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External Cephalic Version

In the United States, there is a widespread belief that the overall cesarean delivery rate is higher than necessary. Efforts are being directed toward decreasing the number of these procedures, in part by encouraging physicians to make changes in their management practices. Because breech presentations are associated with a high rate of cesarean delivery, there is renewed interest in techniques such as external cephalic version (ECV) and vaginal breech delivery. The purpose of this document is to provide information about ECV by summarizing the relevant evidence presented in published studies and to make recommendations regarding its use in obstetric practice.

Background

Breech presentation occurs in approximately 3–4% of term pregnancies (1), and there is a high cesarean delivery rate for breech presentation (2). External cephalic version provides a means of reducing cesarean deliveries, but implementation of ECV varies, with an estimated 20–30% of eligible women not being offered ECV (3, 4). External cephalic version involves applying pressure to a woman's abdomen to turn the fetus in either a forward or backward roll to achieve a vertex presentation. The goal of ECV is to increase the proportion of vertex presentations among fetuses that were formerly in the breech position near term. Once a vertex presentation is achieved, the chances for a vaginal delivery increase.

If an ECV attempt is not successful and breech presentation persists, the decision regarding mode of delivery should depend on the expertise of the health care provider. Thus, a planned term singleton breech vaginal delivery may be reasonable in some cases with full patient counseling and consent, and following specific management protocols (5).

Clinical Considerations and Recommendations

▶ *Which patients are candidates for external cephalic version?*

Fetal presentation should be assessed and documented beginning at 36 0/7 weeks of gestation to allow for ECV (6). Thereafter, patients who have reached at least 37 0/7 weeks of gestation are preferred candidates for ECV for several reasons. First, if spontaneous version is going to occur, it is likely to have taken place by 37 0/7 weeks of gestation (7, 8). Second, risk of a spontaneous reversion after ECV is decreased after 37 0/7 weeks compared with ECV earlier in gestation. Preterm ECV attempts may be associated with high initial success rates but also with higher reversion rates, necessitating additional procedures (9). In an unblinded multicenter randomized controlled trial, a small but significant difference in noncephalic presentation at birth was noted for early ECV (34 0/7–35 6/7 weeks of gestation) compared with ECV at or after 37 0/7 weeks

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of gestation (41.1% versus 49.1%) (relative risk [RR], 0.84; 95% confidence interval [CI], 0.75–0.94; *P*=.002), with no differences in rate of cesarean delivery or preterm birth (10). A more recent review of pooled data from three studies that included 1,906 participants suggested that earlier ECV (at 34–35 weeks of gestation) compared with ECV at early term (37–38 weeks of gestation) reduced noncephalic presentation at birth (RR, 0.81; 95% CI, 0.74–0.90) (11). Further analysis of 1,888 of the participants also noted reduced failure to achieve a cephalic vaginal birth (RR, 0.90; 95% CI, 0.83–0.97) but an increased risk of preterm labor (RR, 1.51; 95% CI, 1.03–2.21) (11). The possible risk of preterm birth needs to be weighed against any benefits of ECV. Third, if complications arise during an attempted ECV, emergency cesarean delivery of a term infant can be accomplished (12).

There is scant information concerning ECV attempts among women who have a preexisting uterine scar or who undergo the procedure during the early stages of labor. Results from one small randomized controlled trial indicate that women with a previous cesarean delivery had ECV success rates comparable with those who had not had a cesarean delivery (13). Although no serious adverse events occurred in a small series (14), larger studies would be needed to establish the risk of uterine rupture. Previous cesarean delivery is not associated with a lower rate of success; however, the magnitude of the risk of uterine rupture is not known. There are scattered reports of successful ECV performed during early labor (9, 15); to date, however, no large study has been published.

External cephalic version is considered to be contraindicated if vaginal delivery is not clinically appropriate (16). The data are not adequate to clearly establish absolute or relative contraindications to ECV, and in many cases they may need to be individualized.

