

External cephalic version for breech presentation at term

A prospective interventional study

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ABSTRACT

الأهداف: لتقييم عملية التحويل الرأسي الخارجي (ECV) لمعالجة الجنين الذي يأتي كمجيء مقعدي عند الأوان.

الطريقة: في الدراسة التدخلية والمستقبلية شاركت 90 مريضة من الذين لديهم مجيء مقعدي للجنين الغير مصحوب بمضاعفات و في الأسبوع 37 أو أكثر من الحمل في محاولة التحويل الرأسي الخارجي ECV في مستشفى البتول التعليمي للنسائية والتوليد، الموصل، العراق. و ذلك في الفترة من يناير 2011م إلى مارس 2012م. النتيجة الرئيسية التي تم قياسها هي نسبة نجاح هذه المحاولة ونسبة العملية القيصرية بعد المحاولة الناجحة. وقد اعتمدت عدد المرات التي ولدت فيها الأم سابقا، نوع المجيء المقعدي، موقع المشيمة، ووزن الطفل عند الولادة كمتنبات لنجاح العملية. كذلك أي مضاعفات حدثت للأم أو الجنين أثناء العملية تم تقييمها. حللت البيانات إحصائيا بطريقة مربع كاي وحددت الأهمية الإحصائية بقيمة $p < 0.05$.

النتائج: كان معدل نجاح المحاولة في هذه الدراسة هو 80% ومعدل العملية القيصرية بعد المحاولة الناجحة هو 12.5% فقط. العوامل المتكهنه لنجاح العملية التي كانت ذا أهمية إحصائية في هذه الدراسة هي تكرار الولادات السابقة لدى الأم والنوع المثني للمجيء المقعدي. لم يكن هناك أي مضاعفات خطيرة للجنين أو الأم مرتبطة بالمحاولة.

الخاتمة: مع الاختيار الملائم للمرضى، تكون عملية التحويل الرأسي الخارجي ECV ناجحة للغاية وبديل أكثر أمانا من الولادة المقعدية المهبلية أو الولادة القيصرية.

Objectives: To evaluate the external cephalic version (ECV) procedure for the management of at term breech presenting fetuses.

Methods: In this prospective, interventional study, 90 patients with uncomplicated breech presentations at or after 37 weeks' gestation were considered for ECV. This was performed in Al-Batool Teaching Hospital, Mosul, Iraq, between January 2011 and March 2012. The main outcome measure was assessed as the

success rate of ECV attempt and the rate of cesarean section following a successful procedure. Parity, type of breech, placental location, and birth weight were evaluated as predictors of success. Also, any fetal or maternal complications during the procedure were evaluated. Data were analyzed by χ^2 test. Statistical significance was determined at a level of $p < 0.05$.

Results: The success rate was 80%. The rate of cesarean section following successful procedure was only 12.5%. Prognostic parameters associated with successful ECV were multiparity and flexed type of breech. There were no serious fetal or maternal complications associated with the attempt.

Conclusions: With appropriate selection of patients, ECV is highly successful and is a safer alternative to vaginal breech delivery or cesarean delivery.

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External cephalic version (ECV) is an obstetrical procedure used during pregnancy in which the fetus is rotated from the breech presentation to the cephalic presentation by manipulation through the mother's abdomen.¹ Breech presentation is the most commonly encountered malpresentation, and occurs in 3-4% of singleton pregnancies at term.^{2,3} Vaginal breech deliveries

