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Paper Accepted*

ISSN Online 2406-0895

Original Article / Оригинални рад

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Breech presentation – maternal and neonatal outcomes and obstetric challenges

Карлична презентација плода – материални, неонатални исходи порођаја и акушерски изазови

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Received: July 3, 2023
Revised: April 24, 2024
Accepted: June 14, 2024
Online First: July 1, 2024
DOI: https://doi.org/10.2298/SARH230703051T

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SUMMARY

Introduction/Objective Breech presentation occurs in 3–4% singleton pregnancies at term and its management is still a controversial in obstetric practice.

The aim of this study was to determine the factors that indicate breech delivery management and to compare maternal and neonatal outcomes in vaginal breech delivery, planned Cesarean section and emergency C-section at the Hospital for Gynecology and Obstetrics of the Zemun Clinical Hospital Centre.

Methods This was a retrospective study conducted from 2015 to 2019. Depending on the mode of delivery patients were divided in three group. In the study we have analyzed maternal risk factors and postpartum complications, delivery details and neonatal characteristics and outcomes.

Results Study included 176 women with singleton fetus in breech presentation. The incidence of breech deliveries was 2.12%. Most common way of delivery was vaginal with 47.72%. In all three groups the majority of women were primiparous, at term, mostly without chronical and gestational diseases. Vaginal delivery was stimulated with oxytocin in 91.67% and as a help for delivery various maneuvers were used. Maternal mortality and short-term complications during hospitalization period were not reported in none of the groups. No significant difference in newborns birth weight between the groups was observed. The highest rate of birth injuries was in newborns from emergency C-section – 10%.

Conclusion The results of our study have shown that vaginal delivery could be a very safe option for both mother and newborn.

Keywords: breech presentation; vaginal delivery; cesarean section

САЖЕТАК

Увод/Циљ Карлична презентација плода се јавља у 3–4% једноплодних терминских трудноћа и начин завршавања порођаја код ње још увек представља контраверзу у акушерској пракси. Циљ ове студије био је да утврди факторе који су утицали на вођење и начин завршетка порођаја код карличне презентације плода и да упореди материалне и неонаталне исходе порођаја код вагиналног порођаја, планираног царског реза и хитног царског реза у Болници за гинекологију и акушерство Клиничког болничког центра „Земун“.

Методе Истраживање је спроведено по типу ретроспективне клиничке студије у периоду од 2015. до 2019. године. У зависности од начина завршетка порођаја породиље су биле подељене у три групе. У истраживању смо анализирали факторе ризика од стране мајке и њене постпарталне компликације, карактеристике порођаја и неонаталне исходе порођаја.

Резултати Истраживање је обухватило 176 жена са једноплодом трудноћом и фетусом у карличној презентацији. Учесталост порођаја са карличном презентацијом плода је била 2,12%. Најчешћи начин завршетка порођаја био је вагинални 47,72%. У све три испитиване групе најзаступљеније су биле првоторке, у термину, без хроничних обољења и гестоза. Вагинални порођај је био стимулисан окситоцином у 91,67% и као помоћ при порођају коришћени су различити маневри. Смртност мајке и краткорочне компликације током периода хоспитализације нису забележене ни у једној групи. Није примећена значајна разлика у тежини новорођенчеда између група. Највећа стопа порођајних повреда забележена је код новорођенчади рођених хитним царским резом – 10%.

Закључак Резултати нашег истраживања указују да би вагинални порођај могао да представља врло безбедну опцију и за мајку и новорођенче.

Кључне речи: карлична презентација; вагинални порођај; царски рез

INTRODUCTION

Breech presentation is defined as fetal presentation with the buttocks and/or feet entering the pelvis first, instead of the head. The incidence of breech presentation decreases with

gestational age and it occurs in 3–4% singleton pregnancies at term [1]. Depending on the position of the fetal legs, there are three main types of this presentation - Frank breech, complete breech and incomplete breech. The type of breech presentation has an impact on the course of labor and possible complications. There are several risk factors that prevent spontaneous positioning of the fetus to cephalic presentation and contribute to the occurrence of the breech presentation those included multiparity, uterine malformations, placenta praevia, prematurity, excessive amniotic fluid volume, macrosomia, fetal anomaly, previous breech presentation, fetal asphyxia, maternal anticonvulsant therapy, older maternal age [2]. The diagnosis of breech presentation is based on physical examination and ultrasound scan and it should include detailed information about the type of presentation, fetal head position, estimated fetal weight, amniotic fluid index, in order to make decision about the delivery management. Due to increased incidence of perinatal, neonatal and maternal morbidity and mortality compared to delivery in cephalic presentation, breech presentation and delivery are marked as high risk [3].

