DEVELOPMENT OF SCORING SYSTEM FOR EVALUATING THE RISK OF CEPHALOPELVIC DISPROPORTION

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ABSTRACT*:*
CEPHALOPELVIC DISPROPORTION IS AN IMBALANCE BETWEEN THE DIMENSIONS OF THE FETAL CRANIUM AND MATERNAL PELVIS THAT PREVENTS OPTIMAL DESCENT OF THE FETUS THROUGH THE PELVI-GENITAL CANAL. EVALUATING THE RISK OF CEPHALOPELVIC DISPROPORTION IS ESSENTIAL IN ORDER TO DECREASE BOTH MATERNAL AND FETAL MORBIDITY.
WE EVALUATED 80 PATIENTS WHO DELIVERED IN THE DEPARTMENT OF OBSTETRICS AND GYNECOLOGY OF UNIVERSITY EMERGENCY HOSPITAL BUCHAREST. THE PATIENTS WERE DIVIDED INTO TWO GROUPS. IN GROUP A WE ENROLLED 40 PATIENTS THAT WERE DIAGNOSED WITH CEPHALOPELVIC DISPROPORTION AND THE FETUS WAS EXTRACTED BY CESAREAN SECTION. IN GROUP B WE INCLUDED 50 PATIENTS WITH RISK FACTORS FOR CEPHALOPELVIC DISPROPORTION WHO DELIVERED VAGINALLY. THE MATERNAL RISK FACTORS FOR CEPHALOPELVIC DISPROPORTION (AGE, HEIGHT, WEIGHT AND WEIGHT GAIN DURING PREGNANCY) WERE ANALYZED AND COMPARED BETWEEN THE TWO GROUPS
WE DEVELOPED A SCORING SYSTEM THAT ALLOWS AN EARLY RISK ASSESSMENT OF CEPHALOPELVIC DISPROPORTION, FACILITATING DIAGNOSIS AND PROPER MANAGEMENT OF THESE PATIENTS.

KEY WORDS: CEPHALOPELVIC DISPROPORTION, SCORING SYSTEM, AGE, WEIGHT, HEIGHT, WEIGHT GAIN DURING PREGNANCY

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INTRODUCTION

Dystocia is defined as difficult labor that requires in most cases the extraction of the fetus by Cesarean section[1,6,7]. The cause of dystocic labor is either anatomic – cepahalopelvic disproportion or functional – anomalies of uterine contraction[1,6,7,14].

Cephalopelvic disproportion is an imbalance between the dimensions of the fetal cranium and maternal pelvis that prevents optimal descent of the fetus through the pelvi-genital canal[5,6,10,12,14,16,17].

Due to lifestyle changes the incidence of voluminous and macrosome fetuses is increasing, and especially in the group of primiparous patients cephalopelvic disproportion is one of the most frequent indications for extracting the fetus by Cesarean section [2-4,8,11,12,14].

Cepaholopelvic disproportion is a major public health condition with potentially critical consequences for both mother and fetus [3,8,12] . Numerous studies have detected risk factors for cephalopelvic disproportion that can be easily evaluated during the admission of the patient in the delivery room : maternal - height, weight, age, weight gain during pregnancy and parity and fetal - estimated birth weight and pubis-fundal height)[9,10-13,15,17].

However, in Romania, a protocol for early risk assessment of cephalopelvic disproportion has not yet been elaborated.

This study was undertaken in order to develop a scoring system for early risk assessment of cephalopelvic disproportion.

MATERIALS AND METHODS

We prospectively evaluated 80 patients with risk factors for cephalopelvic disproportion, who delivered in the Department of Obstetrics and Gynecology of University Emergency Hospital Bucharest, following the subsequent inclusion/exclusion criteria:

- inclusion criteria:
  - The age of the patient > 15 years-old, < 40 years-old
  - Singleton pregnancy
  - Gestational age > 37 weeks of gestation
  - Spontaneous onset of labor
  - Cervical dilatation at admission in the delivery room </= 4 cm
  - The patient monitored in the hospital at least 4 hours
- exclusion criteria:
  - Patients with pregnancy induced hypertension
  - Patients with fever or suspected chorioamiotitis
  - Patients who received antibiotics in the last 3 days
  - Dead fetus
  - Spontaneously ruptured amniotic membranes > 4 hours before the admission in the delivery room

The patients were divided into two groups. In group A we enrolled 40 patients that were diagnosed with cephalopelvic disproportion and the fetus was extracted by Cesarean section. In group B we included 50 patients with risk factors for cepaholopelvic disproportion who delivered vaginally.