▶ *What are the benefits and risks of external cephalic version?*

The immediate benefit of successful ECV is an increased probability that the fetus will be in a vertex presentation for delivery. The ultimate goal is an uncomplicated vaginal delivery. Reports from published studies indicate that there are fewer cesarean deliveries among women who have undergone successful ECV compared with women who have not attempted ECV (12, 17). A recent review assessing the effects of ECV on breech presentation at or near term compared with no attempted ECV pooled data from eight studies involving 1,308 participants. This review noted a significant reduction in noncephalic presentation at birth (RR, 0.42; 95% CI, 0.29–0.61), a reduction in failure to achieve cephalic vaginal birth (RR, 0.46; 95% CI, 0.33–0.62), and a reduction in cesarean deliveries (RR, 0.57; 95% CI, 0.40–0.82) (1). No differences were noted for low Apgar score, low umbilical vein pH, or neonatal death (1).

Adverse events after ECV have been reported and include abruptio placentae, umbilical cord prolapse, rupture of membranes, stillbirth, and fetomaternal hemorrhage; all occurred at rates of less than 1% (18, 19). Fetal heart rate changes during attempted ECVs are not uncommon, but the heart rate usually stabilizes when the procedure is discontinued (20–23). A report from Copenhagen described two cases of intrauterine death 2 weeks and 5 weeks after ECV among 316 women and one instance of premature partial separation of the placenta 2 days after an unsuccessful ECV attempt (24). The two deaths could not be causally linked to ECV. In a study including pregnant women at 36 weeks of gestation or earlier, two cases of abruptio placentae and one case of premature labor occurred shortly after ECV, resulting in one neonatal and two fetal deaths (25). A follow-up study was conducted at the same institution, but changes in management practices and selection criteria were made that caused the outcomes to be difficult to compare (17). Only term gestations were selected, and tocolytic agents as well as fetal monitoring were used during ECV attempts. No fetal deaths were causally linked to ECV. The authors concluded that ECV can substantially decrease breech presentations and the cesarean delivery rate among these patients (17).

One study reported a case of abruptio placentae during an ECV attempt that required emergency cesarean delivery (26). It was the only major complication attributed to ECV among 113 women. Although the incidence of complications associated with ECV is low, the potential is present and, thus, ECV should be performed where prompt evaluation and, if necessary, cesarean delivery are readily available.

▶ *What are the success rates for external cephalic version, and what factors are predictive of success or failure?*

A meta-analysis of ECV-related risks concluded that the success rate for ECV ranged from 16% to 100%, with a pooled success rate of 58% and pooled complication rate of 6.1% (19). Some reports indicate a positive association between parity and successful version (12, 20, 21, 25, 27–31). A transverse or oblique presentation is associated with higher immediate success rates (27, 28, 32). Although scoring systems have been developed to predict which patients are more likely to have a successful ECV attempt, opinion is divided about the usefulness of other factors in predicting successful ECV, including amniotic fluid volume, location of the placenta, and

maternal weight. Moreover, these scoring systems have not been validated. Some reports indicate an association between normal or increased amounts of amniotic fluid and successful ECV (28, 30, 33, 34), whereas other reports do not (35). Two authors reported an association between successful ECV and placenta location (30, 35), but others failed to find an association (28, 32, 34). Two authors found that obesity was associated with a higher failure rate (21, 31), although others found that maternal weight was not a significant predictor of success (28, 34–36). Finally, nulliparity, advanced dilatation, fetal weight of less than 2,500 g, anterior placenta, and low station were more often associated with failure (35, 37, 38).

▶ *How does the use of tocolysis affect the success rate of external cephalic version?*

A randomized study of terbutaline found the success rate of ECV associated with use of this tocolytic to be almost double the rate without its use (39). In the vast majority of published studies, a tocolytic agent had been used routinely (12, 17, 20, 21, 23, 24, 26, 28, 29, 32, 34, 35, 40–44) or selectively (9, 13, 45), but only in rare cases were no tocolytic agents used (25). An extensive review that evaluated interventions for ECV included 28 studies, providing data from 2,706 participants. A subset of five studies with 459 participants revealed parenteral beta stimulant tocolysis was more effective in attaining cephalic presentation in labor (RR, 1.68; 95% CI, 1.14–2.48). A subset of six studies with 742 participants showed a reduction in cesarean deliveries (RR, 0.77; 95% CI, 0.67–0.88), whereas a subset of four studies with 399 participants showed a lower rate of failure to achieve a cephalic vaginal delivery (RR, 0.75; 95% CI, 0.60–0.92) (46). Evidence supports the use of parenteral tocolysis to improve the success of ECV.