Over the years the management of breech delivery, vaginal or cesarean section, has caused many controversies in obstetric practice. After the publication of the Term Breech Trial in 2000, in the most countries the rate of vaginal breech delivery has significantly decreased and the cesarean birth is the preferred approach [1]. Recently, global concern about the high rate of cesarean section worldwide had an impact on rethinking of breech delivery management. Many international organizations and federations, including The International Federation of Gynecology and Obstetrics (FIGO), the Royal College of Obstetricians and Gynecologists (RCOG) and the Society of Obstetricians and Gynecologists of Canada (SOGC) support the vaginal breech birth [1].

The aim of this study was to determine the factors that indicate breech delivery management and to compare maternal and neonatal outcomes in vaginal breech delivery, planned Cesarean section and emergency Cesarean section.

METHODS

We conducted a retrospective clinical study that included women with a diagnosis of breech presentation, who were delivered in Hospital for Gynecology and Obstetrics, Zemun Clinical Hospital Centre from the 1st January 2015 to 31st December 2019. The study excluded women who had multiple gestation, intrauterine death and those with incomplete medical data. For data collection we used birth protocols and data from computer database. All procedures in the study were following the principles of the Declaration of Helsinki. The study was approved by Ethical committee of Zemun Clinical Hospital Center on 21st March 2023, with approval number 12/1.

Depending on the route of delivery patients were divided in three groups – vaginal delivery, planned Cesarean section (C-section) and emergency C-section. Indications for C-section were absolute and relative defined by Association of Scientific Medical Societies in Germany (AWMF) [4]. Absolute indications were absolute disproportion, chorioamnionitis, maternal pelvic deformity, eclampsia and HELLP syndrome, fetal asphyxia, umbilical cord prolapse, placenta previa, abnormal lie and presentation and uterine rupture. Relative indications included pathological cardiotocography, failure to progress labor and previous C-section [4].

In each of the groups the following characteristics were recorded and analyzed: 1. maternal characteristics: age, parity, mode of conception, mother's medical history and associated diseases, 2. delivery details: spontaneous or stimulated with oxytocin, use of peridural analgesia, total duration of labor, prelabor rupture of membrane (PROM), maneuvers

in vaginal breech delivery, episiotomy and perineal tear 3. neonatal characteristics and outcomes: gestational age at birth, birth weight, length, head circumference, umbilical cord wrapped around the neck, 1st and 5th minute Apgar-score, fetal complications as clavicle fracture, long bones fracture, brachial plexus injury, intracranial bleeding and need for intensive care unit 4. Maternal postpartum complications: severe hemorrhage immediately postpartum, thrombosis, embolism, complications due to pre-existing disease, infections (wound infection, urinary infection and endometriosis) and incontinence.

Obtained study data were analyzed statistically using SPSS (version 22, IBM). The categorical variables were stated as frequencies and percentages and quantitative variables as mean and standard deviation. ANOVA was used for comparation of numerical variables between followed groups. A two-sided *p*-value< 0.05 was defined as statistically significant. The results are presented in the tables.

RESULTS

Study included 176 women with singleton pregnancy, with fetus in breech presentation, who gave birth in Hospital for Gynecology and Obstetrics- Clinical Centre Zemun in the observed 5 years period. Total number of deliveries over the study period was 8291, with an incidence of 2.12% of breech deliveries. Depending on the mode of delivery, patients were divided in three groups. First group included 84 women (47.72%) with breech presentation who had vaginal delivery, both spontaneously and stimulated with oxytocin. Second group included 42 women (23.86%) with breech presentation who had had elective C-section. Third group included 50 women (28.42%) breech presentation who had an emergency C-section.

