ONLINE FIRST

This is a provisional PDF only. Copyedited and fully formatted version will be made available soon.

POLISH GYNECOLOGY
GINEKOLOGIA POLSKA
ORGAN POLSKIEGO TOWARZYSTWA GINEKOLOGICZNEGO
THE OFFICIAL JOURNAL OF THE POLISH GYNECOLOGICAL SOCIETY

ISSN: 0017-0011

e-ISSN: 2543-6767

External cephalic version — single-center experience

Authors: Maciej Kwiatek, Tomasz Geca, Aleksandra Stupak, Wojciech Kwasniewski, Radoslaw Mlak, Anna Kwasniewska

DOI: 10.5603/gpl.99736

Article type: Research paper

Submitted: 2024-03-11

Accepted: 2024-03-11

Published online: 2024-04-26

ORIGINAL PAPER / GYNECOLOGY

External cephalic version — single-center experience

Maciej Kwiatek[1], Tomasz Geca[1], Aleksandra Stupak[1], Wojciech Kwasniewski[2], Radoslaw Mlak[3], Anna Kwasniewska[1]

[1]*Department of Obstetrcis and Pathology of Pregnancy, Medical University of Lublin, Poland*
[2]*Department of Oncological Gynaecology and Gynaecology, Medical University of Lublin, Poland*
[3]*Department of Laboratory Diagnostics, Medical University of Lublin, Poland*

Corresponding author:
Maciej Kwiatek
Department of Obstetrcis and Pathology of Pregnancy, Medical University of Lublin, Raclawickie 1, 20–059 Lublin, Poland
e-mail: maciej.kwiatek@umlub.pl

ABSTRACT

Objectives: External cephalic version (ECV) is an alternative to caesarean section for abnormal fetal position. ECV is recommended by the most important scientific committees in the world. ECV complications are rare and occur in 6.1% of cases, however severe complications requiring urgent caesarean section are found in less than 0.4%. Our aim was to demonstrate the effectiveness and safety of ECV and to present our own experience with the procedure of ECV.

Material and methods: ECV was performed on 62 patients (32 nulliparas and 30 multiparas). Qualification criteria included: singleton gestation, gestational age > 36 + 6, longitudinal pelvic lie, no uterine contractions, intact membranes. Indications for immediate cesarean section within 24 hours of ECV were considered a procedural complication. In patients with complications, the condition of the newborn was checked according to the APGAR score and the day of discharge of the mother and child from the maternity ward was analyzed.

Results: ECV finished successfully in 66.1% (nulliparas 56.2% and multiparas 76.7%). Patients with a successful ECV were significantly older and had higher median gestational age. ECV was more often successful when placenta was located on the posteriori wall. In our patients, there were 4 cases of complications requiring delivery at the time of ECV. No serious consequences associated with increased maternal or neonatal morbidity or mortality were reported.
Conclusions: ECV seems to be a safe alternative for women wishing to deliver vaginally, as this procedure does not increase the risk of adverse obstetric outcomes.
Keywords: external cephalic version; labor; cesarean section

INTRODUCTION

External cephalic version (ECV) involves changing the position of the fetus to a longitudinal cephalic one achieved by external pressure on the body part of the fetus located in the pregnant uterus.

External cephalic version has been performed for centuries, it was known and practiced already in the times of Hippocrates [1]. Currently, this procedure, like many procedures in classical obstetrics, has been replaced by a cesarean section, which, because of advances in anesthesiology and surgical techniques, has become a relatively safe operation. However, we must not forget that cesarean section increases the risk of postpartum hemorrhage and thromboembolic complications tenfold, which are the main cause of death in women related to childbirth [2]. It should also be remembered that in countries with high socioeconomic development, increasing the percentage of cesarean sections above 20% does not reduce maternal and perinatal mortality [3, 4]. According to literature data, ECV not only increases the chance of fetal cephalic position the moment of delivery, but also contributes to a reduction in the frequency of cesarean sections compared to not attempting the version [5].

External cephalic version is recommended by the most important scientific committees in the world, such as the Royal College of Obstetricians and Gynecologists, the American College of Obstetricians and Gynecologists, the Society of Obstetricians and Gynecologists of Canada and the Royal Australian and New Zealand College of Obstetricians and Gynecologists [6–11].