The maternal risk factors for cephalopelvic disproportion (age, height, weight, weight gain during pregnancy) were analyzed and compared between the two groups. All analyses were conducted using the SPSS version 19. p-value <0.05 was considered statistically significant.

RESULTS

We evaluated and compared for all the patients enrolled in the study and between the two formed groups the maternal age, height, weight and weight gain during pregnancy (see Table 1.).

	Group A	Group B	Total
Age (Years)			
Mean ± standard deviation	27.35 ± 7.87	26.65 ± 5.22	27 ± 6.64
Minim/Maxim	16/39	16/39	16/39
Height (centimeters)			
Mean ± standard deviation	162.63 ± 5.77	166.55 ± 4.64	164.59 ± 5.57
Minim/Maxim	145/172	155/175	145/175
Weight (kilograms)			
Mean ± standard deviation	80.55 ± 10.50	75.28 ± 8.05	77.91 ± 9.67
Minim/Maxim	59/109	61/91	59/109
Weight gain during pregnancy (kilograms)			
Mean ± standard deviation	19.25 ± 4.97	14.23 ± 4.42	16.74 ± 5.31
Minim/Maxim	9/30	7/24	7/30

Table 1. – Descriptive analysis of the risk factors for cephalopelvic disproportion between groups A and B

Following the descriptive analysis of the patients enrolled in the study, we decided to assort each risk factor for cephalopelvic disproportion into 3 arbitrary categories.

Patients from both groups were distributed into 3 categories according to maternal age (see Figure 1. and Figure 2.):

- I category: age between 16 and 20 years-old
- II category: age between 21 and 30 years-old
- III category: age between 31 and 39 years-old

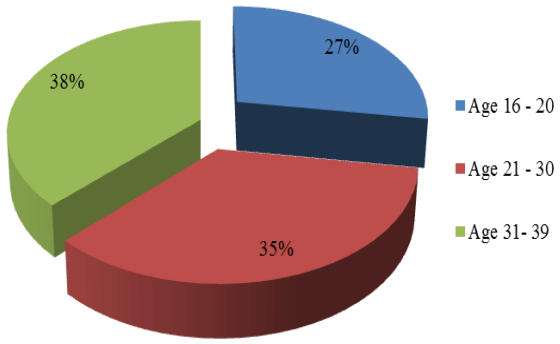

Figure 1. The distribution of patients in group A according to maternal age

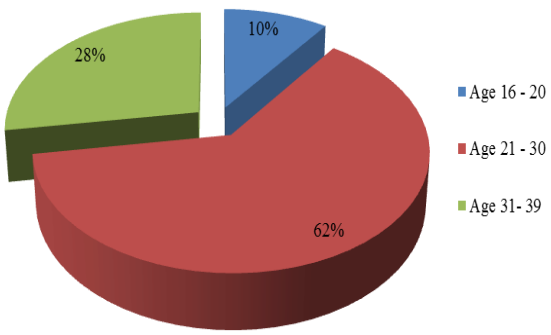

Figure 2. The distribution of patients in group B according to maternal age

Patients from both groups were distributed into 3 categories according to maternal weight (see Figure 3. and Figure 4.):

- I category: weight < 70 kilograms
- II category: weight between 71 and 85 kilograms
- III category: weight > 86 kilograms

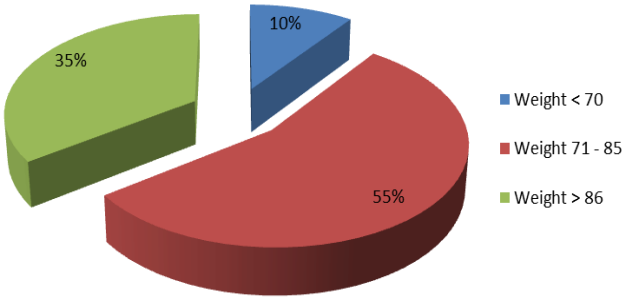

Figure 3. The distribution of patients in group A according to maternal weight

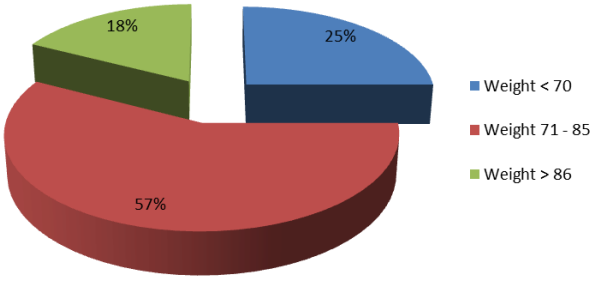

Figure 4. The distribution of patients in group B according to maternal weight

Patients from both groups were distributed into 3 categories according to maternal height (see Figure 5. and Figure 6.):