Mean age of women in study was 30.79 ± 5.59 years, with age range 17–45 years. Using ANOVA, it was determined that age does not affect significantly the type of delivery (p = 1.477) (Table 1.). In all three group the majority of them were primiparous women with 39 of

them (46.4%) in the first group, 25 (59.5%) in the second and 36 (72%) in the third group (see Table 1.). The number of women with second pregnancy in first group was 26 (31%), in the second group 12 (28.6%) and 10 (20%) in last group, while the number of the multiparous women, with 3 and more pregnancies was decreasing between groups- 18 in group 1 (21.4%), 5 (11.9%) in group 2 and 4 in group 3 (8%). Common for all three groups was that the pregnancy has occurred spontaneously. In terms of maternal comorbidities, in the first group none of the women suffered from any chronic or gestational disease. In the second group in 5 women following diseases were reported – 2 women had gestational diabetes, 2 gestational hypertension and 1 myopia and hypothyroidism in pregnancy. In the third group also in 5 women gestational diseases were reported – 2 preeclampsia, 2 gestational hypertension and 1 gestational diabetes (Table 1.).

At the time of delivery almost all women were at term 172 (97.7%). Women who gave birth vaginally were average at 38.75 ± 1.1 gestational week and there were 2 women in this group who were preterm, both 35 weeks. In the planned C-section group average gestation was 39.17±1.1 weeks and there were not preterm births, but there were 6 post term - 41 weeks. In the emergency C-section group average gestation was 38.9±1.16 weeks, there were 2 preterm deliveries at 36 weeks and 4 post term at 41 weeks (see Table 1.). The gestational age did not affect the way of ending childbirth (ANOVA, p = 1.93).

In the vaginal delivery group in most women, 80 of them, labor started spontaneously, two were hospitalized due to premature rupture of membranes (PROM), one was diagnosed with a partial placental abruption and one with an intrauterine growth restriction (IUGR) (see Table 1.). Vaginal delivery was mostly stimulated with oxytocin in 77 women (91.67%) and in 7 women, who were all multipara and came to hospital with cervical dilatation more than 6 centimeters, labor occurred natural without and stimulation. Only two women had a peridural analgesia. For completing delivery manual assistance was used and in most cases by Bracht in

70 women (83.3%), 12 (14.3%) Smellie-Veit and 2 (2.4%) Müller. Episiotomy was performed in 68 women (80.95%) and two of them had the first-degree perineum tear and one cervical rupture. Only first-degree perineum tear was reported in 4 women (4.75 %). Due to an adherent placenta in one women manual exploration of uterine cavity was performed (see Table 2.). There were no cases of instrumental deliveries, instrumental revision of uterine cavity and perineal tear degree III and IV. The average time of total labor duration was 3 hours and 45 minutes. During hospitalization period, women who had vaginal delivery, did not had any short- term complications such as postpartum hemorrhage, infection, thromboembolic or other complications (see Table 1.).

In the group of women who had elective C-section indications were: in 9 (21.4%) a previous operation on uterus i.e., a previous c-section i.e., a myomectomy, 6 (14.3%) fetal macrosomia,6 (14.3%) post term pregnancy, 5 (11.9%) cephalopelvic disproportion, 5(9.5%) uterine myomas, 5 (9.5%) oligohydramnios, 5 (9.5 %) advanced maternal age and in one intervertebral disc operation (see Table 1.). Mean duration of labor in this group was 45 minutes. In women who undergone an elective C-section, maternal mortality and complications in postoperative hospitalization period were not reported (see Table 1.).

Speaking about an emergency C-section indication we divided women in two subgroups. First subgroup, 19 of them (38%), were the ones whose labor started spontaneously as a vaginal delivery stimulated with Oxytocin and afterwards due to stasis in dilatation phase in 14 and threatened fetal asphyxia in 5 operative management of labor was necessary. For the rest, 31 of women with emergency C-section indications were: 1. in 13 women PROM associated with other conditions such as - 5 threatened fetal asphyxia, 3 previous uterine operation, 3 IUGR, uterine myomas, 1 preterm birth and in 1 gestational diabetes, 2. in 7 oligohydramnios, 3. in 3 post term pregnancy, 4. severe preeclampsia (Table 1.). Average labor duration in this group was 1 hour and 26 minutes, because in some of the women the labor started spontaneously. In

this group maternal mortality and short-term complications during postoperative hospitalization period were not reported (Table 1.).