Recommendations issued in 2018 by the Polish Society of Gynecologists and Obstetricians indicate cesarean section as a method of ending labor in all cases of transverse presentation of the live fetus and in the case of breech presentation of the live fetus in pregnancy lasting more than 25 weeks [12]. Only a few exceptions were identified, such as:

significant advancement of labor, delivery of the second fetus in a twin pregnancy, and the occurrence of lethal fetal defects. At the same time, the authors of the recommendations suggested the possibility of performing ECV if the breech presentation persists after the 37th week of pregnancy.

Objectives

The aim of the study was to demonstrate the effectiveness and safety of external cephalic version and to present our own experience with the procedure of ECV, which has been performed at the Department of Obstetrics and Pathology of Pregnancy of the Medical University of Lublin since 2019.

MATERIAL AND METHODS

External cephalic version was performed in patients hospitalized at the Department of Obstetrics and Pathology of Pregnancy in the University Clinical Hospital No. 1 in Lublin in 2019–2022 due to non-cephalic fetal position.

The qualification criteria were a single, full-term pregnancy with a gestational age of more than 36 + 6 weeks of gestation, breech presentation of the fetus, lack of contractile activity of the uterine muscle and intact membranes. The fetal position was confirmed by ultrasounds, which also assessed fetal dimensions, its estimated weight, the amount of amniotic fluid, and the location of the placenta and umbilical cord. Additionally, fetal well-being was confirmed by assessing blood flow in the umbilical vessels and the middle cerebral artery.

The description of ECV procedure

Pregnant women received written consent. Women were hospitalized and the procedure was performed in the delivery room with direct access to the operating room.

Before starting ECV, a 30-minute CTG trace was made in the left lateral position. After verification of the non-stress test, the patient was administered intravenously 25 ug fenoterol (Partusisten Intrapartal, Boehringer Ingelheim, Germany).

After relaxation of the uterine muscle was achieved, approximately 10 minutes after drug administration, the pregnant woman with an empty urinary bladder was placed on her back on a hard, stable surface with her limbs abducted at the hip joints and bent at the knee joints, with the pelvis slightly raised, or in the Trendelenburg position with the bed tilted to back about 20 degrees.

The ECV technique involved releasing the fetal buttocks from the pelvic inlet and pushing them above sacra promontory, and then applying controlled pressure simultaneously to the buttocks and the fetal head to maintain its flexed position. While performing ECV, the patients had the opportunity to use inhalation analgesia using nitrous oxide (Entonox, Linde Gaz Polska, Poland). Every 2 minutes, the fetal heart rate was monitored using ultrasound and the current position of the fetus was confirmed.

After obtaining the longitudinal cephalic presentation, the pregnant woman was placed on her left side again and a 30-minute CTG trace was made. Reassuring CTG trace allowed for a further wait-and-see attitude until delivery.

Failure to achieve the longitudinal cephalic presentation of the fetus after a procedure lasting 15 minutes was considered as ineffective ECV. Patients after unsuccessful ECV with reassuring CTG trace, depending on gestational age, were qualified for further outpatient observation or for elective cesarean section at 40 weeks of pregnancy.

Indications for immediate cesarean section within 24 hours of ECV were considered a procedural complication. In case of complications, the condition of the newborn assessed using the APGAR score and the day of discharge of the mother and neonate from the maternity ward were checked.

Statistical analysis

The statistical analysis was performed using MedCalc statistical software version 15.8. The normality of distribution of continuous variables was assessed using the D'Agostino-Pearson test. Due to the non-normal distribution of continuous variables, non-parametric tests were used in the analysis. The median was used as a measure of data clustering, and data dispersion was presented using the interquartile range (IQR) and/or minimum-maximum range. Categorized data were expressed as absolute numbers and percentages. Verification of the significance of differences between the study groups in terms of categorized variables was performed using the chi-square test. In the case of comparison of continuous variables, the Kruskal-Wallis test was used to determine the level of significance of differences between the study groups. The chance of obtaining a positive effect of the ECV procedure was estimated using the odds ratio (OR) test [OR value and 95% confidence interval (CI) were calculated]. Results with p-values below 0.05 were interpreted as statistically significant. However, results for which p-values were in the range of 0.05–0.07 were considered to show a trend towards statistical significance.

