

## A Comprehensive Review of the Research Literature on External Cephalic Version (ECV)

### *Une recension systématique des écrits scientifiques portant sur la version céphalique externe (VCE)*

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#### ABSTRACT

External cephalic version (ECV) is an approach to turning a fetus from the breech presentation by external maneuvering of the fetus through the maternal abdominal wall into a cephalic presentation. We conducted a systematic search of the current literature on ECV to provide a comprehensive overview of the procedure and associated success rates, risks, and alternatives to ECV. Tocolytics can improve ECV success, but none of the tocolytics shown to be effective for ECV are currently available in Canada. The factors that can best predict ECV success are low uterine tone (associated with parity or tocolytics), easy palpation of the fetal head, and an unengaged breech. The most common side effect of ECV is transient fetal bradycardia with an incidence of one to six percent of all ECV procedures. The risk of requiring an emergency caesarean section because of ECV appears to be around 0.5% or one in 200 ECV procedures performed. Our review suggested no significant risk of fetal/neonatal mortality or serious morbidity associated with ECV. Few alternative approaches to turning a fetus in the breech presentation have been adequately studied. ECV should be considered for all women with a fetus in the breech presentation at term in the absence of any contraindications to the procedure.

#### KEYWORDS

*external cephalic version, breech presentation, midwifery*

*This article has been peer-reviewed.*

#### RÉSUMÉ

La version céphalique externe (VCE) est une approche pour tourner un fœtus en présentation de siège par une manipulation externe du fœtus à travers la paroi abdominale maternelle, et ce, pour le mettre en présentation céphalique. Nous avons effectué une recension systématique des écrits courants portant sur la VCE afin de fournir une vue d'ensemble de ce procédé, du taux de réussite, des risques et des alternatives. Les produits tocolytiques peuvent améliorer la réussite de la VCE, mais aucun des produits tocolytiques qui ont fait preuve d'efficacité pour la VCE ne sont disponibles au Canada. Les facteurs qui peuvent le mieux prédire la réussite de la VCE sont le tonus utérin faible (associé à la parité et aux produits tocolytiques), une bonne palpation de la tête fœtale ainsi qu'un siège non-engagé. L'effet secondaire le plus commun de la VCE est une bradycardie fœtale transitoire avec une incidence d'un à six pour cent de tous les procédés de VCE. Le risque d'avoir recours à une césarienne d'urgence à cause d'une VCE est de 0.5% ou d'une pour 200 procédés de VCE effectués. Notre recension ne démontrait aucune augmentation du risque de mortalité fœtale/néonatale, ni de morbidité sévère associée avec la VCE. Peu d'approches alternatives pour tourner un fœtus en présentation de siège ont été étudiées de façon adéquate. La VCE devrait être considérée pour toutes les femmes avec un fœtus en présentation de siège rendu à terme lorsqu'il n'y a pas de contre-indications à ce procédé.

## MOTS CLÉS

version céphalique externe, présentation de siège, pratique sage-femme

Cet article a été évalué par des pairs.

### Introduction

Among term births, three to four percent of neonates present in the breech presentation, and this is consistent across all ethnic groups.<sup>1</sup> Following the report of a large multi-centre randomised trial which found that perinatal/neonatal morbidity and mortality was significantly lower for planned caesarean section versus planned vaginal delivery, the majority of Canadian women with a fetus in the breech presentation will give birth by caesarean section.<sup>2-4</sup> External cephalic version (ECV) is the only intervention proven to lower the rate of primary caesarean section,<sup>5</sup> and is described as an approach to risk management for breech presentation by the Society of Obstetricians and Gynecologists of Canada.<sup>6</sup> However, many eligible women are not offered ECV, and even fewer actually have the procedure.<sup>2,7</sup>

Each of the management options for breech presentation has benefits and risks. Whether a woman chooses an ECV, an elective caesarean section, or a planned vaginal birth reflects the relative importance she places on such factors as success rate, side-effects, potential harms, time constraints, delivery preference and delivery options available in her community.<sup>8</sup> Although most pregnant women have a preference for vaginal delivery with cephalic presentation, when faced with a breech presentation many are unsure about ECV due to perceived risks associated with the procedure.<sup>9</sup> Being able to provide relevant information about the options for managing a pregnancy complicated by a fetus in the breech presentation is essential to midwifery practice.