Results related to newborns showed that the average body weight of babies from vaginal delivery were weight 3077.85 grams, length 51.65 cm and head circumference 34.75 cm, in planned C-section it was 3562 grams, length 53 cm and head circumference 36.4 cm and in newborns from the emergency C-section weight was 3115 grams, length 51.6 cm and head circumference 35cm (Table 1.). There was no statistically significant difference in newborns birth weight between the groups ($p > 0.005$). In all three groups the mean APGAR score in first minute was 9 and in the fifth minute it was 10 (Table 1.). Although in one newborn from vaginal birth APGAR score was 3/5 and in two newborns from emergency C -section was 5/7, all of them had recovered and were stable in 10^{th} minute of life. The umbilical cord wrapped around the neck was noticed in 12 (14%) of newborns from vaginal, in 6 (14.2%) from elective C-section births and in 11 (22%) of babies from emergency C-section. Birth complications were present in 3 newborns vaginal delivery group and they were perinatal asphyxia and respiratory distress syndrome, intracranial hemorrhage and a clavicle fracture (Table 1.). Neonatal birth complications in emergency C-section group were present in 6 (10%) babies and they were - respiratory distress syndrome in 3 newborns, brain infection, intracranial hemorrhage and paresis of brachial plexus (Table 1.).

DISSCUSION

The incidence of breech deliveries over the 5 years observed study period was about 2-3%, which is in accordance with incidence worldwide [1]. During the last decades overall rate of C-section has significantly increased, which is followed by an increase number of breech presentations escalating to C-section [5]. This has led to the loss of familiarity with vaginal breech delivery techniques and skills, especially in younger obstetricians, leaving the C-section

often as the only available option. Today there is a global concern about high caesarean rates worldwide and an urge to return to traditional obstetrics and vaginal delivery. Therefore, it is not surprising that lately there is more support for performing vaginal delivery in breech presentation. Nowadays, we have recommendations in this manner from the French College of Gynecologists and Obstetricians (CNGOF) and The American College of Obstetricians and Gynecologists (ACOG) [6, 7].

Results of our study showed that almost a half of a women had a vaginal delivery (47.72%) which was similar to results of some authors from Europe like France and Belgium, where the breech delivery was managed following the strict protocols. If we compare obtained results with other studies in Serbia, an increased rate of C-section is noticed in a period of five-year difference [8, 9]. The number of women undergoing vaginal breech delivery still remain high comparing to some other results both from Europe and worldwide where studies C-section rate of over 70% [1, 6, 7, 10, 11]. Almost all the women who had vaginal delivery were at term, healthy, with estimated birth weight less than 4000g, so they had no contraindications for vaginal delivery. In terms of parity, primiparous women were the most numerous in all three groups, but with the highest rate in emergency C-section group. Nulliparity is considered as a risk factor for failed vaginal labor and other authors also reported high rates in C-section groups [12]. In this study majority of women were stimulated with oxytocin, which other authors do not report and we had a rare use of epidural analgesia which is considered to be effective for women in vaginal birth [1, 2, 13, 14]. Our patients did not go under labor induction, which is one of the factors that adversely affects the outcome of vaginal birth [2, 14]. As a help for delivery of the fetal head Bracht's maneuver was used, while some other reported Smellie-Veit which was present with less than 15% in our study [15]. The percentage of performed episiotomy was over 80%, which could be considered as high due to opinion that it is something that should not be done in routine, but the variable data are found in literature [1, 14].

Nevertheless, in the study there were not instrumental deliveries such as outlet forceps for delivery of fetal head [15]. In the vaginal delivery group, there were no postpartum complications such as bleeding or infections, as well as a maternal death, which could be seen as a very good indicator of a safe delivery [16]. The newborns from vaginal birth at average 9/10 APGAR score and majority of them was without any injuries and did not need access to intensive unite care, also there was not recorded fetal or neonatal deaths [3]. Fetal birth asphyxia was less frequent in vaginal delivery than in emergency C-section [17].