RESULTS

External cephalic version was performed on 62 patients. The median age of the women was 31 years (min.–max. range: 22–44 years) and the median gestational age at ECV time was 37 weeks 5 days (min-max range: 37 + 0–41 + 1). The patients included 32 primiparous (51.61%) and 30 multiparous women (48.39%). External cephalic version was effective in 66.1% of cases, of which in the group of primiparous women in 56.2%, and in multiparous women in 76.7%. Apart from women's age, gestational age and estimated fetal weight, the groups of primiparous and multiparous did not differ in terms of other analyzed variables, such as: amount of amniotic fluid, location of the placenta, maternal weight nor body mass index (BMI) (Tab. 1).

Table 1. Characteristics of the study group in terms of demographic and clinical variables, including comparison of primiparous and multiparous women

Variables	Cohort (n = 62)	Nulliparas (n = 32)	Multiparas (n = 30)	p value
Maternal age [years]; (median — IQR)	31 (30–32.19)	29 (27.5–31.5)	34 (31–38)	0.0002 *
Min.–max.	22–44	22–37	25–44	
Gestational age [weeks + days]; (median — IQR)	37 + 5 (37 + 3–38 + 3)	37 + 4 (37 + 1–38 + 3)	38 + 3 (37 + 2–39 + 0)	0.0310 *
Min.–max.	37 + 0–41 + 1	37 + 0–39 + 2	37 + 0–41 + 1	
EFW [g]; (median — IQR)	3130.5 (3022.88–3284.56)	3042.5 (2764.5–3319.5)	3265 (3024–3423)	0.0137 *
Min.–max.	2200–4029	2200–3667	2504–4029	
Placenta location				
Anterior	34 (54.8%)	16 (50%)	18 (60%)	0.5924
posteriori	28 (45.2%)	16 (50%)	12 (40%)	
AFI [cm]; (median — IQR)	10 (9–12)	10 (8–12)	10 (9–12)	0.7600
	5–20	5–20	5–15	

Min.–max.				
Successful ECV No Yes	 21 (33.9%) 41 (66.1%)	 14 (43.7%) 18 (56.2%)	 7 (23.3%) 23 (76.7%)	0.1530
Maternal weight [g]; (median — IQR) Min.–max.	73 (69.81–77) 56–108	72 (66–87.5) 56–108	73.5 (68–80) 61–89	0.7244
BMI; (median — IQR) Min.–max.	26 (25–27) 20–39	26 (23.5–30.5) 20–39	26 (24–30) 22–32	0.9831

*statistical significance; IQR — interquartile range; EFW — estimated fetal weight; AFI — amniotic fluid index; ECV — external cephalic version; BMI — body mass index

Patients with a successful ECV were significantly older than women with ineffective procedure [32 years (29–36 years) vs 20 years (28–32 years); p = 0.0423]. In patients who had a positive effect of ECV compared to those who did not, a significantly higher median gestational age was observed [38.3 weeks (37.2–39 weeks) vs 37.2 weeks (37–38.1 weeks); p = 0.0202]. Moreover, there was a slightly higher chance of a positive effect of ECV in women whose placenta was located on the posterior wall compared to those in whom it was located on the anterior wall (78.6% vs 55.9%; OR = 2.89; 95% CI: 0.94–8.95; p = 0.0648). Detailed data on the chance of a positive effect of the ECV procedure depending on demographic and clinical variables in the entire study group are presented in Table 2.

Table 2. The chance of a successful external cephalic version (ECV) procedure depending on demographic and clinical variables in the entire study group

Variable	Successful ECV		OR (95% CI) p-value
	No	Yes	
Maternal age [years]; (median) Min.–max.	20 (28–32) 22–44	32 (29–36) 24–41	0.0423*
Nulliparas Multiparas	14 (43.7%) 7 (23.3%)	18 (56.2%) 23 (76.7%)	2.56 (0.85–7.66) 0.0937
GA [weeks + days];	37 + 2 (37 + 0–38 + 1)	38 + 3 (37 + 2–39 + 0)	0.0202*

(median) Min.–max.	 37 + 0–41 + 1	 37 + 0–41 + 0	
EFW [g]; (median) Min.–max.	3024 (2810.3–3228.5) 2504–3941)	3195 (2994.8–3383) 2200–4029	0.1149
Spine position left right	 9 (25%) 12 (46.2%)	 27 (75%) 14 (53.8%)	039 [0.13–1.14] 0.0862
Placenta location Anterior Posteriori	 15 (44.1%) 6 (21.4%)	 19 (55.9%) 22 (78.6%)	2.89 (0.94–895) 0.0648
AFI [cm]; (median) Min.–max.	10 (7.8–12) 5–16	10 (9–12) 6–20	0.3884
Maternal weight [kg]; (median) Min.–max.	 74 (66.8–81.3) 59–95)	 72 (67–83) 56–108	0.7263
BMI; (median) Min.–max.	26 (25–29.5) 22–36	26 (24–30) 20–39	0.3425

*statistical significane; OR — odds ratio; CI — confidence interval; GA — gestational age; EFW — estimated fetal weight; AFI — amniotic fluid index; BMI — body mass index.

