

# Clinical analysis of 40 cases of external cephalic version without anesthesia

Journal of International Medical Research

49(1) 1–7

© The Author(s) 2021

Article reuse guidelines:

[sagepub.com/journals-permissions](https://sagepub.com/journals-permissions)

DOI: 10.1177/0300060520986699

[journals.sagepub.com/home/imr](https://journals.sagepub.com/home/imr)



Zheng Zhi<sup>1</sup>  and Lin Xi<sup>2</sup>

## Abstract

**Objective:** This study aimed to investigate the success rate, complications, and success-related factors of external cephalic version (ECV) of singleton breech pregnancies after 37 gestational weeks without anesthesia.

**Methods:** We studied 40 singleton breech pregnancies in women who underwent ECV without anesthesia after 37 gestational weeks from October 2018 to March 2020. On the basis of success of ECV, the women were divided into two groups of the successful group and the failed group. Various factors were analyzed to determine those that affect the success of ECV.

**Results:** Of the 40 attempts of ECV, 24 (60.0%) were successful and 16 (40.0%) failed. With regard to success-related factors, parity was significantly different between the two groups, with more multiparous women in the successful group than in the failed group. However, none of the other factors were significantly different between the groups. Fetal outcome was good in all of the cases. Ultimately, 3 cesarean sections were performed in the successful group and 16 were performed in the failed group.

**Conclusions:** ECV of breech presentation after the 37th week of pregnancy without anesthesia is an effective and relatively safe alternative, and can effectively reduce the cesarean section rate.

## Keywords

Breech, cesarean section, fetal therapy, ultrasound, pregnancy, anesthesia

Date received: 10 September 2020; accepted: 14 December 2020

## Introduction

The breech position is a common abnormal fetal position in the clinic, accounting for 3% to 5% of the total number of births.<sup>1</sup> Breech presentation may lead to difficulty in delivering the fetal head. During delivery in the breech position, premature rupture of

<sup>1</sup>Department of Obstetrics and Gynecology, Wenzhou People's Hospital, Wenzhou, China

<sup>2</sup>Department of Chinese Medicine, Wenzhou People's Hospital, Wenzhou, China

### Corresponding author:

Lin Xi, Department of Chinese Medicine, Wenzhou People's Hospital, No. 57 Canghou Street, Lucheng District, Wenzhou City, Zhejiang Province 325000, China. Email: [zgzwzlx@139.com](mailto:zgzwzlx@139.com)



the membranes, prolapse of the umbilical cord, and prolongation of the labor process can easily occur. Even perinatal death is closely related to the breech position.<sup>2</sup>

In 2006, the American College of Obstetrics and Gynecologists suggested that cesarean deliveries are preferred over vaginal breech deliveries.<sup>3</sup> The breech position accounts for approximately 13% of causes of cesarean section.<sup>4</sup> External cephalic version (ECV) is a technique used to convert the fetus from breech presentation to head presentation through the mother's abdominal wall during full-term or near full-term pregnancies. To promote natural childbirth and reduce the rate of cesarean section, our hospital began to perform ECV without anesthesia in 2018. This study aimed to determine the success rate, involved factors, complications, and safety of women undergoing ECV without anesthesia in our hospital to provide a reference for clinical application of ECV.

## Materials and methods

### *Patients and clinical data*

We performed a retrospective study by reviewing clinical records of ECV performed from October 2018 to March 2020 in Wenzhou People's Hospital. This study included healthy pregnant women with singleton breech presentations at 37 to 41 gestational weeks. Exclusion criteria were as follows: multiple pregnancies, the umbilical cord wrapped around the fetal neck more than two times before birth, premature rupture of the membranes, an amniotic fluid index (AFI) <8 cm, placenta previa, prenatal hemorrhage, preeclampsia, intrauterine growth restriction, fetal distress, uterine malformations, pelvic malformations and stenosis, a history of placental abruption, scarred uterus, severe comorbidities and complications, no intention of vaginal delivery, and any contraindication for

vaginal delivery. All women had a detailed ultrasound examination before the ECV procedure. Data were collected from the departmental database, including maternal age, maternal height, maternal weight, gestational age at delivery, parity, placental location, AFI, fetal biparietal diameter, umbilical cord around the fetal neck, delivery mode, fetal birth weight, and the Apgar score.