To facilitate informed discussion, this paper describes the ECV procedure and its importance in current obstetric practice. Success rates, risks of the procedure, ways to maximise success and predictors of success are summarised. Methods to incorporate

ECV into midwifery practice are discussed and alternative approaches to turning fetuses in the breech presentation are reviewed.

### Methods

A systematic search of five databases, AMED (Allied and Complementary Medicine), CINAHL, EMBASE, MEDLINE and the Cochrane Database of Systematic Reviews was conducted to locate relevant articles regarding the outcomes, risks, and the predictors and facilitators of success of external cephalic version. In order to provide an overview of current literature on this topic, systematic review articles and meta-analyses were used where available, including systematic reviews from the Cochrane Library. Recent original research articles were consulted to add to the findings of reviews, and to provide specific information about aspects of ECV that have not been extensively studied. Because of changes in the approach to ECV with the use of ultrasound and monitoring, research articles prior to 1990 were only included where they were considered primary resources for the epidemiological description of the topic.

### External Cephalic Version

External cephalic version (ECV) is a procedure that involves manually turning the fetus through the maternal abdomen from a breech to a cephalic presentation, and it is normally conducted in an environment where complications can be managed. Preparatory guidelines for arranging ECV are presented in Figure 1, and an explanation of the ECV procedure in Figure 2.

In a survey of Canadian practitioners, the median self-estimated success rate of those who performed ECV was 30% for nulliparous women and 58% for parous women.<sup>3</sup> These rates seem consistent with rates from other studies.<sup>10,11</sup> After a successful ECV, the rate of vaginal delivery is at least 80%,<sup>10</sup> and ECV

remains the only evidence-based intervention to increase the probability of vaginal delivery for women with a breech presentation at term.<sup>5</sup>

### *Risks of ECV*

When ECV is attempted in an environment where emergencies can be appropriately managed, the risk to the woman and her fetus is low.<sup>5</sup> Complications are infrequent, and caesarean section can resolve most complications that might be encountered. The risk of any complications leading to immediate caesarean section is approximately 0.5 percent, or one in 200 ECV procedures.<sup>12</sup> There is not enough evidence from randomised trials to assess complications of external cephalic version at term compared to no ECV. The information available to draw conclusions about the risks of ECV comes from small randomised trials and larger cohort studies. In this review, the results of two recent systematic reviews as well as two large observational studies not included in the reviews are assessed to provide a summary of the risks of ECV (Table 1).<sup>12-15</sup>

The most common side effect of ECV reported in the literature is transient bradycardia or abnormal cardiotocogram (CTG) (1.5-6.7%).<sup>12-15</sup> Transient changes in the fetal heart rate pattern are thought to represent a normal physiological response to the procedure, reflecting a mature nervous system.<sup>16</sup> Persistent bradycardia is much less common, but is the leading indication for emergency caesarean section following ECV.<sup>12-14</sup> In a case series of 805 ECVs, Collins et al. report two cases where caesarean section was indicated because of abnormal CTG persisting more than 20 minutes after the procedure (2/805, 0.25%).<sup>12</sup> A systematic review by Nassar et al. of controlled studies comparing ECV with no ECV for eligible women reports a higher rate of FHR changes leading to delivery (2/183, 1.1%).<sup>14</sup> The denominator in this paper may be underestimated however, as at least one study reviewed by Nassar but not included in the calculation of fetal heart rate changes leading to delivery reported no complications associated with 200 ECVs, including the need for emergency caesarean section.<sup>17</sup>

Version-related vaginal blood loss is reported in 0.3-0.6% of ECVs, but in the majority of cases the bleeding is not clinically significant.<sup>12,14,15</sup> Placental

**Figure 1:** *Preparing for ECV*

### **Screen for Contraindications**

#### *Absolute contraindications*

- Any contraindication to vaginal birth
- Planned caesarean section for any reason
- Multiple pregnancy
- Placenta previa
- Recent significant antepartum hemorrhage
- Severe oligohydramnios
- Severe polyhydramnios
- Maternal cardiac disease
- Major life-threatening fetal anomalies
- Fetal heart rate abnormalities
- Intrauterine growth restriction (IUGR)