- I category: height < 159 centimeters
- II category: height between 160 and 169 centimeters
- III category: height > 170 centimeters

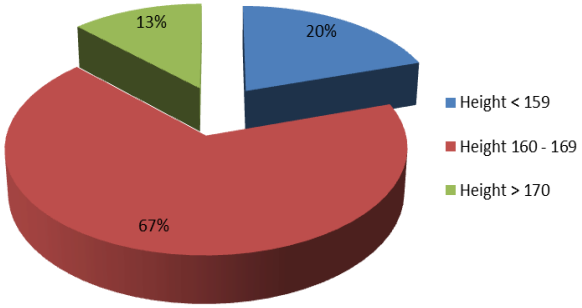

Figure 5. The distribution of patients in group A according to maternal height

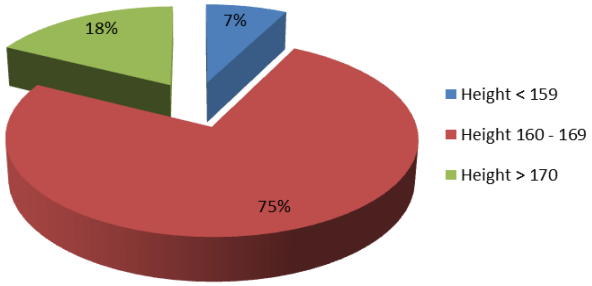

Figure 6. The distribution of patients in group B according to maternal height

Patients from both groups were distributed into 3 categories according to maternal weight gain during preganancy (see Figure 7. and Figure 8.):

- I category: weight gain during pregnancy < 15 kilograms
- II category: weight gain during pregnancy between 16 and 20 kilograms
- III category: weight gain during pregnancy > 21 kilograms

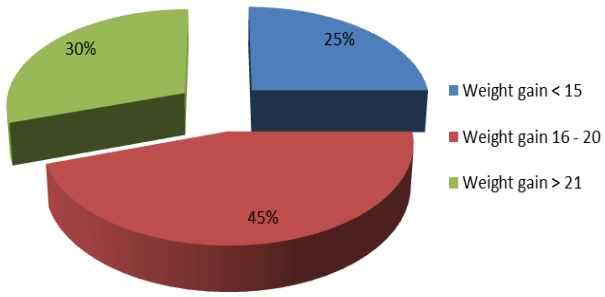

Figure 7. The distribution of patients in group A according to maternal weight gain during pregnancy

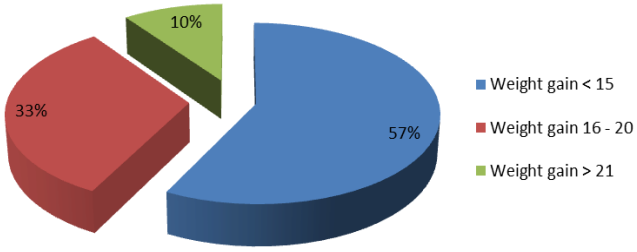

Figure 8. The distribution of patients in group B according to maternal weight gain during pregnancy

DISCUSSIONS

Analyzing the results of our study it is obvious that maternal age and weight gain during pregnancy are the risk factors with the highest impact of correlation with cephalopelvic disproportion. However, the previously demonstrated risk factors of cephalopelvic disproportion, maternal height and weight are not statistically significant in this study [9,10-13,15,17].

According to the results of this study we elaborated a scoring system for early risk assessment of cephalopelvic disproportion using maternal age, weight, height and weight gain during pregnancy (see Table 2).

Age (years)	Risk score	Height (centimeters)	Risk score	Weight (kilograms)	Risk score	Weight gain during pregnancy (kilograms)	Risk score
16 - 20	2	< 159	1	< 70	1	< 15	1
21 - 30	1	160 - 169	2	71 - 85	2	16 - 20	2
31- 39	3	> 170	3	> 86	3	> 21	3
The risk of cephalopelvic disproportion							
Low				4 - 6			
Medium				7 - 9			
High				10 – 12			

Table 2. – Scoring system for early risk assessment of cephalopelvic disproportion

We decided to develop a scoring system using only maternal age, height, weight and weight during pregnancy due to the fact that these parameters can be easily determined during the emergency admission of the patient in the delivery room. The scoring system assorts each patient in one of the three categories: low/medium/high risk of cephalopelvic disproportion.

CONCLUSION

Evaluating the risk of cephalopelvic disproportion is essential in order to decrease both maternal and fetal morbidity. The developed scoring system allows an early risk assessment of cephalopelvic disproportion, facilitating diagnosis and proper management of these patients.

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