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are associated with increased perinatal morbidity and mortality.^{4,5} Most breech babies at term are now delivered by cesarean section (CS). The incidence of CS for breech presentation has increased markedly in the last 3 decades especially after the publication of the term breech trial.^{6,7} Although an elective CS is safer for the baby than vaginal breech delivery, it increases maternal risks and carries a risk for future pregnancies.^{4,6} This means that measures to reduce the incidence of breech presentation have become more important, and that the effect of any such measure on the incidence of CS will be more marked. External cephalic version reduces the incidence of breech presentation at term and of breech delivery, whether vaginal or by CS; thereby, it reduces the morbidity and mortality associated with the breech delivery for both the mother and the fetus.^{2,8,9} This makes ECV an important obstetric intervention and it is therefore recommended by the Royal College of Obstetricians and Gynecologists, and has been given a level (Ia) of recommendation.^{4,7} Likewise, the American College of Obstetricians and Gynecologists^{1,2} recommended that effort should be made in reducing the incidence of breech presentation at term by external cephalic version whenever possible.^{1,2} External cephalic version should be offered to all women with uncomplicated breech presentation at term.⁶⁻⁸ There are no specific contraindications in attempting ECV after the estimated date of delivery, although data are often sparse.^{1,7} External cephalic version should only be performed in a setting where urgent CS is possible as there may be evidence of fetal compromise during or soon after the procedure.^{3,7} Certain contraindication should be considered before attempting the procedure, which can be absolute or relative. Absolute contraindications include multiple pregnancy, antepartum hemorrhage, need for CS regardless of presentation, ruptured membranes, major uterine anomaly, and suspected fetal compromise. Relative contraindication include previous CS, maternal disease such as hypertension or diabetes, fetal growth restriction, oligohydramnio and major fetal anomalies.^{7,10-12} External cephalic version has a very low complication rate.^{7,13} The common risk of ECV is transient fetal heart bradycardia, and occurs in 8-10% of cases. It usually resolves within 5 minutes of ECV attempts and is not usually associated with adverse sequelae for the fetus. Uncommon risks include premature rupture of membrane (<2%), abruptio placentae (<1%), fetomaternal hemorrhage (often minor and of little clinical significance as long as anti-D immunoglobulin is administered appropriately), and cord entanglement (<1.5%).^{7,13,14} For the mother, ECV attempts causes negligible morbidity. Morbidity

consists mainly of discomfort at the time of procedure. Approximately 35% of women suffered from mild discomfort during the ECV, and 5% suffered from severe pain. The procedure may be stopped for this reason.^{7,15,16} Despite these recommendations for ECV from current guidelines, and different studies performed in this subject, it is still not common practice to manage a breech presentation in many obstetrics centers including our center.^{4,16,17} On the other hand, there is an increasing trend to deliver breech presenting baby by CS. The aim of this study was to assess the ECV procedure for the management of at term breech presenting fetus and evaluate its value in clinical practice, its success rate, its safety, and the rate of CS following a successful procedure; and encourage women and obstetricians to opt for ECV and help to limit the low acceptance of the procedure.

Methods. This prospective interventional study was performed between January 2011 and March 2012. The study protocol was approved by the local research ethics committee of Mosul Medical College, Mosul, Iraq. This study was carried out in compliance with the Helsinki Declaration.

Patients with breech presentation at or after 37 completed weeks of gestation were recruited from the antenatal clinic at Al-Batool Teaching Hospital, which is a tertiary obstetric and gynecological hospital in Mosul, Iraq, or referred, by obstetricians from the private clinic. We evaluated the antenatal course, past obstetric history, and medical history for possible contraindication to the procedure. Patients with contraindication to ECV were excluded.

Exclusion criteria were multiple pregnancy, evidence of utero-placental insufficiency, non-reassuring fetal monitoring pattern, significant third-trimester bleeding, ruptured membrane, amniotic fluid abnormalities especially oligohydramnios, uterine malformations, placenta previa, uncontrolled hypertension, major fetal anomaly, need for CS regardless of presentation, and declined written consent.

We applied the following protocol for ECV: informed consent for ECV was obtained following a description of the procedure to the patient, its benefits and possible risks, and the possibility of being unsuccessful. The most recent ultrasound was requested to confirm the placental position, adequate liquor volume, and normal fetus and to assess the fetal attitude and position of the fetal legs. The documentation of fetal well-being by reactive fetal heart rate pattern or satisfactory biophysical profile score was carried out. Blood sample for blood group

and Rhesus type was obtained. Salbutamol in the form of oral tablet was used in some patients as tocolytic if this was decided to be necessary by the doctor. In some patients, the procedure was carried out under real time ultrasound guidance if needed.

