% дечака и 10,23% девојчица.

Закључак Клинички скрининг развојног поремећаја кука није довољан за рано постављање дијагнозе и одлуку о лечењу код превремено рођене деце. Висока учесталост нестабилног кука типа *IIc* (ризичан) и *IId* (децентрирајући) код превремено рођене деце захтева рану дијагнозу и терапију. За превремено рођено дете широко повијање је оправдано бар до осам месеци по рођењу. Неопходна је нежна манипулација током неге и физикалне терапије превремено рођеног детета.

Кључне речи: порођај; прематурус; ултразвук; зглоб кука

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