#### *Relative contraindications*

- Ruptured membranes
- Uterine anomalies
- Hyper-extended fetal head

#### *Ultrasound in preparation of ECV to assess:*

- Type of breech (frank, complete, footling)
- Position of fetal back and neck
- Estimated fetal weight and abdominal circumference
- Amniotic fluid volume
- Placental site

abruption is confirmed in approximately 0.1% or one in 1000 ECVs, and even in these cases, with prompt delivery the outcome is consistently good.<sup>18</sup> Attempts to determine the incidence of disruption to the maternal-placental interface with ECV are traditionally achieved with the Kliehauer-Betke test. In studies where this test was routinely performed after an ECV attempt, fetal-maternal haemorrhage occurred in 1.5 – 3.7% of cases regardless of ECV success.<sup>13,14,18</sup> In a subsequent study of cell-free fetal DNA as a more sensitive marker for sub-clinical fetal-maternal haemorrhage, the researchers showed a significant rise in the fetal DNA level associated with ECV, representing a disturbance of the maternal-fetal transfer of either fetal cells or fetal DNA.<sup>19</sup> Because of the documented risk of fetal-maternal haemorrhage, it

## Figure 2: Description of External Cephalic Version

### Pre-procedure

- *Non-stress test*  
A 20 minute non-stress test or biophysical profile is carried out and must be reassuring before the procedure is started.
- *Consent*  
Success rates, risks and benefits are explained, the procedure is described, and consent for ECV as well as for emergency caesarean section is obtained.
- *Positioning*  
The woman lies on her back with her legs slightly flexed at the knee. Keeping arms extended and at sides enhances abdominal relaxation.

### ECV Procedure

- The practitioner disengages the breech using both hands and lifts the breech to one side (usually the side opposite the cephalic pole)
- The fetal head is encouraged downward in a forward roll by the application of pressure to both poles (maximum pressure on breech)
- The practitioner may pause at any time to auscultate the fetal heart, to promote maternal relaxation, or to allow the fetus to settle into a new position
- A backward roll may be attempted if the forward roll is unsuccessful
- The ECV is discontinued if the fetal heart rate is abnormal, if the woman is excessively uncomfortable or requests discontinuation, or if continued attempts are unsuccessful

### Post-procedure

- The presentation is confirmed using ultrasound
- A non-stress test is completed to ensure fetal well-being
- Anti-D immunoglobulin is provided for Rhesus negative women

is recommended that all Rhesus-negative women be provided with anti-D immunoglobulin 300 µg after ECV to prevent alloimmunization.<sup>20</sup> Routine testing to quantify fetal-maternal haemorrhage is recommended, and if a result of more than 15 ml fetal red blood cells occurs, additional anti-D immunoglobulin (10 µg for every 0.5 ml fetal red blood cells above 15 ml) should be given.<sup>20</sup>

Although considered a relative contraindication by some, ECV is an option for women with a prior low segment uterine scar. There are no reports of uterine rupture attributable to ECV as it is currently performed,<sup>13-15,21,22</sup> however, the number of reported cases involving women with a previous caesarean section or myomectomy are low.<sup>12</sup> In two studies (n=38 and n=56) of ECV after one previous low-segment caesarean section, ECV success is high (66% and 82% respectively) and no complications are reported.<sup>21,22</sup> Fifty percent of women in one study achieved a vaginal birth (19/38).<sup>21</sup> Multiparous women who have delivered a previous breech baby have a one in ten chance of having a subsequent breech pregnancy, and have a much lower rate of spontaneous version than other multiparous women.<sup>23</sup> Flamm et al. show a high success rate of ECV even with a high proportion of the women having breech presentation as the indication for their first caesarean.<sup>22</sup>

There is no evidence to suggest that ECV induces labour. In a controlled study by Nassar et al. the rate of prelabour rupture of membranes (PROM) and/or spontaneous onset of labour for women within 24 hours of ECV at term (n=399) was no different than for women with breech pregnancies who did not have an ECV at the same gestational age (n=161).<sup>15</sup> Regalia et al., who conducted a case series of 923 ECVs, found a rate of 1.9 percent rupture of membranes within 48 hours of ECV.<sup>24</sup> Collins et al. reported one case of spontaneous rupture of membranes occurring during the ECV leading to a caesarean section due to persistent breech presentation (n=805).<sup>12</sup> Cord prolapse with spontaneous rupture of membranes following ECV rarely occurred. In Nassar's systematic review of adverse outcomes associated with ECV there were no cases of cord prolapse,<sup>14</sup> and in her subsequent retrospective audit of ECVs, one case was reported