All of the women were informed of the risks associated with ECV and signed an informed consent form. This study was approved by the ethics committee of Wenzhou People's Hospital (ID: 2020-297).

### *Procedures*

All ECV operations were performed by experienced obstetricians. All of the pregnant women were willing to undergo ECV. We performed a routine blood test, coagulation function test, and non-stress test before the operation. ECV attempts are carried out in the labor room with a bedside ultrasound machine and an emergency cesarean section operating room. Before the operation, B-ultrasound confirmed the fetal position again. The pregnant woman emptied her bladder before the procedure. A venous channel was established and infusion of terbutaline (0.25 mg/1 mL) for slow intravenous injection was provided, and then ECV began. The obstetrician stood on the right side of the pregnant woman. A forward roll of the fetus was usually initially attempted. First, the fetal buttocks were dislodged from the pelvis. The fetal head and buttocks were then grasped with both hands, and the fetus was slowly rotated by pushing upwards and simultaneously guiding the head downwards. The two hands of the obstetrician were in synchrony with each other. The rotation was gentle, avoided force, and continued intermittently until the fetus turned to the head position.

After the procedure, success or lack of success was verified by ultrasound. The fetal heart rate was monitored during the operation. If the forward roll was unsuccessful, a backward flip was attempted. The maximum number of attempts allowed was three. If fetal heart rate deceleration occurred, the procedure was stopped immediately, and intrauterine resuscitation measures, such as changing posture, oxygen inhalation, and accelerated infusion, were taken. If the fetal heart rate did not recover, an emergency cesarean section was performed.

After ECV was successful, an abdominal belt was used to fix the fetal position. Electronic fetal monitoring was performed for 20 to 40 minutes to observe the fetal heart rate and contractions. If fetal heart monitoring was normal and the pregnant woman was in a healthy condition, she was discharged. All of the pregnant women were followed up to delivery after ECV. The delivery mode and maternal and neonatal outcomes were recorded.

### *Statistical analysis*

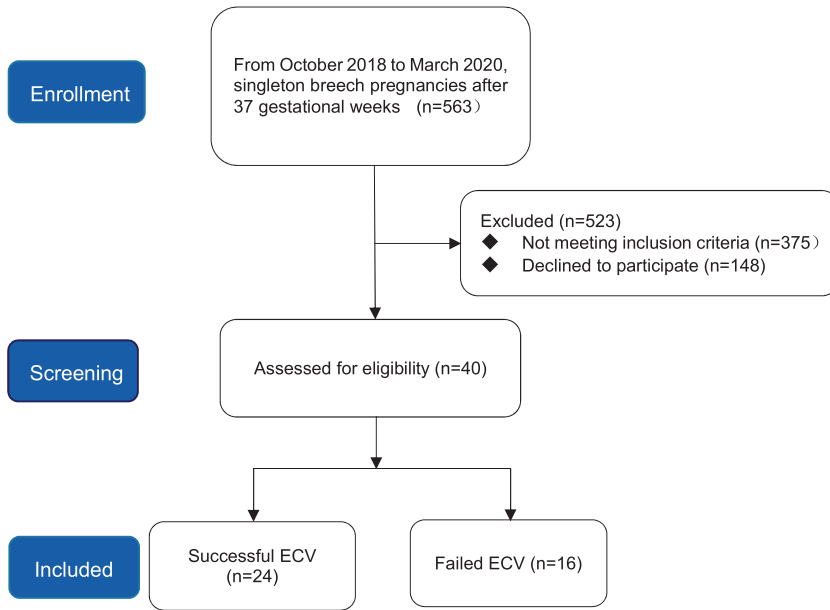
Measurement data are shown as mean  $\pm$  standard deviation. We compared data, such as maternal age, maternal height, maternal weight, gestational age at delivery, fetal biparietal diameter, AFI, and fetal birth weight, between the ECV success and failure groups using the independent-sample t-test. Enumeration data are expressed as cases/percentage. Comparison of these data, such as parity, umbilical cord around the fetal neck, and placental location, between the two groups was made using the  $\chi^2$  test. A value of  $P < 0.05$  was considered to have a statistically significant difference. The data were analyzed by SPSS version 24.0 software (IBM Corp., Armonk, NY, USA).