In the analyzed group, there were 4 cases of complications requiring immediate delivery after ECV. None of them reported serious consequences related to increased maternal or neonatal morbidity or mortality. Details are presented in Table 3.

Table 3. Complications after external cephalic version (ECV)

Complication	Number of cases [n]	Percentage [%]	Successful ECV	Mode of delivery	Time from ECV till first signs [h]	APGAR score in 1/3/5/10 minute	Time of mother's discharge [days]	Time of neonate's discharge [days]
Bleeding	2	3.2	No	cc	1	7/8/9/9	4	4
			Yes	cc	1	10/10/10/10	4	4

Pathological CTG	2	3.2	Yes	cc	14	10/10/10/10	3	3
			No	cc	10	10/10/10/10	5	5

cc — cesarean section; CTG — carditocogram

DISCUSSION

External cephalic version, commonly used before the era of cesarean section, was abandoned and not performed by many maternity centers in Poland due to the possibility of complications, because cesarean section has become a common, accessible, relatively simple and relatively safe procedure.

The basic condition for performing ECV is the patient's voluntary informed consent to such action. Data from the 1990s and after 2000 show that gynecologists do not offer an attempt of ECV to 4–33% of women who seem to be suitable candidates for the procedure [13, 14]. Moreover, of those who are offered ECV, reported rates of maternal refusal range from 18% to 76% [14–16]. In Poland, the number of women qualified for ECV as well as the number of patients who refuse to consent to the procedure seem to be a much bigger problem. Performing ECV should be considered primarily in the group of multiparous women due to the higher effectiveness of the procedure itself. Typically, the greater effectiveness is explained by the decreased abdominal wall musculature and uterine tone in those women in comparison nulliparous ones. Additionally, in multiparous women after successful ECV, vaginal delivery is more often successful. However, this procedure should also be recommended to women with an increased risk of intraoperative complications or with chronic diseases that reduce the safety of anesthesia. Recommending ECV in primiparous women with a breech fetus in a full-term pregnancy also helps reduce the number of primary cesarean sections.

To ensure that ECV is safe for the mother and fetus, many algorithms have been created to correctly qualify patients and properly perform the procedure itself [6–11].

The basic criterion for qualifying patients for ECV is the appropriate gestational age. External cephalic version should be performed in full-term pregnancy, after the 37th week is completed [12]. Thanks to this, if there is a need to deliver the baby immediately, iatrogenic preterm labor is not induced. There are relatively few contraindications to ECV. Patients with fetal macrosomia, cephalopelvic disproportion, or placenta previa should always be excluded from the procedure. Therefore, at the beginning, an ultrasound examination should always be

performed to confirm the position of the fetus, its size and proportions, the location of the placenta and the correct amount of amniotic fluid. Other contraindications include maternal immunization with the Rh factor, antenatal bleeding from the genital tract, abnormal cardiotocography, multiple pregnancy, premature rupture of membranes, and preeclampsia [2].

The safest place to perform the procedure is a delivery room with operating room facilities for an emergency cesarean section. For the safety of the fetus, it should be possible to monitor CTG trace before and after the procedure and check the fetal heart rate during version. For the correct orientation of the fetus in the uterine cavity, ECV should also take place under ultrasounds control. Pregnant women may get a short-acting beta-agonist intravenously to relax the uterine muscle [17]. It has been proven that this action significantly increases the rate of successful ECVs and reduces the number of cesarean sections. Administration of anesthesia is not recommended. In the case of women with the Rh-negative blood group, remember to prevent serological conflict.

Factors that increase the chance of successful ECV include: multiparity, transverse or oblique position, complete breech position, correct amount of amniotic fluid and the presenting part not engaged into the pelvic inlet [18].

Factors that reduce the chances of successful ECV include: nulliparity, large cervical dilatation, estimated fetal weight below 2500 g, location of the placenta on the anterior wall, reduced amount of amniotic fluid, maternal obesity, incomplete breech position, posterior position of the fetal spine, presenting part engaged into the pelvic inlet [18].