**Figure 3: Key Points for Discussing ECV to Enhance Informed Choice**

*Key points for discussion*

- 3-4% of all fetuses at term are in the breech presentation at delivery (see Table 2 for rates of spontaneous version)
- Typical success rates of ECV are 30% for nulliparous women and 60% for parous women
- Vaginal birth after a successful ECV is around 80%
- The key predictors of ECV success are low uterine tone, palpable fetal head, and unengaged breech

*Side effects of ECV*

- Transient fetal bradycardia occurs around 6% of the time and is thought to be a normal fetal response
- Fetal-maternal hemorrhage is known to occur, and it is recommended that Rh-negative women receive anti-D immunoglobulin 300 microg
- Around 30% of women find the procedure to be painful

*Complications of ECV*

- Persistent fetal bradycardia occurs less than 1% of the time
- Vaginal bleeding associated with placental abruption is low (1/1000, 0.1%)
- PROM occurring during the procedure is extremely rare
- ECV has not been shown to induce labour
- The risk of any complication necessitating an urgent caesarean section is 0.5% or 1 in 200 ECVs

*Alternative approaches*

- Alternate approaches to turning a fetus from breech to cephalic presentation are not nearly as well studied as ECV
- Moxibustion is a promising approach with small studies showing some benefit
- There is no study to examine the effectiveness of the Webster technique
- Maternal posturing techniques are not shown to be helpful

(1/399, 0.3%).<sup>15</sup> Regalia et al. report two cases of cord prolapse, but in both cases, the ECV was performed during early labour.<sup>24</sup> Although there may be a small risk of cord prolapse associated with the ECV procedure, it is possible that a successful ECV may reduce the overall risk of cord prolapse as both malpresentation and unengagement are risk factors for cord prolapse.<sup>13,25</sup>

The incidence of fetal demise among women who have an ECV is similar to a low-risk pregnancy population between 36 and 40 weeks.<sup>13</sup> There is no significant difference in the incidence of perinatal death among women who have an ECV procedure compared to those women with persisting breech presentation who do not have an ECV.<sup>14</sup> In two articles that together report the outcomes of 1204 ECVs, there are no perinatal deaths attributable to ECV.<sup>12,15</sup> Fetal trauma and amniotic fluid embolism have been listed in obstetrical texts as risks associated with ECV.<sup>25</sup> Fetal trauma appears to be extremely rare, with one case of femur fracture in the fetus thought to be caused by ECV reported in a systematic review that included 7377 cases.<sup>13</sup> We did not find any reports of amniotic fluid embolism associated with ECV in studies, reviews, or case reports.

*Maximizing ECV success*

**Tocolysis**

A Cochrane review concluded that routine tocolysis with beta-mimetics increases the success rate of external cephalic version at term.<sup>26</sup> The meta-analysis indicated that routine tocolysis with beta-mimetics was associated with a 26% decreased risk of ECV failure (6 trials, 617 women, RR 0.74, 95% CI 0.64–0.87) and a 15% decrease of caesarean section (3 trials, 444 women, RR 0.85, 95% CI 0.72–0.99).<sup>26</sup> Beta-mimetics that have been used for ECV include ritodrine, terbutaline, hexaprenaline and salbutamol. They act by stimulating the beta receptors on smooth muscle, including the myometrium, to effect uterine relaxation. Side effects include tachycardia, palpitations, hypotension, tremor, agitation, pulmonary edema, hypokalemia and hyperglycemia.<sup>6</sup> Some practitioners may prefer to avoid the side effects associated with tocolytics by following a policy of using tocolytics only when an initial attempt at ECV