Data were insufficient to analyze adverse effects of beta stimulant tocolysis. However, even the small amount of data available for the use of nitric oxide donors for ECV were sufficient to discourage its use (46). Data for the use of calcium channel blockers for ECV also were insufficient (46).

▶ *Does successful external cephalic version translate into lower cesarean delivery rates?*

Whether ECV results in a lower cesarean delivery rate for women with breech presentation who elect this procedure compared with those women who do not depends on several factors. The first factor is whether the ECV is successful; women who have successful ECV have lower cesarean delivery rates than those who do not (12, 20–22, 28–32, 34, 40, 47). Two randomized studies also have shown a significant decrease in cesarean delivery rates among patients assigned to ECV compared with those not assigned to ECV (17, 21). Only one study has suggested that women who have had successful ECV have higher cesarean delivery rates because of fetal distress and dystocia compared with matched controls without ECV (27). Recent reviews provide supportive evidence that ECV is associated with a reduction in cesarean deliveries (1, 46). Factors that tend to lessen overall differences between ECV and non-ECV groups include spontaneous conversion of presentation from breech to vertex or vice versa and the willingness of obstetrician–gynecologists and other obstetric care providers to perform vaginal breech deliveries. The need to perform a cesarean delivery for other indications in women who have had a successful ECV also may lessen the overall effect of ECV on the cesarean delivery rate.

External cephalic version is a valuable management technique and, in a properly selected population, poses little risk to either the woman or the fetus. If successful, ECV provides a clear benefit to the woman by allowing her an opportunity for a successful vertex vaginal delivery. Because the risk of an adverse event occurring as a result of ECV is small and the cesarean delivery rate is significantly lower among women who have undergone successful ECV, all women who are near term with breech presentations should be offered an ECV attempt if there are no contraindications.

▶ *How does the use of anesthesia affect the success rate of external cephalic version?*

Individual studies have found a significantly greater success rate for ECV associated with the use of epidural anesthesia; however, these studies may have been biased by low overall ECV success rates or physician preferences (15, 41, 48). It also has been suggested that epidural anesthesia be considered for women with a previous failed ECV attempt (49). One randomized trial addressed the use of spinal anesthesia before the ECV attempt and found no significant difference in ECV success between the group with spinal analgesia and the group with no spinal analgesia (44% versus 42%, respectively; P=.863) (50). Another randomized trial noted a significant difference in ECV success between spinal analgesia plus tocolysis versus tocolysis alone (87.1% versus 57.5%, respectively; P=.009; 95% CI, 0.075–0.48) (51).

A recent review of interventions for ECV also investigated the use of regional anesthesia for ECV (46). Six studies, including 409 participants, were available for analysis and identified that regional anesthesia in combination with tocolytics had a lower failure rate than tocolytics alone (RR, 0.61; 95% CI, 0.43–0.86).

No significant difference was noted in cephalic presentation in labor, cesarean delivery, or fetal bradycardia (46). A meta-analysis evaluating the success of regional anesthesia similarly noted increased success for ECV with regional (spinal or epidural) anesthesia compared with ECV without regional anesthesia (59.7% versus 37.6%, respectively; pooled RR, 1.58; 95% CI, 1.29–1.93) and did not identify a difference in cesarean delivery rates (48.4% versus 59.3%, respectively; pooled RR, 0.80; 95% CI, 0.55–1.17). Stratifying between epidural and spinal methods did not identify any difference in success of ECV (52). Data are insufficient to conclusively evaluate regional anesthesia without tocolysis or to make a recommendation favoring spinal or epidural anesthesia during ECV attempts.

▶ *What is an example of a standard protocol for performing an external cephalic version?*

Before attempting ECV, an ultrasound examination is necessary to confirm the malpresentation of the fetus and rule out the presence of any anomalies that would complicate a vaginal delivery. Informed consent is needed and may include risks and benefits of the procedure as well as use of tocolysis and regional anesthesia if they are to be used for an ECV. Fetal well-being and contraction pattern should be assessed by a nonstress test or biophysical profile before and after the procedure (see Fig. 1). External cephalic version should be attempted only in settings in which cesarean delivery services are readily available.