A meta-analysis of 84 studies covering a total of 12,955 ECVs showed a wide range in the effectiveness of the procedure (16 to 100%). The average percentage is 58%, showing significant differences between nulliparous and multiparous women (40% vs 60%) [19]. The authors of the meta-analysis proved that complications of ECV are rare and affect 6.1% of cases. However, severe complications and those requiring urgent caesarean section can be considered extremely rare (0.24% and 0.35%, respectively). The most common complication observed during or after ECV are fetal heart rate disturbances that occur in approximately 6%. It is worth remembering that bradycardia lasting less than 3 minutes is a common phenomenon during version, as is a non-reassuring CTG for 40 minutes, and these are not symptoms related to fetal distress. If bradycardia persists for more than 6 minutes, the patient should be qualified for immediate cesarean section. Much rarer reported complications with an incidence not exceeding 1 percent include: feto-maternal transfusion, rupture of

membranes, intrauterine death, premature separation of the placenta, and umbilical cord prolapse.

If the procedure is unsuccessful, it may be attempted again within a few days. If you fail again, it is not recommended to try any more. When ECV has been successful, expectant management is recommended, and induction of labor is not necessary in the absence of additional indications. In approximately 3–6% of cases, there is a spontaneous return to the breech position [20]. During deliveries after ECV, a slightly higher percentage of cesarean sections and operative deliveries was observed due fail in progress of labor and symptoms of threatened intrauterine asphyxia compared to women whose fetus was in the spontaneous cephalic position [6]. The risk of cesarean section appears to be greater the shorter the time between ECV and the start of labor is [6].

In 2018 Katukuri et al. [21] analyzed the condition of newborns after planned cesarean sections due to the breech position of the fetus and after deliveries after ECV [21]. The cesarean section rate in the second group was 25%. The condition of newborns was assessed according to the APGAR score, the need for hospitalization in the neonatal intensive care unit, the need for respiratory support, and neonatal hypoglycemia. The study did not show statistically significant differences between groups of children.

CONCLUSIONS

In conclusions, it should be emphasized once again that ECV is a safe alternative for women who want to give birth vaginally, as this procedure does not increase the risk of unfavorable obstetric outcomes compared to the group of women delivered by planned cesarean section due to non-cephalic fetal presentation.

Article information and declarations

Data availability statement

The data is available after e-mail contact with the corresponding author.

Ethics statement

Bioethical Committee of the Medical University of Lublin KE-0254/125/05/2022.

Author contributions

The authors confirm contribution to the paper as follows: study conception and design — M.K, T.G; data collection — M.K, T.G; analysis and interpretation of results — M.K, R.M, W.K; draft manuscript preparation — M.K, A.S, A.K.

All authors reviewed the results and approved the final version of the manuscript.

Funding

DS 128.

Acknowledgments

None.

Conflict of interest

The authors declare no conflict of interest.

Supplementary material

None.