**Table 1: Studies of Adverse Outcomes of ECV**

Author/Year/Location	Collaris RJ, Oei G. (2004) <sup>13</sup>	Nassar N, Roberts CL, Barratt A, et al. (2006) <sup>14</sup>	Nassar N, Roberts CL, Cameron CA, Peat B. (2006) Australia <sup>15</sup>	Collins S et al. (2007) United Kingdom <sup>12</sup>
Study Description	Review of 44 studies that reported on outcomes and complications of ECV including 7377 women (1990-2002).	Systematic review of 11 randomized trials, cohort and case-control studies that compared ECV with control group including 2503 women (1983-1997).	Retrospective audit of 1070 women with breech presentation at term (1997-2004). Women eligible for ECV compared. ECV group (n=399) vs. No ECV (n=161); 68% nulliparous in ECV group, 0% previous caesarean section.	Prospective case series of 805 women who had an ECV. Predominantly Caucasian, 58% nulliparous, 3% previous caesarean section.
ECV success rate	59%	68%	39%	44%
Success in nulliparous women		48%	31%	
Success in parous women		78%	57%	
Spontaneous reversion to breech after successful ECV	5.6%	3%	2.5%	3%
Spontaneous cephalic version after unsuccessful ECV	-	4%	1.2%	3%
<b>Adverse outcomes</b>				
<i>Side effects of ECV</i>				
Mild or moderate pain	-	109/313 (34.8%)	-	-
Fetomaternal transfusion	18/486 (3.7%)	4/260 (1.5%)	-	-
Transient bradycardia	347/6088 (5.7%)	49/731 (6.7%)	6/399 (1.5%)	13/805 (1.6%)
Persistent bradycardia > 20 minutes	27 (0.37%)	2/183 (1.1%)	0/399 (0.0%)	2/805
PROM during procedure	-	-	-	1/805 (0.1%)
PROM within 24 h	-	0/25 (0.0%)	3/399 (0.8%)	-
Spontaneous labour within 24 h	-	7/863 (1.0%)	5/246 (2.0%)	-
<i>Maternal outcomes</i>				
Admitted for observation	-	-	-	39/805 (5%)
Vaginal bleeding	35/7447 (0.47%)	2/618 (0.3%)	2/399 (0.6%)	-
Placental abruption	9/7500 (0.12%)	0/158 (0.0%)	0/399 (0.0%)	1/805 (0.1%)
Uterine rupture	-	0/103 (0.0%)	0/399 (0.0%)	0/805 (0.0%)
Scar dehiscence	-	-	-	0/805
Emergency CS related to ECV	32/7442 (0.43%)	-	-	4/805 (0.5%)
Indication:				
Transient FHR changes	4	-	0/399	0/805 (0.0%)
Persistent FHR changes	22	2/183 (1.1%)	0/399	2/805 (0.3%)
Vaginal blood loss	17	-	1/399	1/805 (0.1%)
Umbilical cord complications	3	-	0/399	0/805 (0.0%)
Rupture of membranes during ECV	-	-	0/399	1/805 (0.1%)
Mode of delivery after successful ECV				
Spontaneous vaginal delivery	-	-	131/153 (86.8%)	255/345 (74%)
Instrumental vaginal delivery	-	-	-	57/345 (16.5%)
Emergency cesarean section	-	-	20/153 (13.3%)	33/345 (9.5%)
<i>Fetal outcomes</i>				
Cord prolapse	-	0/200 (0.0%)	1/399 (0.3%)	-
Cord presentation	-	-	2/399 (0.6%)	-
Fetal trauma (fractures or bruising)	1	-	-	0/805 (0.0%)
Neonatal encephalopathy	-	-	-	0/805 (0.0%)
Apgar score < 7 at 5 minutes	-	-	7/399 (1.7%)	3/800 (0.3%)
Arterial pH at delivery <7.05	-	-	-	9/489 (1.8%)
NICU admission	-	-	24/399 (6.1%)	36/805 (4.5%)
Perinatal mortality	12/7500 (1.6 per 1000)	2/437 (4.6 per 1000)	0/399 (0.0 per 1000)	1/805 (1.2 per 1000)

has been unsuccessful.<sup>6</sup> This approach is supported by one randomised trial that demonstrates a relatively high success rate with minimum usage of tocolysis.<sup>27</sup> Tocolysis with beta-mimetics is a standard part of the ECV procedure in many parts of the world; however, these drugs are not available for this purpose in Canada. The SOGC recommends first attempting ECV without a tocolytic, and if unsuccessful, to consider uterine relaxation by nitroglycerin.<sup>6</sup> Nitroglycerin is a vasodilator that acts by forming nitric oxide and affecting the chain of events that ultimately regulates the contraction of smooth muscle. A more common use of nitroglycerin in obstetrics is the treatment of uterine hyper stimulation in labour. In trials comparing the use of nitroglycerin with ritodrine for the facilitation of ECV, nitroglycerin was not found to be helpful,<sup>28, 29</sup> and nitroglycerin use was associated with an increased occurrence of post procedure headache.<sup>28</sup>