## **Results**

There were 563 cases of breech singleton pregnancies after 37 gestational weeks from October 2018 to March 2020 in our hospital, and 40 ECV attempts were performed (Figure 1). Of these ECV attempts, 24 (60.0%) were successful and 16 (40.0%) failed. These women were divided into the successful group and the failed group. With regard to success-related factors, the difference in parity between the two groups was significant ( $P < 0.01$ ), with more multiparous women in the successful group than in the failed group. The 40 cases included 19 nulliparous and 21 multiparous women. There was no significant difference in any of the other factors between the groups (Table 1).

Of the 24 pregnant women who succeeded in ECV, 20 (83.3%) had normal vaginal births, 3 (12.5%) had deliveries by cesarean section, and 1 (1.2%) had a delivery by forceps because of fetal distress. The reasons for cesarean sections in these women were facial presentation ( $n = 1$ ) and fetal distress ( $n = 2$ ). All of the 16 women who failed to have ECV performed were delivered by cesarean section.

One of the pregnant women failed to have ECV in the afternoon. This pregnant woman had mild lower abdominal pain symptoms after the procedure and the non-stress test was normal. B-ultrasound suggested mild placental abruption at night. Emergency cesarean section was performed at this time. In one woman, fetal bradycardia lasting longer than 10 minutes occurred during the procedure, and there was no improvement in intrauterine recovery after oxygen inhalation and a change in posture. Emergency cesarean delivery was performed because of the fetal distress. The Apgar scores of the two neonates were both 10. No cases of neonatal asphyxia occurred. No adverse complications occurred during ECV.



**Figure 1.** CONSORT flow chart.  
ECV, external cephalic version.

**Table 1.** Analysis of factors affecting the success rate of external cephalic version.

| Factor                                      | Successful group<br>(n = 24) | Failed group<br>(n = 16) | t/ $\chi^2$          | P value |
|---|------------------------------|--------------------------|----------------------|---------|
| Maternal age (years)                        | 29.67 ± 4.39                 | 28.88 ± 4.66             | 0.55 <sup>(1)</sup>  | 0.59    |
| Maternal height (cm)                        | 160.38 ± 4.10                | 155.72 ± 25.18           | 0.89 <sup>(1)</sup>  | 0.38    |
| Maternal weight (kg)                        | 63.92 ± 13.66                | 62.66 ± 9.55             | 0.32 <sup>(1)</sup>  | 0.75    |
| Gestational age (weeks)                     | 37.71 ± 0.86                 | 37.50 ± 0.73             | 0.80 <sup>(1)</sup>  | 0.43    |
| Fetal BPD (mm)                              | 92.50 ± 4.69                 | 90.25 ± 4.25             | 1.63 <sup>(1)</sup>  | 0.11    |
| AFI (mm)                                    | 134.79 ± 33.44               | 126.25 ± 29.24           | 0.83 <sup>(1)</sup>  | 0.41    |
| Fetal birth weight (kg)                     | 3.35 ± 0.42                  | 3.26 ± 0.32              | 0.71 <sup>(1)</sup>  | 0.48    |
| Parity                                      |                              |                          |                      |         |
| Nullipara, n (%)                            | 6 (25.0)                     | 13 (81.3)                | 12.18 <sup>(2)</sup> | <0.01   |
| Multipara, n (%)                            | 18 (75.0)                    | 3 (18.8)                 |                      |         |
| Umbilical cord around the fetal neck, n (%) |                              |                          |                      |         |
| Yes   | 8 (33.3)                     | 3 (18.85)                | 1.02 <sup>(2)</sup>  | 0.31    |
| No  | 16 (66.7)                    | 13 (81.3)                |                      |         |
| Placental location, n (%)                   |                              |                          |                      |         |
| Anterior placenta                           | 7 (29.2)                     | 5 (31.3)                 | 0.87 <sup>(2)</sup>  | 0.35    |
| Non-anterior placenta                       | 17 (70.8)                    | 11 (68.8)                |                      |         |

<sup>(1)</sup>Analyzed by the t-test; <sup>(2)</sup>analyzed by the  $\chi^2$  test.  
BPD, biparietal diameter; AFI, amniotic fluid index.