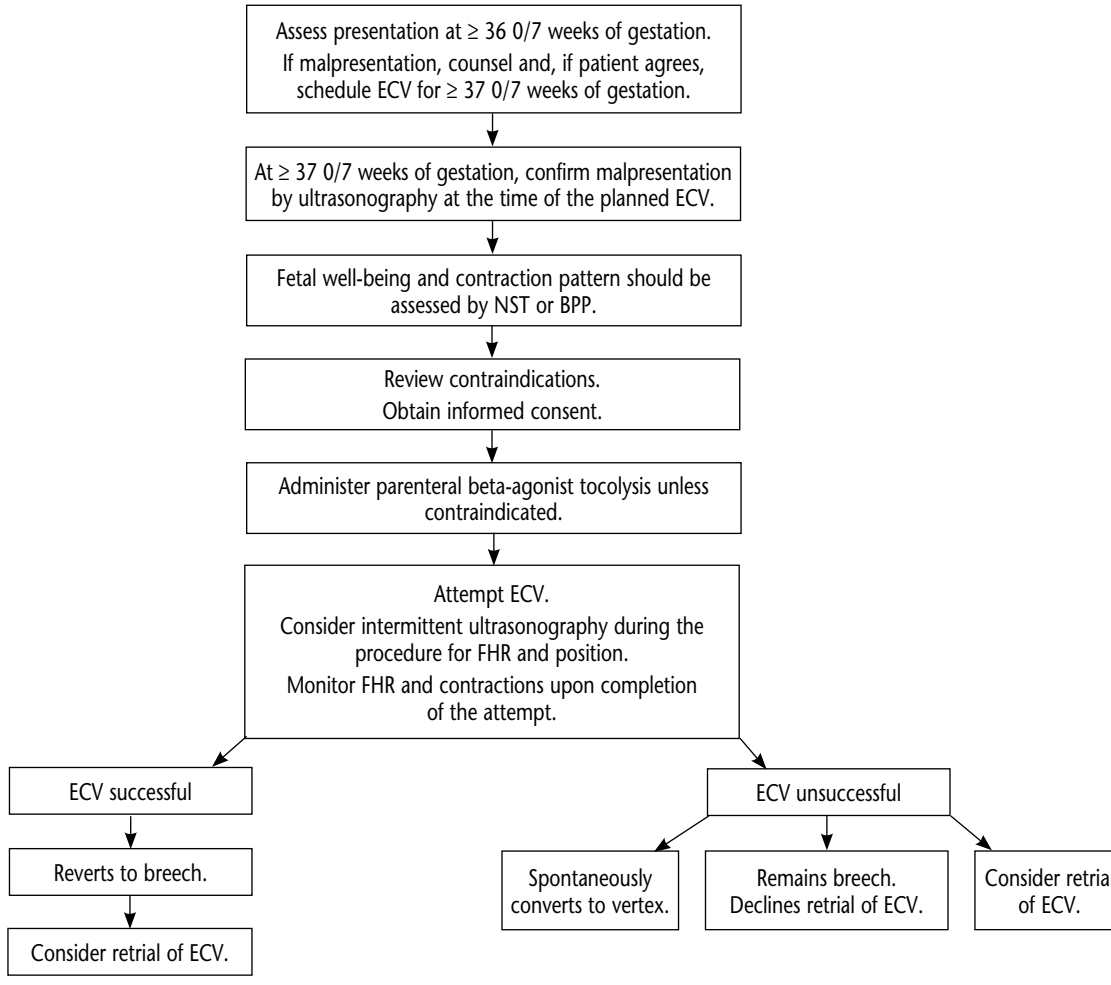

Fig. 1. An algorithm for patient management for external cephalic version. Note: All Rh-negative women who undergo an ECV attempt, whether successful or not, should receive Rh immune globulin unless they are known to have an Rh-negative fetus, are already sensitized, or will give birth in less than 72 hours and can have an assessment for risk of sensitization. Abbreviations: BPP, biophysical profile; ECV, external cephalic version; FHR, fetal heart rate; NST, nonstress test. ⇦