### Regional Analgesia

External cephalic version can be uncomfortable or even painful for some women, and this may interfere with version efforts. Regional analgesia can be used during ECV to ensure maternal comfort and abdominal relaxation. A Cochrane Review analysed the data from randomised trials that compared the use of regional analgesia to facilitate ECV with ECV alone. Two of the studies used epidural analgesia, and the other three studies used spinal analgesia. In the trials that used epidural

analgesia, there was significantly less failure of ECV; however, there was no difference when spinal epidural was used.<sup>26</sup> The Cochrane authors postulate that the preloading of fluid for women who receive epidural analgesia, along with the time allowed between its administration and the ECV procedure is sufficient to increase the amniotic fluid volume, and make ECV easier and more successful.<sup>26</sup> The combined trials are not large enough to establish the safety of regional analgesia for ECV.<sup>30-32</sup> The Cochrane review concludes that conflicting results between the studies of epidural and spinal analgesia for ECV confound generalizations about the usefulness of regional analgesia for ECV and further research is needed.<sup>26</sup> In addition, there is concern that without feedback from women regarding pain sensation, too much force may be applied to turn the fetus and this may in turn increase the occurrence of complications. Alternately, it is possible that by decreasing maternal abdominal resistance, less force may be required to turn the fetus.

The use of regional analgesia to facilitate ECV increases the complexity and required expertise of the procedure, and may alter the risks associated with ECV. These factors may make ECV with regional analgesia less acceptable to practitioners and to women. On the other hand, women who are fearful of the discomfort associated with ECV may be more likely to proceed if analgesia is offered. In a 2001 survey of Canadian practitioners who

**Table 2:** *Breech Presentation and Likelihood of Spontaneous Version by Gestational Age*

Gestational Age	Breech Presentation 1, 23, 52 - 55	Likelihood of spontaneous cephalic version prior to delivery <sup>23</sup>		
		Multiparous - no previous breech delivery	Multiparous - previous breech delivery	Primiparous
28 weeks	20 - 24 %			
32 weeks	7 - 15 %	78%	32%	46%
34 weeks	5 - 12 %			
37 + weeks	3 - 7 %	28%	7%	8%
At delivery	3 - 4 %			

perform ECVs, nine percent indicated using epidural analgesia, and most used it selectively.<sup>3</sup>

### Other Approaches

Acoustic stimulation of the fetus evokes a startle response including a change in neurobehavioural state, an increase in body movements, and a temporary acceleration of the fetal heart rate.<sup>33</sup> When used as an adjunct to the ECV procedure, one small trial of 26 women reports a much lower failure rate than when ECV was performed alone [RR 0.17, 95% CI 0.05–0.60].<sup>34</sup> Confirmation of the findings is needed before widespread use.<sup>26</sup> In one study, ECV with tocolysis and vibroacoustic stimulation was compared with no ECV at term.<sup>17</sup> The ECV success rate was 55% in this study, and there were no major complications reported.<sup>17</sup>

Amnioinfusion is a procedure of infusing saline into the amniotic sac.<sup>26</sup> There are no randomised trials to assess the effectiveness of the intervention for the facilitation of ECV, and observational studies are conflicting. In a pilot study of seven women, amnioinfusion to increase the amniotic fluid index in women who had one unsuccessful ECV and low amniotic fluid did not result in any successful ECVs.<sup>35</sup> This is in direct contrast to a study of six women with a failed ECV who all underwent a successful ECV after amnioinfusion.<sup>36</sup> There is inadequate information to support this intervention.

### Following ECV

After an unsuccessful ECV, there is a small chance that the fetus will spontaneously turn to a cephalic presentation. A study of this phenomenon found as many as 12% of fetuses would still turn for parous women, but only two percent for nulliparous women.<sup>40</sup> This is higher than the findings in most studies which report rates of spontaneous version after failed ECVs ranging from one to four percent overall.<sup>12,14,15,21</sup> Similarly, rates of reversion to breech following a successful ECV appear to be low, ranging from 2.5 to 6%.<sup>12-15</sup>

Repeating the ECV procedure after a failed procedure is a common protocol. A double blinded randomised controlled trial of repeat ECV procedures using tocolysis versus no tocolysis had

additional successful ECVs in both groups with the tocolysis group showing the highest rate of success (29.0% versus 11.3%) [RR 3.21, 95% CI 1.23–8.39].<sup>27</sup> Some practitioners use tocolytics or analgesics only for repeat ECV procedures. Single cohort observational studies, both prospective and retrospective, indicate that the use of epidural facilitated ECV after an unsuccessful procedure may improve overall ECV success rates, but because there is no comparison group these findings cannot be conclusive.<sup>37-39</sup>