REFERENCES

1. Słomko Z. Ginekologia T. 1. Wydawnictwo Lekarskie PZWL, Warszawa 2008.
2. Tsakiridis I, Mamopoulos A, Athanasiadis A, et al. Management of Breech Presentation: A Comparison of Four National Evidence-Based Guidelines. Am J Perinatol. 2020; 37(11): 1102–1109, doi: 10.1055/s-0039-1692391, indexed in Pubmed: 31167240.
3. World Health Organization Human Reproduction Programme, 10 April 2015. WHO Statement on caesarean section rates. Reprod Health Matters. 2015; 23(45): 149–150, doi: 10.1016/j.rhm.2015.07.007, indexed in Pubmed: 26278843.
4. Xie RH, Gaudet L, Krewski D, et al. Higher cesarean delivery rates are associated with higher infant mortality rates in industrialized countries. Birth. 2015; 42(1): 62–69, doi: 10.1111/birt.12153, indexed in Pubmed: 25597509.
5. Hofmeyr GJ, Kulier R, West HM, et al. External cephalic version for breech presentation at term. Cochrane Database Syst Rev. 2000; 10(2): CD000083, doi: 10.1002/14651858.CD000083, indexed in Pubmed: 10796122.
6. External Cephalic Version and Reducing the Incidence of Term Breech Presentation: Green-top Guideline No. 20a. BJOG. 2017; 124(7): e178–e192, doi: 10.1111/1471-0528.14466, indexed in Pubmed: 28299867.
7. Management of Breech Presentation: Green-top Guideline No. 20b. BJOG. 2017; 124(7): e151–e177, doi: 10.1111/1471-0528.14465, indexed in Pubmed: 28299904.
8. ACOG Committee Opinion No. 745: Mode of Term Singleton Breech Delivery. Obstet Gynecol. 2018; 132(2): e60–e63, doi: 10.1097/aog.0000000000002755.
9. American College of Obstetricians and Gynecologists' Committee on Practice Bulletins--Obstetrics, American College of Obstetricians and Gynecologists' Committee on Practice Bulletins--Obstetrics. Practice Bulletin No. 161 Summary: External Cephalic Version. Obstet Gynecol. 2016; 127(2): 412–413, doi: 10.1097/AOG.0000000000001305, indexed in Pubmed: 26942380.
10. Kotaska A, Menticoglou S, Gagnon R, et al. Society of Obstetricians and Gynaecologists of Canada, MATERNAL FETAL MEDICINE COMMITTEE. Vaginal delivery of breech presentation. J Obstet Gynaecol Can. 2009; 31(6): 557–566, doi: 10.1016/S1701-2163(16)34221-9, indexed in Pubmed: 19646324.
11. The Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Management of breech presentation at term. https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG_MEDIA/Women%27s%20Health/Statement%20and%20guidelines/Clinical-

Obstetrics/Management-of-breech-peresentation-at-term-(C-Obs-11)-Review-July-2016.pdf?ext=.pdf (28.05.2019).
12. Wielgos M, Bomba-Opoń D, Breborowicz GH, et al. Recommendations of the Polish Society of Gynecologists and Obstetricians regarding caesarean sections. Ginekol Pol. 2018; 89(11): 644–657, doi: 10.5603/GP.a2018.0110, indexed in Pubmed: 30508218.
13. Bewley S, Robson SC, Smith M, et al. The introduction of external cephalic version at term into routine clinical practice. Eur J Obstet Gynecol Reprod Biol. 1993; 52(2): 89–93, doi: 10.1016/0028-2243(93)90233-3, indexed in Pubmed: 8157147.
14. Yogev Y, Horowitz E, Ben-Haroush A, et al. Changing attitudes toward mode of delivery and external cephalic version in breech presentations. Int J Gynaecol Obstet. 2002; 79(3): 221–224, doi: 10.1016/s0020-7292(02)00274-6, indexed in Pubmed: 12445986.
15. Leung TY, Lau TK, Lo KW, et al. A survey of pregnant women's attitude towards breech delivery and external cephalic version. Aust N Z J Obstet Gynaecol. 2000; 40(3): 253–259, doi: 10.1111/j.1479-828x.2000.tb03331.x, indexed in Pubmed: 11065030.
16. Raynes-Greenow CH, Roberts CL, Barratt A, et al. Pregnant women's preferences and knowledge of term breech management, in an Australian setting. Midwifery. 2004; 20(2): 181–187, doi: 10.1016/j.midw.2003.10.002, indexed in Pubmed: 15177862.
17. Cluver C, Gyte GML, Sinclair M, et al. Interventions for helping to turn term breech babies to head first presentation when using external cephalic version. Cochrane Database Syst Rev. 2012; 1(2): CD000184, doi: 10.1002/14651858.CD000184.pub3, indexed in Pubmed: 22258940.
18. What factors determine the success of an external cephalic version? BJOG. 2019; 126(4): 501, doi: 10.1111/1471-0528.15586, indexed in Pubmed: 30729658.
19. Grootscholten K, Kok M, Oei SG, et al. External cephalic version-related risks: a meta-analysis. Obstet Gynecol. 2008; 112(5): 1143–1151, doi: 10.1097/AOG.0b013e31818b4ade, indexed in Pubmed: 18978117.
20. Ben-Meir A, Elram T, Tsafrir A, et al. The incidence of spontaneous version after failed external cephalic version. Am J Obstet Gynecol. 2007; 196(2): 157.e1–157.e3, doi: 10.1016/j.ajog.2006.10.889, indexed in Pubmed: 17306662.
21. Katukuri V, Andrews S, Leeman L, et al. What Happens after a Failed External Cephalic Version? [36I]. Obstetrics & Gynecology. 2018; 131(1), doi: 10.1097/01.aog.0000533462.17181.3f.