One ECV technique involves lifting the breech upward from the pelvis with one hand and providing pressure on the head with the other hand to produce a forward roll. If the forward roll fails, a backward roll somersault may be attempted. External cephalic version may be performed by one or two people. During the ECV procedure, intermittent use of ultrasonography allows for evaluation of the fetal heart rate as well as the position of the fetus. An ECV attempt should be abandoned if there is significant fetal bradycardia, discomfort to the patient, or if the procedure cannot be completed easily with the aforementioned maneuvers. After the ECV attempt, fetal evaluation is repeated, and the patient is monitored for 30 minutes (or longer, if clinically indicated). Anti-D immune globulin is administered to Rh-negative patients if delivery is not anticipated in the next 72 hours. There is no evidence to support the routine practice of immediate induction of labor in order to minimize reversion.

▶ *What are the cost implications of external cephalic version?*

A decision analysis measuring various cost implications calculated that the use of ECV would result in fewer cesarean deliveries and lower costs than either scheduled cesarean delivery or trial of labor without an ECV attempt (53). Even if failed ECV attempts were followed by routine cesarean delivery, the overall cesarean delivery rate would be lower than that of a trial of labor without an ECV attempt. Sensitivity analysis revealed that as long as less than 52% of all breech presentations are eligible for a trial of labor, a policy of attempting ECV followed by either a trial of labor or routine cesarean delivery (for failed attempts) would be less expensive than a policy of routine cesarean delivery or trial of labor without ECV (53). Another computer-based decision model used hospital costs and quality-adjusted life years gained to determine the cost effectiveness in dollars of ECV (54). External cephalic version appeared to be cost-effective as long as the probability of success was greater than 32% (54).

Summary of Recommendations and Conclusions

The following recommendation is based on good and consistent scientific evidence (Level A):

- Because the risk of an adverse event occurring as a result of ECV is small and the cesarean delivery rate is significantly lower among women who have undergone successful ECV, all women who are near term with breech presentations should be offered an ECV attempt if there are no contraindications.

The following recommendation and conclusions are based on limited or inconsistent scientific evidence (Level B):

- Fetal presentation should be assessed and documented beginning at 36 0/7 weeks of gestation to allow for ECV.
- Previous cesarean delivery is not associated with a lower rate of success; however, the magnitude of the risk of uterine rupture is not known.
- Evidence supports the use of parenteral tocolysis to improve the success of ECV.

The following recommendations are based primarily on consensus and expert opinion (Level C):

- Fetal well-being and contraction pattern should be assessed by a nonstress test or biophysical profile before and after the procedure.
- External cephalic version should be attempted only in settings in which cesarean delivery services are readily available.

Performance Measure

The percentage of women who are identified with a fetal malpresentation at 36 0/7 weeks of gestation or later (without contraindication to a vaginal delivery) and counseled about the option of ECV

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The MEDLINE database, the Cochrane Library, and the American College of Obstetricians and Gynecologists' own internal resources and documents were used to conduct a literature search to locate relevant articles published between January 1981–October 2014. The search was restricted to articles published in the English language. Priority was given to articles reporting results of original research, although review articles and commentaries also were consulted. Abstracts of research presented at symposia and scientific conferences were not considered adequate for inclusion in this document. Guidelines published by organizations or institutions such as the National Institutes of Health and the American College of Obstetricians and Gynecologists were reviewed, and additional studies were located by reviewing bibliographies of identified articles. When reliable research was not available, expert opinions from obstetrician–gynecologists were used.

Studies were reviewed and evaluated for quality according to the method outlined by the U.S. Preventive Services Task Force:

- I Evidence obtained from at least one properly designed randomized controlled trial.
- II-1 Evidence obtained from well-designed controlled trials without randomization.
- II-2 Evidence obtained from well-designed cohort or case–control analytic studies, preferably from more than one center or research group.
- II-3 Evidence obtained from multiple time series with or without the intervention. Dramatic results in uncontrolled experiments also could be regarded as this type of evidence.
- III Opinions of respected authorities, based on clinical experience, descriptive studies, or reports of expert committees.

Based on the highest level of evidence found in the data, recommendations are provided and graded according to the following categories:

Level A—Recommendations are based on good and consistent scientific evidence.

Level B—Recommendations are based on limited or inconsistent scientific evidence.

Level C—Recommendations are based primarily on consensus and expert opinion.

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