### Timing of ECV

The current practice of performing ECV at term gestation is based on the rationale that by term most spontaneous versions that are going to occur will have done so, and that if emergency delivery is required as a result of a complication resulting from the ECV, a term infant will be born.<sup>5</sup> In addition, the research evidence confirms relative safety when ECV is performed after 37 weeks gestation. A pilot trial to determine if starting ECV just prior to full term (34–36 weeks gestation) would decrease the likelihood of the fetus being non-cephalic at birth found a 9.5% reduction in the rate of non-cephalic presentation at birth when compared to ECV at term (37–38 weeks gestation) [RR 0.86, 95% CI 0.70–1.05].<sup>41</sup> Although not statistically significant ( $p=0.09$ ), this finding is clinically important and suggests that there may be a real benefit to beginning the procedure early. However, in order to support a clinical policy of initiating ECV earlier than 37 weeks gestation, the early procedure must be shown to be useful and not harmful. A large pragmatic trial is now being undertaken.<sup>42,43</sup>

### Predictors of ECV success

Achieving or predicting a successful ECV will not necessarily predict a successful vaginal delivery. There is evidence to suggest that women who have had a successful ECV are more likely to have obstetrical interventions in labour such as assisted vaginal delivery or emergency caesarean section.<sup>44,45</sup> The increase in the rate of emergency caesarean section is attributed to an increase in labour dystocia.<sup>44</sup> Since ECV at term is more successful when the breech is unengaged in the pelvis, having a successful ECV may be a marker for



a less good fit of the presenting part to the pelvis leading to this higher rate of dystocia. Although many studies have examined predictors of successful ECV, there is currently no way to consistently predict which women will go on to have a vaginal delivery. An attempt at building a prediction model for ECV and successful vaginal delivery has been unsuccessful.<sup>46</sup>

The success of ECV is consistently higher among parous women compared to nulliparous women.<sup>47,48</sup>

Although it would follow that multiparity is a predictor of ECV success, a thorough review of the literature conducted in 2005 reveals that the key predictors of ECV outcome are uterine tone, ease of palpation of the fetal head, and the degree of descent of the fetal breech.<sup>10</sup> Each of these relatively subjective clinical factors may be more favourable for a multiparous woman. This same literature review found that when uterine tone is assessed as a degree of relaxation of the uterus, or of the ease of palpating the fetus, parity becomes insignificant as a predictor of success when uterine tone is controlled for.<sup>10</sup> Since uterine tone is influenced by tocolytics, the assessment of uterine tone as a predictor may not be possible prior to an attempt at the procedure when tocolytics are to be used. The ease of palpation of the fetal head differs from uterine tone because there are several other factors that can affect clinical palpation such as maternal obesity, abdominal muscular wall, placental location, and the location of the fetal head relative to maternal ribs. The degree of descent or engagement of the fetal breech is another predictive variable for the success of ECV, with an undescended breech being more likely to turn. Engagement usually occurs earlier in gestation among nulliparous women, which may partly explain the increased success among multiparous women when ECV is performed after 37 weeks gestation. Furthermore, it may explain the differences among ethnic groups as engagement typically occurs later among black nulliparous women, and ECV appears to be more successful among this group.<sup>49</sup> This finding may also lend support to the hypothesis that beginning ECV earlier, especially for nulliparous women, may improve outcomes.<sup>3</sup>

Other variables that appear to affect the success of

ECV, but which are not as predictive include the type of breech presentation, placental location, fetal spine position and amniotic fluid volume.<sup>10</sup> The fetus in the frank breech presentation generally has a higher failure rate, and less spontaneous version. It is thought that the legs, flexed at the hips and extended at the knees, act as a splint, preventing version.<sup>50</sup> The most consistent finding around placental location is that a posteriorly-located placenta is associated with a higher chance of success.<sup>10</sup> While severe oligohydramnios and polyhydramnios are generally regarded as contraindications to ECV, studies of predictors of ECV success that included amniotic fluid volume as a possible predictor support the notion that within normal ranges of amniotic fluid volume, increased fluid increases success.<sup>10</sup> The overall volume of amniotic fluid changes through pregnancy, reaching a maximum volume in the early third trimester, and declining thereafter.<sup>51</sup> The proportion of amniotic fluid to fetal size is the highest at 35-36 weeks, and it is postulated that ECV success rates may be increased at this gestation. Variables that were not found to be independent predictors of ECV success include fetal size and maternal weight.<sup>10</sup>