## Discussion

### *Clinical significance of ECV*

ECV refers to performing a series of operations on the abdomen of a pregnant woman where the fetus is rotated from breech presentation to head presentation. ECV is one of the most effective clinical interventions in breech pregnancies.<sup>5,6</sup> In 2015, a previous study reported 2396 women with breech presentation.<sup>7</sup> A total of 550 of these women who were allocated to a vaginal delivery protocol and 1060 who were allocated to have planned cesarean section (67%) were delivered by cesarean section. In our study, the success rate of ECV was 60%, the cesarean section rate after successful ECV was only 12.5%, and the overall cesarean section rate was 50%. Our results suggest that ECV effectively reduces the rate of cesarean section.

### *Advantages of ECV without anesthesia*

Traditional ECV is performed by anesthesiologists with epidural anesthesia. Our hospital performs ECV without anesthesia. Only one intravenous injection of terbutaline is provided by the nurse before performing ECV, and only one to two obstetricians need to complete the operation. This greatly reduces the risk and complications of anesthesia, and also reduces the cost.

### *Timing of ECV*

A breeched fetus may still automatically switch to the head position before full term, but most fetuses are in breech before 32 weeks of gestation.<sup>8</sup> After comprehensive assessment, the best time to recommend ECV has been extended to 37 weeks.<sup>9,10</sup> The possibility of spontaneous reversal of the fetal position after 37 weeks is small. Failure of ECV or complications can be terminated by emergency

cesarean section to avoid the risk of premature delivery and reduce neonatal complications. At present, there is no clear limit on the upper limit of ECV for gestational weeks. However, as the gestational weeks increase, fetal weight increases, and the amount of amniotic fluid volume decreases. This increases the difficulty of implementing ECV and the success rate is affected. Therefore, the upper limit of ECV is generally recommended to be 39 gestational weeks.<sup>11</sup> With full-term ECV, the fetus has already matured. If the above-mentioned complications occur, cesarean section can be performed in time without adverse effects on the mother and child.

### *Safety of ECV*

Melo et al.<sup>12</sup> showed that the incidence of ECV was < 1%, the incidence of emergency cesarean section was 0.5%, and the total incidence of complications from ECV was only 3% to 4%. These findings indicate that ECV is safe. Only 2 (5.0%) of 40 pregnant women undergoing ECV in our hospital experienced mild complications (1 mild placental abruption and 1 fetal distress), which required emergency cesarean section. The operating room has an emergency cesarean section process, which greatly reduces the risk. To date, we have not experienced any serious maternal or fetal complications. However, because of the small number of cases included in this study, safety aspects need to be followed up, with many cases required for validation.

### *Factors affecting the success of ECV*

The effectiveness of breech reversal has been recognized worldwide, but obstetricians are still searching for which factors predict the success of external inversions. However, the factors that can predict the success of external reversal are inconsistent in various studies. A prospective, controlled