Technique of ECV. The procedure was carried out as a single operator. We performed ECV in the casualty unit, outpatient clinic, or ultrasound clinic. In all cases, the adjacent operating theatre was available for an emergency CS if required. We followed the technique described by Richard.⁸ When the prerequisites for ECV were met, the woman was positioned supine with slight lateral tilt. The breech was first disengaged from the pelvis and each fetal pole was grasped with one hand. The buttock was then gently guided toward the fundus, while the head was directed toward the pelvis. Pressure was maximally aimed at moving the breech upward. The fetus was gently rotated with steady and controlled movements rather than rushed or jerky. A forward roll was attempted first. This involves flexing the fetal spine and turning the fetus through 180 degrees in the direction that maintains fetal flexion throughout. If this sequence proves unsuccessful, rotation in the opposite direction may be tried (backward roll).

Fetal heart rate (FHR) was auscultated every 2 minutes either with Pinard's stethoscope or sonic aid, or observed through ultrasound if the procedure was carried out under ultrasound guidance. Monitoring was continuous during the procedure. If FHR drops below 100 beats per minute, the procedure was stopped and the fetus might rotate back to its original position. A second attempt was made only after FHR returned to normal (if at all). The uterine manipulation was limited to a total of 10 minutes' duration (the vast majority turned within 5 minutes). Procedures were also discontinued for any unreasonable maternal discomfort to ensure that the mother is not subjected to excessive discomfort. Successful procedure was defined as conversion from breech to cephalic presentation at the time of the procedure. Following an ECV attempt, whether successful or not, repeated cardiotocography (CTG) was performed. If this is normal and reassuring, the patient can be allowed to go home with an appointment after few days to confirm the persistence of the cephalic presentation. Also, following ECV attempt, whether successful or not, non-sensitized rhesus-negative women received anti-D immunoglobulin to avoid the risk of alloimmunization. We asked the patient to report if there is a reduction of fetal movement, vaginal bleeding, or leaking liquor. All patients were followed-up for the presentation of the fetus at time of delivery, mode of delivery, neonate condition and birth weight at delivery,

and any perinatal or maternal complications. Parity (nullipara or multipara), type of breech (flexed, extended or footling), placental location (fundal, anterior or posterior), and birth weight of the baby were selected as factors that predict the success of the procedure. We used birth weight instead of estimated fetal weight in view of the inaccuracy of the estimates, knowing that most patients delivered within a short period of ECV procedures.

Data analysis was performed using MiniTab statistical software program, version 14.2 (Minitab, Kumamoto, Osaka, Nagoya, Japan). Z-test for one proportion was used to determine the significance of the outcome of the procedure with 95% confidence intervals (CI), and χ^2 test for univariate analyses to assess the effect of each selected predictive variable on the likelihood of successful version. The level of significance was set at $p < 0.05$.

Results. External cephalic version was performed in 90 women. It was successful in 72 (80%) women. Of this, 87.5% delivered vaginally, 12.5% by CS for various indications: 5.5% of the fetuses underwent spontaneous version to breech presentation and transverse lie at the onset of labor, 4.2% with poor progress in labor, and 2.8% with fetal distress (Table 1). Seventy-eight percent of patients in the failed ECV group declined further assessment for vaginal breech delivery and underwent an elective CS. Only 4 women were agreeable for trial of vaginal breech delivery and underwent clinical assessment and they were assessed to be suitable, and all of them were delivered vaginally with no complications. The overall CS rate for failed version group was 78%. The outcome of the study and mode of delivery in both groups is shown in Table 1. The effect of the parity on the success of ECV procedure is shown in Table 2. The type of breech and its relation to the outcome of ECV procedure is shown in Table 3. The relation of placental site to the results of the ECV is shown in Table 4. The effect of the birth weight of fetuses on the success of the procedure is shown in Table 5. One version attempt was abandoned due to prolonged fetal bradycardia at the start of the procedure. The bradycardia resolved promptly once maternal manipulation ceased and the patient was admitted for more observation. The patient developed recurrent attack of fetal bradycardia in the same day and underwent emergency CS and the baby was in good condition at time of birth. There was a transient fetal bradycardia during version attempts in 5.6% of patients (5/90) that resolved spontaneously by giving a short pause, and did not require us to stop the version attempt. No other fetal complications