#### *Alternatives to ECV*

Providing information about the alternatives to an intervention is part of informed choice. In the case of breech presentation, not intervening and planning the mode of delivery depending on fetal presentation at the onset of labour is an option. Spontaneous version to cephalic presentation can occur up to the onset of labour. A large observational study demonstrates that although more than 50 percent of fetuses that present in the breech presentation at 32 weeks gestation will turn before birth, after 34 weeks the rate of spontaneous version falls dramatically, and when a fetus is breech at 37 weeks, the rate of spontaneous version is low: amongst parous women (one in four) and still lower amongst nulliparous women (one in 15).<sup>23,52</sup> An overview of the rate of breech presentation and the likelihood of spontaneous version by gestational age is presented in Table 2.<sup>1,23,52-55</sup>

#### **Maternal Posture**

Two commonly reported positions, the maternal knee-chest posture and the breech tilt position, were thought to encourage version by disengaging the breech from the pelvis and encouraging the abnormal presentation.<sup>56,57</sup> However, a Cochrane review of the randomised controlled trials on maternal posture for cephalic version of breech presentation showed no difference in cephalic version by posture compared with spontaneous version.<sup>58</sup> A common theme in the childbirth literature is that maternal postural techniques be recommended because they do not cause harm, however this perpetuates clinical practice based on anecdote and tradition rather than evidence.<sup>56,57</sup> At present there is no evidence to support the use of postural management for breech presentation.<sup>58</sup>

### **Moxibustion**

Traditional Chinese medicine proposes that moxibustion, a method of using heat generated by burning herbal preparations to stimulate acupuncture points, at acupoint BL 67 (beside the outer corner of the fifth toenail) promotes cephalic version of fetuses in breech presentation.<sup>59</sup> This technique is thought to work by stimulating the energy channel that links to the uterus, promoting fetal activity.<sup>60</sup> A Cochrane review found that moxibustion may be beneficial in reducing the need for ECV by about half [RR 0.47, 95% CI 0.33 0.66], and that well-designed trials are needed to provide further evidence for this intervention.<sup>61</sup>

### **Webster Technique**

The Webster Technique is a chiropractic adjustment of the sacrum that is intended to relieve the musculoskeletal causes of intrauterine constraint that may contribute to persistent breech presentation.<sup>62-64</sup> Despite the fact that the Webster Technique is commonly found on internet web pages dedicated to breech pregnancies, a search of the scientific literature in both medical and allied health databases reveals no studies or trials examining this technique. Research into the use of chiropractic adjustment to improve fetal presentation is needed prior to recommending this intervention.

### **Homeopathic Pulsatilla**

Homeopathic pulsatilla is recommended by homeopaths to effect version in women with abnormal presentation.<sup>60</sup> A small cohort study (n=26) suggests there may be some benefit when the remedy is given beginning at 34 weeks gestation<sup>65</sup> and further study should be undertaken.

### *Midwifery Care and ECV*

Breech presentation is often first diagnosed in the midwife's clinic, so midwives need to be prepared to provide a comprehensive range of options, both complementary and conventional. ECV is a skill that has been performed by midwives and is considered by some to be a skill easily acquired, especially by an obstetric care provider who is familiar with fetal surveillance and the abdominal palpation of pregnant women to determine fetal position.<sup>66</sup> A training program for midwives in the United Kingdom includes a computer-based training module, a written examination, practice sessions with a model abdomen, and supervised practice of 20 ECVs<sup>67</sup> (the plateau of the learning curve for the technique of ECV is thought to be around 20).<sup>68</sup> In an evaluation of one midwife's first 100 ECVs following this training program, the midwife had an overall success rate of 43%.<sup>67</sup> Initiating midwife-led ECVs in the hospital requires cooperation from other obstetrical team members including obstetric and anesthesia staff who will need to be aware of the procedure and the possibility of urgent caesarean section.

### *Conclusion*

As primary care providers, midwives play an essential role in diagnosing breech presentation, and informing women of their choices for management. ECV is a safe procedure and reduces the incidence of breech presentation at term. Pregnant women with a diagnosed breech presentation should be informed of the benefits and risks associated with ECV. With nearly all breech babies delivered by caesarean section, facilitating access to ECV is one way for midwives to improve women's chances of a vaginal delivery and decrease transfer of care.

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