study of 500 breech pregnancies showed that the success rate of external reversal surgery for multiparous women was 3.74 times that of nulliparous women (95% confidence interval: 2.37–5.9).<sup>13</sup> The success rate of a posterior wall placenta was 2.85 times that of an anterior wall placenta (95% confidence interval: 1.87–4.36), and the success rate of a posterior placenta was 2.85 times that of an anterior placenta (95% confidence interval: 1.87–4.36). In another meta-analysis, the following factors were identified as increasing the success rate of external inversions: multipara, complete breech position, posterior wall placenta, AFI of  $\geq 10$  cm, and maternal weight  $< 65$  kg.<sup>14</sup> Other studies showed that indicators, such as ethnicity, maternal age, parity, body mass index, week of gestation, fetal birth weight, breech position, placental location, and AFI, with the exception of birth order, were not significant factors for ECV.<sup>15</sup> In our study, we also found that ECV was more successful in multiparas than in nulliparas. Because of the limitation of the number of cases in this study, other factors, such as the AFI, fetal biparietal diameter, placental location, and height and weight of pregnant women were not significantly different between the two groups. Additional studies with large sample sizes are required to further investigate factors affecting ECV.

## Conclusions

For pregnant women with a singleton breech position, an attempt of ECV without anesthesia can reduce the cesarean section rate, resulting in a relatively safe and effective operation. In medical institutions that have appropriate facilities for emergency cesarean section, after full evaluation, we recommend selecting suitable pregnant women to have ECV performed by well-trained obstetricians to ensure the safety of mothers and children.


## Declaration of conflicting interest

The authors declare that there is no conflict of interest.

## Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

## ORCID iD

Zheng Zhi  <https://orcid.org/0000-0002-7590-2709>

## References

1. Cunningham F, Leveno K, Bloom S, et al. *Williams obstetrics*. 23rd ed. New York: McGraw-Hill Professional, 2009, pp. 571–578.
2. Øye CR, Foss OA and Holen KJ. Breech presentation is a risk factor for dysplasia of the femoral trochlea. *Acta Orthop* 2016; 87: 17–21.
3. ACOG Committee on Obstetric Practice. ACOG Committee Opinion No. 340. Mode of term singleton breech delivery. *Obstet Gynecol* 2006; 108: 235–237.
4. Bragg F, Cromwell DA, Edozien LC, et al. Variation in rates of caesarean section among English NHS trusts after accounting for maternal and clinical risk: cross sectional study. *BMJ* 2010; 341: c5065.
5. Tan JM, Macario A, Carvalho B, et al. Cost-effectiveness of external cephalic version for term breech presentation. *BMC Pregnancy Childbirth* 2010; 10: 3.
6. De Hundt M, Velzel J, De Groot CJ, et al. Mode of delivery after successful external cephalic version: a systematic review and meta-analysis. *Obstet Gynecol* 2014; 123: 1327–1334.
7. Hofmeyr GJ, Hannah M and Lawrie TA. Planned caesarean section for term breech delivery. *Cochrane Database Syst Rev* 2015; 2015: Cd000166.
8. Hofmeyr GJ, Kulier R and West HM. External cephalic version for breech presentation at term. *Cochrane Database Syst Rev* 2015; 2015: Cd000083.

9. American College of Obstetricians and Gynecologists' Committee on Practice Bulletins—Obstetrics. Practice Bulletin No. 161 Summary: External Cephalic Version. *Obstet Gynecol* 2016; 127: 412–413.
10. Ebner F, Friedl TWP, Leinert E, et al. Predictors for a successful external cephalic version: a single centre experience. *Arch Gynecol Obstet* 2016; 293: 749–755.
11. Andrews S, Leeman L and Yonke N. Finding the breech: Influence of breech presentation on mode of delivery based on timing of diagnosis, attempt at external cephalic version, and provider success with version. *Birth* 2017; 44: 222–229.
12. Melo P, Georgiou EX, Hedditch A, et al. External cephalic version at term: a cohort study of 18 years' experience. *BJOG* 2019; 126: 493–499.
13. Chalifoux LA and Sullivan JT. Anesthetic management of external cephalic version. *Clin Perinatol* 2013; 40: 399–412.
14. Kok M, Cnossen J, Gravendeel L, et al. Ultrasound factors to predict the outcome of external cephalic version: a meta-analysis. *Ultrasound Obstet Gynecol* 2009; 33: 76–84.
15. Vaz De Macedo C, Clode N and Mendes Da Graça L. Prediction of Success in External Cephalic Version under Tocolysis: Still a Challenge. *Acta Med Port* 2015; 28: 554–558.