The elective C-section was the least common mode of delivery and it was performed in less than third of women (23.86%). Results of study showed that most frequent indication for C-section was previous uterine surgery, dominantly previous C-section. This is with accordance to similar studies, which confirms that primary C-section leads to next one, even when vaginal labor could be safe option [18]. For primiparous women, who were the most frequent in this group, indications were cephalopelvic disproportion, fetal macrosomia, post term pregnancy and oligohydramnios. Estimated birth weight over 3500g and post term pregnancy are found to be common indication for elective C-section, especially in primiparous like our patients [2, 17]. In none of the women the indication was just fetal malpresentation i.e., breech presentation or maternal choice [2, 5]. There were no maternal and neonatal complications recorded in elective C-section group, which is in accordance with the current evidence on short-term benefits for the mother and baby with this way of the breech delivery [7].

In the third of patients an emergency C-section was performed, which is more than the others have reported, mostly due to higher rate of planned CS as a safer option [1, 5]. The percentage of primiparous women in this group was the highest in compare to previous ones and most of them were at term pregnancies. We have noticed that in 40% of them the labor was planned as vaginal, but mostly due to statis in dilatation phase i.e. dysfunctional labor our due

to threatened fetal asphyxia it was finished operatively. Previously mentioned conditions and umbilical cord prolapse, which did not occur in our population, are found as ones that leads to emergency C-section [15]. Other indications were previous uterine operation, IUGR and uterine myomas and PROM. Although the most of newborns had a mean APGAR score 9/10, in this group we had a 10% of birth injuries and complications and they were - respiratory distress syndrome, brain infection, intracranial hemorrhage and paresis of brachial plexus. One of the limitations of this study was that we do not have available date whether those newborns admitted to neonatal intensive care unit because afterbirth they were transferred to another medical institution for further diagnosis and treatment. For the same reason eventual long-term consequences in those babies remain unknown. However, the obtained data suggest that emergency childbirth should be avoided and emphasize the importance of proper planning of breech delivery.

Concerning the fetal weight as a very important factor that affect decision of breech delivery ending, this parameter was analyzed. The average birth weight in all three groups was over 3000 grams (3077–3159 grams) and there was no statistically significant difference in newborns birth weight between the groups, which an important predictor for a successful vaginal delivery [12]. However, the largest average birth weight was noticed in planned C-section group where the fetal macrosomia was the second most common indication for elective C-section. This result is in accordance with other researches as well with recommendations about the importance of correct estimate of the fetal size and confirms that the decision of planning C-section in cases of fetal macrosomia is completely justified [19]. In addition to fetal weight, other important factor that could affect delivery outcome are woman's characteristics presented with obstetrical conjugate. Although there was high incidence of cephalopelvic disproportion in both planned and emergency C-section group, in the study we have not specifically analyzed this parameter, which is also one of the study limitations.

CONCLUSION

The results of our study have shown that vaginal delivery is very safe option for both mother and newborn. Obstetric skills and accurate prenatal maternal and fetal assessment are the key for making the best possible decision on the delivery management.

Conflict of interest: None declared.

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Table 1. Birth characteristics of mother and fetus by group

Parameters	**Vaginal delivery**	**Planned C-section**	**Emergency C-section**
Percent of delivered women	47.2%	23.86%	28.42%
Median age	30.3 ± 5.35	33.2 ± 5.45	29.6 ± 5.6
Primiparous women	46.4%	59.5%	72%
Full term	97.6%	85.7%	90%
Chronic disease or gestosis	0	14.2%	10%
Prelabor rupture of membrane	2.38%	0	62%
Fetal macrosomia	3.57%	14.3%	0
Previous uterine operation	0	21.4%	9.7%
Maternal mortality	0	0	0
Maternal short-term complications	0	0	0
Fetal weight	3077.85 g	3562 g	3115 g
Fetal length	51.65 cm	53 cm	51.6cm
Fetal head circumference	34.75 cm	36.4 cm	35 cm
APGAR score 1'/5'	9/10	9/10	9/10
Newborns birth injuries and complications	4%	0	10%

Table 2. Details of vaginal delivery

Parameters	**Stimulated with oxytocin**	**Spontaneous delivery**
Number of deliveries	77	7
Prelabor rupture of membrane	2	0
Bracht manual assistance	64	6
Smellie-Veit manual assistance	11	1
Müller manual assistance	2	0
Episiotomy	67	1
First-degree perineal tear	5	1
Manual revision of uterine cavity	1	0