had occurred, and all babies delivered in good health. There were no maternal complications apart from mild discomfort, which was lessened by giving them a short pause throughout the procedure.

Discussion. External cephalic version effectively reduces the rates of breech presentation and CS in women with a singleton breech fetus at term. In our study, ECV was successful in 80% of cases. The reported success rate of ECV ranges from 35-86%, with a commonly quoted figure of 50%.^{6,7,10} Our study was higher than the rate reported by Nassar et al¹⁷ (39%), Wise et al¹⁸ (59%), and Cho et al¹⁹ (63%). The high success rate in our study may be due to the good selection of patients, lower proportion of primigravida in the study groups, and experienced obstetrician who performed the procedure. The effect of parity on the success rate of ECV had been confirmed in many similar studies.^{6,7,10,17-19} The obstetrician's skill was studied by Bogner et al,²⁰ who found that the skill of the performing physician had a significant influence ($p < 0.0005$) on the success rate. The vast majority (87.5%) of those with successful ECV delivered by normal vaginal delivery of a cephalic presenting fetus. This is very important as the

main purpose of ECV procedure is to avoid the possible complications that are associated with 2 other options that may be chosen for the management of breech presentation at term, which are elective CS or vaginal breech delivery. In other words, to reduce the number of elective CS with its associated morbidity particularly on the mother and to avoid the possible morbidity associated with vaginal breech delivery particularly on the fetus. This is higher compared to previous reports.²⁰⁻²² The rate of vaginal delivery in the successful ECV group in Bogner et al's²⁰ study was 81.1%, Mezei et al's²¹ 84%, and El-Toukhy et al's²² 67%. Numerous studies have investigated the factors that could affect the success rate of ECV; however, most studies differ considerably in methodological quality and sample size. The most commonly used variable in previous studies were maternal weight, parity, amount of amniotic fluid, placental location, uterine tone, type of breech (footling, frank, complete), non-engagement of the breech, and fetal weight estimated by ultrasound. A literature review was performed and no single factor that was common to all studies was found; some factors that were found to be associated with ECV success in some studies were reported to have no effect on the success rate in other studies.²³⁻²⁸ Our study showed that parity has the strongest influence on the success of ECV. The success rate for multipara was 94% compared to 36% for primipara, and this difference was statistically significant ($p = 0.001$). Our result was consistent with previous studies carried out by Yong,²³ Kok et al,^{24,25} Ben-Meir et al,²⁶ and Gottvall and Ginstman²⁷ who found that multipara was a significant predictor for

Table 1 - Outcome of external cephalic version (ECV) and mode of delivery in 90 study samples.

Variables	Successful ECV	Failed ECV	Total
Total women*	72 (80.0)	18 (20)	90 (100)
Vaginal delivery	63 (87.5)	4 (22)	67 (74.4)
LSCS	9 (12.5)	14 (78)	23 (25.6)

* $p = 0.001$; 95% confidence intervals: 71.7-88.3% using Z-test for one proportion

Table 2 - Relationship between the outcome of external cephalic version (ECV) and the parity in the study sample.

Parity	Successful ECV	Failed ECV	Total N=90	P-value*
Primipara	4 (36)	7 (64)	11 (12.2)	0.001
Multipara	68 (86)	11 (14)	79 (87.8)	

Data are presented as number and percentage (%), *Chi-square test

Table 3 - Relationship between the outcome of external cephalic version (ECV) and the type of breech.

Type of breech	Successful ECV	Failed ECV	Total N=90	P-value*
Flexed	36 (94.7)	2 (5.2)	38 (42.2)	0.002
Extended	33 (73.3)	12 (26.7)	45 (50.0)	
Footling	3 (42.9)	4 (57.1)	7 (7.8)	

Data are presented as number and percentage (%), *Chi-square test was used.

Table 4 - Relationship between the outcome of external cephalic version (ECV) and the placental location.

Placental site	Successful ECV	Failed ECV	Total N=90	P-value*
Fundal	10 (77)	3 (23)	13 (14.4)	0.439
Anterior	26 (74)	9 (26)	35 (38.9)	
Posterior	36 (86)	6 (14)	42 (46.7)	

Data are presented as number and percentage (%), *Chi-square test was used.

Table 5 - Relationship between the outcome of external cephalic version (ECV) and fetal weight.

Birth weight at time of delivery	Successful ECV	Failed ECV	Total N=90	P-value*
≥3000g	34 (77.3)	10 (22.7)	44 (48.9)	0.527
<3000g	38 (82.6)	8 (17.4)	46 (51.1)	

Data are presented as number and percentage (%), *Chi-square test was used.

successful ECV outcome. For the type of breech, our study showed that flexed breech revealed significantly better success rate when compared to extended and footling breech and this difference was statistically significant ($p=0.002$). These findings are in agreement with the results observed by Ben-Meir et al²⁶ and Arif et al.²⁸ In contrast, Yong²³ found that the type of malpresentation was not a significant factor. Although the success rate in our study was higher with the posteriorly located placenta (86%), the result was not statistically significant ($p=0.439$). This result was in contrast with the observation of Yong,²³ Ben-Meir et al,²⁶ and Arif et al,²⁸ who all found that non-anterior placental location was significant predictor of success. The same with the birth weight, no statistically significant difference were found between the successful and failed ECV group and our result was consistent with the findings of Yong;²³ however, Kok et al²⁴ found that increasing estimated fetal weight was a favorable predictor of successful ECV. We already excluded cases with oligohydramnios from our study, so liquor volume is not taken as a predictive factor in our study.

Study limitations. Our study limitations include: small sample size and each predictive factor was analyzed individually rather than using logistic regression for multivariate analysis.

For this reason, the predictive factor for successful ECV in our study might be regarded as inconclusive; however, we can conclude that attempting ECV in multiparous with flexed type of breech is more likely to be successful. The procedures were performed with few maternal and fetal complications. These findings were in agreement with many similar studies^{20,22,29,30} that were performed in recent years wherein ECV procedures were performed at term for breech presentation with adequate ultrasound assessment and frequent fetal heart monitoring during the procedure, and they found a favorable neonatal outcome and no significant maternal or perinatal complications. The most commonly encountered complication in our study was transient fetal heart bradycardia (5.6%) that resolved spontaneously. Collins et al,²⁹ reported CTG abnormalities after the procedure in 2% of their patients. Grootsholten et al,³⁰ observed that the risk of abnormal CTG patterns after ECV was 6.1% and the risk of emergency CS due to abnormal CTG patterns following ECV was 0.2%. There was no perinatal mortality in our study. Also, maternal complications were negligible apart from mild discomfort. Our policy in adopting gentle manipulation of the fetus rather than forceful movement is an important factor in reducing maternal and fetal complication rates.

Finally, we would like to emphasize the need to spread and improve ECV skills. It is essential that skills for performing ECV should be developed, promoted, and improved with continuous practice at teaching hospitals. The procedure should probably be practiced regularly to improve the success rate. It might be appropriate to appoint 2 or 3 experienced obstetricians in each hospital to evaluate the patients and perform the procedure so their skill can be more readily improved and their result can be more adequately evaluated.

In conclusion, with appropriate selection of patients and presence of a skilled obstetrician, external cephalic version is highly successful and is a safer alternative to vaginal breech delivery or cesarean delivery. Attempting ECV at term reduces the chance of breech presentation and therefore the associated risks, particularly of avoidable CS.

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